CITY OF HANAHAN
INVITATION FOR BID

HANAHAN STEWARD STREET PARK

Solicitation No. COH #060523
Solicitation Date: June 6, 2023

Bid Closing Date: July 20, 2023 at 2:00 PM

City of Hanahan
Procurement Department
1255 Yeamans Hall Road
Hanahan, South Carolina 29410

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PROCUREMENT DEPARTMENT
1255 Yeamans Hall Road
Hanahan, S.C. 29410

INVITATION FOR BID
PROJECT OVERVIEW

BID TITLE: Hanahan Steward Street Park

BID NUMBER: COH #060523

BID SCHEDULE:

ISSUE INVITATION FOR BIDS	Tuesday, June 6, 2023	
PRE-BID CONFERENCE (MANDATORY)	Thursday, June 15, 2023	10:00 AM
LAST DAY FOR QUESTIONS AND SUBSTITUION REQUESTS	Monday, July 10, 2023	2:00 PM
ISSUE FINAL ADDENDUM	Thursday, July 13, 2023	2:00 PM
BID CLOSING DATE	**Thursday, July 20, 2023**	**2:00 PM**
BID REVIEW PERIOD	Tuesday, August 8, 2023	City Council
ISSUE "INTENT TO AWARD"	Tuesday, August 15, 2023	
CONTRACT EXECUTED	Tuesday, August 22, 2023	
ISSUE NOTICE TO PROCEED	Thursday, August 24, 2023	
CONSTRUCTION DURATION (270 calendar days)	Monday, May 20, 2024	

BID DOCUMENTS

Bid Documents and any amendments may be digitally downloaded via Vendor Registry available from the City of Hanahan Web Site:

https://cityofhanahan.com/administration/page/bids-rfps-rfqs

PRE-BID CONFERENCE (MANDATORY)

A Mandatory Pre-Bid Conference will be held on **Thursday, June 15, 2023 at 10:00 A.M. EST** at the offices of ADC Engineering, Inc. located at 1226-B Yeamans Hall Road, Hanahan SC 29410 in the Main Conference Room.

INDEPENDENT SITE VISIT (NON-MANDATORY)

For those Bidders who wish to conduct a site visit, the site will be unlocked and available from **11:00 A.M. until 2:00 P.M. on Thursday, June 15, 2023**. The project site is located at 5920 Steward Street, Hanahan SC 29410. This will be the only time available to view the site. The site will be locked and unavailable after this time period.

QUESTIONS / SUBSTITUTION REQUESTS

The last day and time for submittal of written questions and substitution requests shall be no later than **Monday, July 10, 2023 at 2:00 P.M EST**. All questions shall be submitted in the form of an email to ADC Engineering, Inc.

- Warren Pruitt at warrenp@adcengineering.com; and
- Maureen Coughlin at maureenc@adcengineering.com.

BID SUBMITTAL DEADLINE

Bids will be received until **Thursday, July 20, 2023 at 2:00 P.M. EST**, after which time they will be publicly read. Late bids will not be accepted. Bidders are invited to attend the opening of this bid at the time stated above.

BIDS SHALL BE DELIVERED TO:

City of Hanahan
c/o: ADC Engineering, Inc.
ATTN: Warren Pruitt, ASLA
1226-B Yeamans Hall Road, Hanahan, S.C. 29410

BID SECURITY, PERFORMANCE OR PAYMENT BONDS

All are required.

An official authorized to bind the Bidder must sign the bid proposal and it shall contain a statement to the effect that the proposal shall remain valid for a period of at least 90 calendar days from the closing date for submission of Bid. The bid submittal must be submitted in a sealed envelope showing the above Bid title, Bid number and closing date/time with Bidder's business name and address.

This Invitation for Bid (IFB) does not commit City of Hanahan to award a contract, to pay any cost incurred in the preparation of a bid proposal or to procure or contract for services. The City reserves the right to accept or reject any, all, or any part of Bids received as a result of this solicitation, to negotiate with all qualified Bidders, or to cancel in part or in its entirety this IFB if it is in the best interest of the City to do so. The City will be the sole judge as to whether offers submitted meet all requirements contained in this solicitation.

Once a bidder downloads a solicitation and proceeds to bid, it is each bidders responsibility to review all governing terms and conditions, submit complete and accurate bid responses in the proper format, and to periodically check the site for updates and/or addendums.

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SECTION 1 - GENERAL INFORMATION

You are invited to submit a BID in accordance with the requirements of this solicitation that are contained herein. It is requested that your proposal be submitted to the City of Hanahan – care of ADC Engineering, Inc. not later than **Thursday, July 20, 2023 at 2:00 P.M. EST (local time)**, at which time, respondent's Bids will be publicly opened. In the event of possible negotiation(s) with Bidders offers, prices may not be divulged at the time of an open announcement.

Bids will be considered as specified herein or attached hereto under the terms and conditions of this Invitation for Bids.

A Bid must be made in the official name of the firm or individual under which business is conducted (showing the official business address) and must be signed in blue ink by a person duly authorized to legally bind the person, partnership, company, or corporation submitting the proposal.

Bidders are to include all applicable requested information and are encouraged to include any additional information they wish to be considered. Additional information shall be a separate section of the proposal and shall be identified as such.

Three (3) clearly identified originals of your bid are required. The proposal must be complete, clear and concise. Bids presented on digital media (disk, flash drive, etc.) will not be accepted.

Bids must be submitted prior to, or at the time, date and exact location specified to be considered. No late Bids will be accepted. Oral, USPS mail, emailed, uploaded to City's website, telegraphic, facsimile or other electronically transmitted bids will not be considered.

BIDS SHALL BE DELIVERED TO:

City of Hanahan
c/o: ADC Engineering, Inc.
ATTN: Warren Pruitt, ASLA
1226-B Yeamans Hall Road, Hanahan, S.C. 29410

All copies of the Bid, the bid security, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name and number, the Bidder's name and address and the Bid closing date and time. If the Bid is sent by a delivery services, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids. ***City of Hanahan shall not be responsible for unidentified Bids***. Failure to do so can result in a non-responsive bid.

Bids may be withdrawn by Bidder prior to, but not after, the time set for the closing. An email request is acceptable provided it is received before the closing date and time.

All entries shall be entered in ink or type written and shall remain valid for a period of not less than 90 calendar days. Mistakes may be crossed-out and corrections inserted adjacent thereto, and shall be initialed, in ink, by the person signing the proposal.

Offers, amendments thereto or withdrawal requests must be received by the time advertised for BID closing date and time to be timely filed. It is the Bidder's sole responsibility to ensure that the documents are received by the person (or office) at the time indicated in the solicitation document.

By submission of an offer, you are guaranteeing that all goods, workmanship and services meet the requirements of the solicitation during the contract period.

City of Hanahan **reserves** the right:

- To accept or reject any or all Bids received as a result of this solicitation, or to cancel in part or in its entirety this solicitation if it is in the best interest of the City to do so;
- To waive any or all informalities;
- To solicit additional information from the Bidders, or any one Bidder should City of Hanahan deem such information necessary;
- To consider modifications received at any time before the award is made, if such action is in the best interest of the City; and
- To negotiate contract terms, conditions and cost.

This contract will be awarded to the Bidder whose bid/proposal is within the competitive range and determined to be in the best interest of City of Hanahan.

The words "Bidder", "Contractor", "Vendor", "Consultant", "Proposer", "Offeror" are used interchangeably throughout this Solicitation to define the companies submitting offers, and replace terms such as person(s), firm(s), or corporation(s).

The Bidder is responsible for clarifying any ambiguity, conflict, discrepancy; omission or other error in the IFB, or it shall be deemed waived.

Failure to submit all required information may be determined as a non-responsive Bid.

This IFB does not commit City of Hanahan to award a contract, to pay any cost incurred in the preparation of a proposal or to procure or contract for the articles of goods or services.

ADDENDA: If it becomes necessary to revise any part of this IFB, an addendum will be issued and made available via Vendor Registry available from the City of Hanahan Web Site. All addenda become part of the IFB and are contractually binding **whether or not received by the Bidder**.

SECTION 2 - TERMS AND CONDITIONS

PROJECT TIME OF COMPLETION

Time of completion for this project shall be beginning upon execution of the Contract and issuance of a Notice to Proceed. Contract duration is **270 calendar days**.

TIME FOR CONTRACTOR'S PERFORMANCE / DELAYS

The Contractor shall commence the performance of this Contract on the date set forth in the Notice to Proceed, issued by the Contracts and Procurement Director, and shall diligently continue its performance to and until Final Completion of the Project. The Contractor shall accomplish Substantial Completion of the Project no more than **270 calendar days** following the issuance of a Notice to Proceed (sometimes hereinafter referred to as the "Contract Time"). By signing this Contract, the Contractor agrees that the Contract Time is a reasonable time for accomplishing Substantial Completion of the Project. There will be no monetary early completion incentive. The Contractor shall submit its initial progress schedule in accordance with the Contract Documents.

The Parties agree it is impossible to determine the actual and consequential damages resulting from Contractor's delay in completion of the Work, so a liquidated damages provision is appropriate. The Parties intend for a sum certain of **$1,000.00 per day** for each and every calendar day the completion of the Work is delayed beyond the calendar date in this Contract to be the predetermined measure of compensation for actual damages for a delay in completion of the Work. The Contractor agrees that if the Work, or any part thereof, is not completed within the time agreed upon in this Contract or any extension thereof, the Contractor or its sureties shall be liable to the Owner in the amount of $1,000.00 per day for each and every calendar day the completion of the Work is delayed beyond the calendar date in this Contract, as fixed and agreed liquidated damages and not as a penalty; and the Owner shall have the right to deduct from and retain out of monies which may be then due or which may become due and payable to the Contractor, the amount of such liquidated damages; and if the amount so retained by the Owner is not sufficient to pay in full such liquidated damages, the Contractor shall pay to the Owner or its sureties the amount necessary to effect payment in full of such liquidated damages.

Liquidated Damages will not be assessed for any adjustment of the Contract Time for completion of the Work granted in accordance with the provisions of this Contract.

Permitting the Contractor to continue and finish the Work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, will in no way be deemed a waiver on the part of the Owner of any of its rights under this Contract.

Additional provisions concerning the Contractor's liability in certain specific events or circumstances are set forth throughout the Scope of Work. By signing this Contract, the Contractor expressly agrees to the terms thereof.

If the Contractor fails to achieve Final Completion of all punch list items within 30 calendar days of the date of Substantial Completion, the Owner reserves the right to contract with other parties to complete the Work, or to use other forces, utilizing funds retained or collected under this Contract.

In addition to other remedies of the Owner, actual damages may be withheld or collected for failure to meet the date for Final Completion, as set forth above.

Partial use or occupancy of the Project shall not result in the Project being deemed substantially complete, and such partial use or occupancy shall not be evidence of Substantial Completion.

All limitations of time set forth herein are material and are of the essence of this Contract.

The Contractor agrees to punctually and diligently perform all parts of the Work at the time scheduled. In this connection, the Contractor agrees that it will keep itself continually informed of the progress of the job and will, upon its own initiative, confer with the Owner so as to plan its work in coordinated sequence with the work of the Owner and of others and so as to be able to expeditiously undertake and perform its work at the time most beneficial to the entire Project. The Contractor will be liable for any loss, costs, or damages sustained by the Owner for delays in performing the Work hereunder, other than for excusable delays, as set forth below, for which the Contractor may be granted a reasonable extension of time.

If the Contractor is delayed at any time in the progress of the Work by any separate contractor employed by the Owner, or by changes in the Work, or by labor disputes, fire, unusual delay in transportation, unusually severe weather conditions, unavoidable casualties, delays specifically authorized by the Owner, or by causes beyond the Contractor's control, avoidance, or mitigation, and without the fault or negligence of the Contractor and/or subcontractor or supplier at any tier, then the Contract Time shall be extended by Change Order for such reasonable time, if any, as the Owner may determine that such event has delayed the progress of the Work, or overall completion of the Work if the Contractor complies with the notice and documentation requirements set forth below.

If the Contractor is delayed, obstructed, hindered or interrupted for a period of time exceeding 7 calendar days by any act or neglect of the Owner, an adjustment shall be made for any increase in the direct cost of performance of this Contract (excluding profit, extended home office overhead, incidental or consequential damages or disruption damages) and the Contract modified in writing accordingly. The Contractor must assert its right under this Article by giving written notice to the Architect/Engineer within 10 calendar days of the beginning of a delay, obstruction, hindrance or interruption by the Owner.

No adjustment shall be made for any delay, obstruction, hindrance or interruption after Final Payment under this Contract or to the extent that performance would have been so delayed, obstructed, hindered or interrupted by any other cause, including, but not limited to concurrent cause or fault or negligence of the Contractor, or for which an equitable adjustment is provided for or excluded under any other term or condition of this Contract. The direct costs described above shall be limited to those direct costs attributable solely to this Project, and shall be subject to documentation and verification of costs as required by the Owner. If unit prices are established in the Contract Documents or subsequently agreed upon, they shall form the basis for cost calculations under any claims for delay.

Any claim for extension of time shall be made in writing to the Owner, not more than 10 business days from the beginning of the delay. The notice shall indicate the cause of delay upon the progress of Work. If the cause of the delay is continuing, the Contractor must give such written notice every Ten (10) Business Days. Within 10 business days after the elimination of any such delay, the Contractor shall submit further documentation of the delay and a formal Change Order request for an extension of time for such delay.

The written request for a time extension shall state the cause of the delay, the number of calendar days extension requested, and such analysis and other documentation as is reasonably requested by the Owner to demonstrate a delay in the progress of the Work or the overall Project completion. If the Contractor does not comply with the above notice and documentation requirements, the claim for the delay shall be waived by the Contractor. The above notice and documentation requirements shall also be a condition precedent to the Contractor's entitlement to any extension of time.

Extensions of time will be the Contractor's primary remedy for any and all delays, obstructions, hindrances, or interference. Payment or compensation, for direct costs only (as set forth above), may be made to the Contractor for hindrances or delays solely caused by the Owner if such delays or hindrances are within the Owner's ability to control and are not partially caused by the Contractor or any of its agents, subcontractors or others for whom it is responsible. No payment or compensation will be made for interference, obstructions, hindrances or delays which are not solely caused by the Owner or which arise from the Owner's actions.

Without limitation, the Owner's exercise of its rights, regardless of the extent or number of such changes, or the Owner's exercise of any of its remedies or any requirement to correct or re-execute defective work, shall not under any circumstances be construed as delays, hindrances or interference compensable further than as described herein.

Weather delays are generally referred to as "rain days." Time for hot, cold, and/or windy conditions have been allowed for in the allocated date of completion. An average number of rain days has also been included in the completion date determination. This was determined by the following method: all calendar days in each month in which rainfall in any part of the day exceeded 0.10 inch has been calculated and averaged. These averages are as follows:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
9	10	8	8	9	9	14	16	11	16	7	12

Rain delays, therefore, will only be considered when the number of calendar days in any month in which rainfall, as recorded by the Charleston National Weather Service at the Charleston International Airport location, as 0.10 inch or greater, exceeds the number of calendar days shown. In considering a claim for rain days, the actual conditions at the Work Site shall control. Notwithstanding the requirements pertaining to the filing of claims herein, the Contractor shall make a claim for a time extension due to rain delays no later than the tenth (10th) calendar day of the month following the release of the National Oceanic and Atmospheric Administration (NOAA) monthly report.

CONTRACTOR LICENSE REQUIREMENT

The Contractor shall procure all permits and licenses and pay all charges and fees necessary and incidental to the lawful conduct of his business. He shall keep himself fully informed of existing and future Federal, State, and Local Laws, ordinances and regulations which in any manner affect the fulfillment of his contract and shall comply with the same.

INSURANCE

The successful bidder shall procure, maintain, and provide proof of, insurance coverage for injuries to persons and/or property damage as may arise from or in conjunction with, the work performed on behalf of the City by the bidder, his agents, representatives, employees or subcontractors. Proof of coverage as contained herein shall be submitted 10 calendar days prior to the commencement of work and such coverage shall be maintained by the bidder for the duration of the contract period; for occurrence policies.

General Liability

Coverage shall be as broad as: Comprehensive General Liability endorsed to include Broad Form, Commercial General Liability form including Products/Completed Operations.

Minimum Limits:

$1,000,000	General Aggregate Limit
$1,000,000	Products & Completed Operations
$1,000,000	Personal and Advertising Injury
$1,000,000	Each Occurrence Limit
$50,000	Fire Damage Limit
$5,000	Medical Expense Limit

Automobile Liability

Coverage sufficient to cover all vehicles owned, used, or hired by the bidder, his agents, representatives, employees or subcontractors.

Minimum Limits:

$1,000,000	Combined Single Limit
$1,000,000	Each Occurrence Limit
$5,000	Medical Expense Limit

Workers' Compensation

Limits as required by the Workers' Compensation Act of SC. Employers Liability - $1,000,000.

Professional Liability

Minimum limits are $1,000,000 per occurrence.

Coverage Provisions

1. All deductibles or self-insured retention shall appear on the certificate(s) and shall appear on the certificate(s) and be subject to approval by the City. At the option of the City, either; the insurer shall reduce or eliminate such deductible or self-insured retention; or the bidder shall be required to procure a bond guaranteeing payment of losses and related claims expenses.
2. Failure to comply with any reporting provisions of the policy(s) shall not affect coverage provided by the City, its officers/officials/assigns/employees or volunteers.
3. The insurer shall agree to waive all rights of subrogation against the City, its' officers/officials/assigns/agents, employees or volunteers for any act, omission or condition of premises which the parties may be held liable by reason of negligence.
4. The bidder shall furnish the City certificates of insurance including endorsement affecting coverage. The certificates are to be signed by a person authorized by the insurance company(s) to bind coverage on its' behalf, if executed by a broker, notarized copy of authorization to bind, or certify coverage must be attached**.**
5. The City of Hanahan, its' officers/officials, employees, agents and volunteers shall be added as "additional insured" as their interests may appear. This provision does not apply to Professional Liability or Workers' Compensation/Employers Liability.
6. The Offeror's insurance shall be primary over any applicable insurance or self-insurance maintained by the City.
7. Shall provide 30 calendar days written notice to the City before any cancellation, suspension, or void of coverage in whole or part, where such provision is reasonable.
8. All coverage for subcontractors of the bidder shall be subject to all of the requirements stated herein.
9. All insurance shall be placed with insurers maintaining A.M. Best rating of no less than an A.

QUALITY ESTIMATES

City of Hanahan does not guarantee to purchase any amount under the contract to be awarded. Estimated quantities are for the purposes of submitting proposals only and are not to be construed as a guarantee to purchase any amount.

SPECIFICATIONS

Any deviation from specifications ***must*** be clearly indicated by offeror, otherwise, it will be considered that the bid proposal is in strict noncompliance. Product substitutions will be considered on other makes, models or brands having comparable quality, style, workmanship and performance characteristics. All product substitution requests shall be submitted in writing prior to the posted deadline for consideration. Alternate bid proposals offering lower quality or inferior performance will not be considered.

ACCEPTANCE OR REJECTION OF PROPOSALS

The City of Hanahan reserves the right to accept or reject any or all proposals or parts of proposals, and to waive informalities therein.

TAXES

Proposal prices shall be exclusive of state sales and federal excise taxes. **Where the state or city government entities are not exempt from sales taxes on sales within their state**, the Contractor shall add the sales taxes on the billing invoice as a separate entry. **The City of Hanahan is not tax exempt.**

MODIFICATION OR WITHDRAWAL OF PROPOSALS

Proposals may be modified or withdrawn prior to the time set for the opening of proposals. After the time set for the opening of proposals no proposal may be modified or withdrawn, unless done in response to a request for a "Best and Final Offer" from the City of Hanahan.

PATENTS, COPYRIGHTS, ETC.

The Contractor shall release, indemnify and hold the City, its officers, agents and employees harmless from liability of any kind or nature, including the Contractor's use of any copyrighted or uncopyrighted composition, secret process, patented or unpatented invention, article or appliance furnished or used in the performance of this contract.

SECURITY REQUIRED

A. Bid Security

Each bid must be accompanied by a bid bond acceptable to the City. Bid bonds must be issued by a corporate surety registered and authorized to do business in the State of South Carolina. Bid bonds shall be payable to the City, shall be for at least five percent (5%) of the total amount of the bid, and shall serve as a guaranteed deposit that the bid will be carried out to the complete satisfaction of the City. In lieu of a bond, Bidder may submit a certified check or cashier's check in aforesaid amount payable in U.S. funds. Faxed bid bonds will not be acceptable.

B. Forfeiture of Bid Security

Nonperformance by the successful Bidder, or its failure to execute the Contract and meet performance and payment bond requirements and insurance requirements within 5 business days after issuance of Notice of Award, shall result in its bid security being forfeited as liquidated damages, and the Notice of Award and Contract will be rescinded and awarded to another Bidder. Withdrawal of a bid after the opening date and time but prior to final award after the opening date, may also result in forfeiture of bid security.

C. Return of Bid Security

Bid security will be returned to all bidders after the successful Bidder has executed the Contract and delivered all required bonds and insurance certificates and endorsements. Bidders will not be entitled to any interest earnings on returned funds, and in the case of bid security by check, such will be returned to bidder.

D. Payment and Performance Security

(1) The successful Bidder shall provide performance and payment bonds, in a form satisfactory to the City, in the following amounts:

Payment Bond: 100% of the total amount of the Contract.

Performance Bond: 100% of the total amount of the Contract.

(2) The aforesaid payment and performance bonds must be issued by a corporate surety, registered and authorized to do business in South Carolina, and must be counter-signed by a licensed, authorized South Carolina agent.

(3) Attorneys-in-fact who sign bid bonds or performance bonds must file with each bond a certified and effective, dated copy of their power of attorney.

AWARD

The City of Hanahan ***may* award multiple contracts** as the result of this solicitation. Awards shall be made to the responsible offeror(s) whose bid proposal is determined to be the most advantageous to the City of Hanahan, taking into consideration price and the other evaluation factors that may be set forth in this solicitation.

NON-COLLUSION

By signing the proposal/bid the offeror certifies that the proposal submitted, has been arrived at independently and has been submitted without collusion with, and without any agreement, understanding or planned common course of action with, any other vendor of materials, supplies, equipment or services described in the Invitation for Bid, designed to limit independent bidding or competition. (**See Attached Statement of Non-Collusion)**.

CONTRACTOR PERSONNEL

The Contractor shall enforce strict discipline and good order among the contractor's employees and other persons carrying out the contract. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them.

ETHICS CERTIFICATE

By submitting an offer, the offeror certifies that the offeror has and will comply with, and has not, and will not, induce a person to violate **Title 8, Chapter 13** of the South Carolina Code of Laws, as amended (ethics act). The following statutes require special attention: **Section 8-13-700**, regarding use of official position for financial gain; **Section 8-13-705**, regarding gifts to influence action of public official; **Section 8-13-720**, regarding offering money for advice or assistance of public official; Sections **8-13-755** and **8- 13-760**, regarding restrictions on employment by former public official; **Section 8-13-775**, prohibiting public official with economic interests from acting on contracts; **Section 8-13-790**, regarding recovery of kickbacks; **Section 8-13-1150**, regarding statements to be filed by consultants; and **Section 8-13- 1342**, regarding restrictions on contributions by Contractor to candidate who participated in awarding of contract.

The City may rescind any contract and recover all amounts expended as a result of any action taken in violation of this provision. If Contractor participates, directly or indirectly, in the evaluation or award of public contracts, including without limitation, change orders or task orders regarding a public contract, Contractor shall, if required by law to file such a statement, provide the statement required by **Section 8- 13-1150** to the procurement officer at the same time the law requires the statement to be filed. {**02- 2A075-2}**

CANCELLATION

The City may cancel its participation upon 30 calendar days written notice, unless otherwise limited or stated in the terms and conditions of this solicitation. Cancellation may be in whole or in part. Any cancellation under this provision shall not affect the rights and obligations attending orders outstanding at the time of cancellation, including any right of and Purchasing Entity to indemnification by the contractor, rights of payment for goods/services delivered and accepted, and rights attending any warranty or default in performance in association with any order. Cancellation of the contract due to Contractor default may be immediate.

DEFAULT AND REMEDIES

Any of the following events shall constitute cause for the City of Hanahan to declare Contractor in default of the contract: 1. **Nonperformance of contractual requirements**; 2. **A material breach of any term or condition of this contract** the City of Hanahan shall issue a written notice of default providing a period in which Contractor shall have an opportunity to cure. Time allowed for cure shall not diminish or eliminate contractor's liability for liquidated or other damages. If the default remains, after Contractor has been provided the opportunity to cure, the City of Hanahan may do one or more of the following: **1. Exercise any remedy provided by law; 2. Terminate this contract and any related contracts or portions thereof; 3. Impose liquidated damages; 4. Suspend Contractor from receiving future proposal solicitations.**

LAWS AND REGULATIONS

Any and all supplies, services and equipment offered and furnished shall comply fully with all applicable Federal, State and City laws and regulations.

CONFLICT OF TERMS

In the event of any conflict between these standard terms and conditions and any special terms and conditions which follow; the special terms and conditions shall govern.

HOLD HARMLESS

The Contractor shall release, protect, indemnify and hold the City of Hanahan and their respective, officers, agencies, employees, harmless from and against any damage, cost or liability, including reasonable attorney's fees for any or all injuries to persons, property or claims for money damages arising from acts or omissions of the contractor, his employees or subcontractors or volunteers.

RISK OF LOSS

Contractor agrees to bear all risks of loss, injury or destruction of goods and materials ordered herein which occur prior to delivery and acceptance; and such loss, injury or destruction shall not release Contractor from any obligation hereunder.

JURISDICTION

Contractor acknowledges that it is subject to the jurisdiction and process of the City of Hanahan as to all matters and disputes arising pursuant to the Agreement and the performance thereof, including any questions as to liability for taxes, licenses, or fees levied by the State or its political subdivisions. Contractor agrees to execute any and all agreements necessary to accomplish this provision.

AMENDMENTS

The terms of this contract shall not be waived, altered, modified, supplemented or amended in any manner whatsoever without prior written approval of the designated City of Hanahan contract administrator.

ASSIGNMENT/SUBCONTRACT

Contractor shall not assign, sell, transfer, subcontract or sublet rights, or delegate responsibilities under this contract, in whole or in part, **without the prior written approval** of the City of Hanahan designated contract administrator.

NOTE: If Contractor intends to hire subcontractors, they must be listed by the Contractor in the bid documents.

NONDISCRIMINATION

The offeror agrees to abide by the provisions of Title VI and Title VII of the Civil Rights Act of 1964 (42 USC 2000e), which prohibit discrimination against any employee or applicant for employment, or any applicant or recipient of services, on the basis of race, religion, color, or national origin; and further agrees to abide by Executive Order No. 11246, as amended, which prohibits discrimination on basis of sex; 45 CFR 90 which prohibits discrimination on the basis of age, and **Section 504 of the Rehabilitation Act of 1973**, or the **Americans with Disabilities Act of 1990** which prohibits discrimination on the basis of disabilities. The offeror further agrees to furnish information and reports to requesting State(s), upon request, for the purpose of determining compliance with these statutes. Offeror agrees to comply with each individual state's certification requirements, if any, as stated in the special terms and conditions. This contract may be canceled if the offeror fails to comply with the provisions of these laws and regulations. The offeror must include this provision in every subcontract relating to purchases by the States to ensure that subcontractors and vendors are bound by this provision.

ILLEGAL IMMIGRATION REFORM ACT COMPLIANCE

By submitting an offer, Bidder certifies that it will comply with the applicable requirements of **Title 8, Chapter 14** of the South Carolina code of Laws (originally enacted as **Section 3** of The South Carolina Illegal Immigration act, 2008 S.C. Act No. 280) and agrees to provide upon request any documentation required to establish either: (a) the applicability of **Title 8, Chapter 14** to Bidder and any subcontractor or sub-subcontractors; or (b) the compliance with **Title 8, Chapter 14** by Bidder and any subcontractors or sub-subcontractors. Pursuant to **Section 8-14-60**, "A person who knowingly makes or files any false, fictitious, or fraudulent document, statement, or report pursuant to this chapter is guilty of a felony and, upon conviction, must be fined within the discretion of the court or imprisoned for not more than five years, or both". Bidder agrees to include in any contracts with its subcontractors' language requiring the subcontractors to (a) comply with the applicable requirements of **Title 8, Chapter 14**, and (b) include in any contracts with the sub- subcontractor's

language requiring the sub-subcontract to comply with the applicable requirements of **Title 8, Chapter 14**. In the event any contractor, subcontractor and/or sub-subcontractor is found not to be in compliance with the **SC Immigration Reform Act (hereinafter "The Act")**, the Contractor agrees to fully indemnify the City for any loss suffered by the City as a result of such contractor, subcontractor or sub-subcontractor's failure to comply with the Act.

FEDERAL, STATE AND LOCAL LAWS

The Contractor assumes full responsibility and liability for compliance with any and all local, state and federal laws and regulations applicable to Contractor and his employees including, but not limited to, compliance with the EEO guidelines, the **Occupational Safety and Health Act of 1970**, and minimum wage guidelines.

SEVERABILITY

If any provision of this contract is declared by a court to be illegal or in conflict with any law, the validity of the remaining terms and provisions shall not be affected; and the rights and obligations of the parties shall be construed and enforced as if the contract did not contain the particular provision held to be invalid.

PAYMENT

Within five (5) days after the Notice to Proceed is issued to the successful bidder, the successful bidder shall deliver to the City a preliminary progress schedule indicating the times (number of days or dates) for starting and completing the various stages of the work, including any milestones for the project and values for the milestones. This schedule can be used to serve as the basis for progress payments during performance of the work. The successful bidder shall invoice the City upon completion and approval of described work in the initial approved payment application schedule. Typically, payment is made within thirty (30) days of an approved pay application.

FORCE MAJEURE

Neither party to this contract shall be held responsible for delay or default caused by fire, riot, pandemic(s), acts of God and/or war which is beyond that party's reasonable control. CITY OF HANAHAN may terminate this contract after determining such delay or default will reasonably prevent successful performance of the contract.

HAZARDOUS CHEMICAL INFORMATION

The Contractor will provide one set of the appropriate material safety data sheet(s) and container label(s) upon delivery of a hazardous material to the user agency. All safety data sheets and labels will be in accordance with each participating state's requirements, if applicable**.**

FIRM PRICE

Unless otherwise stated in the special terms and conditions, for the purpose of award, offers made in accordance with this solicitation must be good and firm for a period of 90 calendar days from the date of proposal opening. **Prices must remain firm for the full term of the contract.**

EXTENSION OF PRICES

In the case of error in the extension of prices in the proposal, the unit prices will govern.

BID PROPOSAL PREPARATION COSTS

The City of Hanahan is not liable for any costs incurred by the offeror in bid proposal preparation.

CONFLICT OF INTEREST

The Contractor certifies that it has not offered or given any gift or compensation prohibited by the state laws of any the City of Hanahan participants to any officer or employee of the City of Hanahan to secure favorable treatment with respect to being awarded this contract.

CONTRACTOR LIABILITY

The Contractor assumes full responsibility for all injuries to, or death of any person and for all damage to property, including property and employees of the City and for all claims, losses or expense which may in any way arise out of the performance of the work, whether caused by negligence or otherwise; and the Contractor shall indemnify and save the City harmless from all claims, losses, expense, or suits for any such injuries, death or damages to property, and from all liens, losses, expenses, claims or causes of action of any sort which may arise out of the performance of the work, and shall defend, on behalf of the City and suit brought against the City for attorney's fees and for all other expenses incurred by the City in connection with or as a result of any such suit, claims, or loss. Under no circumstances and with no exception will City of Hanahan act as arbitrator between the Contractor and any subcontractor. The Contractor will be solely responsible for compliance with building code requirements, all dimensions, and all conditions relating to his work under this contract. Workmanship shall be first quality in every respect. All measures necessary to ensure a first-class job shall be taken.

INDEPENDENT CONTRACTOR

The Contractor shall be an independent contractor, and as such shall have no authorization, express or implied to bind the City of Hanahan to any agreements, settlements, liability or understanding whatsoever, and agrees not to perform any acts as agent for City of Hanahan, except as expressly set forth herein.

DEBARMENT

The Contractor certifies that neither it nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction (contract) by any governmental department or agency. If the Contractor cannot certify this statement, attach a written explanation for review by City of Hanahan.

GOVERNING LAW

This procurement and the resulting agreement shall be governed by and construed in accordance with the laws of the city and state sponsoring and administering the procurement. The construction and effect of any Participating Addendum or order against the contract(s) shall be governed by and construed in accordance with the laws of the Participating Entity's City and State. Venue for any claim, dispute or action concerning an order placed against the contract(s) or the effect of a Participating Addendum shall be in the Purchasing Entity 's City and State.

ENTIRE AGREEMENT:

This Agreement, and any attached exhibits hereto, and the solicitation documents, if any, constitute the entire Agreement between the parties and shall not be amended, altered or changed except after prior written approval from the City of Hanahan Procurement Office, in compliance with the S.C. Consolidated Procurement Code, and by written agreement, signed by the parties.

Accepted and executed the date stated above.

CONTRACTOR/VENDOR/OFFEROR:

BY: _____

ITS: _____

CITY:

BY: _____

ITS: _____

SECTION 3 – REQUIREMENTS–SCOPE OF WORK

SCOPE OF WORK

The City of Hanahan plans to develop a new park on a 4.9 acre site at the end of Steward Street in Hanahan, S.C. The project site is comprised of two parcels owned by the City of Hanahan

The site was formerly a wastewater treatment facility that was closed over 20 years ago. A sewer pump station (TMS 265-08-04-045) consisting of 0.275 acres within the Berkeley County Water and Sewer (BCWS) system is still located on the property.

Site improvements will include: the demolition of the existing pumphouse and operations building and removal of asphalt pavement and concrete slabs. The project includes a new restroom building, renovation of the existing storage shed into a park pavilion, a wood boardwalk, a new covered fishing pier and a floating kayak launch. The site infrastructure will include vehicle parking, food truck service, pedestrian walks and plaza and stormwater, site utilities and associated park features.

There are wetlands on the site as verified by the Preliminary Jurisdictional Determination (PJD) letter dated November 12, 2021 (SAC-2021-01601). The project proposes to build boardwalks and docks over the wetlands, as well as clean up the outfalls around the existing pipes exiting the sites on the north and west sides of the property. No wetlands will be filled as part of this project.

SCDHEC Navigable Water and USACE Dock permits have been obtained. Activities include the construction of a fixed pier head with roof, a gangway leading to a floating kayak launch dock, a fixed fishing pier and a fixed pier from the pier head to the fishing pier. In addition, a walkway leads from the uplands to the structure and three elevated boardwalks will be constructed.

ALLOWANCES

There are no allowances associated with this project.

ALTERNATES

The following Alternatives are included as described below and set forth on the Bid Form. Refer to Section 012300 – Alternatives.

Alternate No. 1:	Trex Decking. Replace wood deck on boardwalk and dock with Trex Decking, or approved equal.
Alternate No. 2:	Pavilion Fireplace. Add masonry fireplace at pavilion.
Alternate No. 3:	Kayak Launch and Ramp.
Alternate No. 4:	Additional Site Furnishings. Inclusive of table and chair sets, rocking chairs, picnic tables, benches and trash containers. Base Bid includes bicycle racks and bollards.
Alternate No. 5:	Flagpole – 30 foot, illuminated.
Alternate No. 6:	Wood Fence. Add approximately 552.5 feet of 8 foot wood fence.

UNIT PRICES

The following Unit Prices are included as described below and set forth on the Bid Form. Refer to Section 012200 – Unit Prices.

Unit Price No. 1: Earth Moving - Removal of unsuitable materials and replacement with controlled fill. Base Bid includes 1,500 CY for removal of unsuitable materials and replacement with controlled fill.

Unit Price No. 2: Storm Drainage Utilities - Removal of unsuitable materials and replacement with granular bedding. Base Bid includes 50 CY for removal of unsuitable materials and replacement with granular bedding.

OWNER-FURNISHED/OWNER-INSTALLED (OFOI) PRODUCTS

There are no OFOI products associated with this project.

ADDITIONAL INFORMATION

Please include any detailed explanation of services offered, as they relate to the City Requirements provided herein, and your recommended approach to addressing the City needs.

LICENSE AND PERMITS

The Contractor must be bonded and obtain all applicable licenses, and promptly pay all taxes required by the State of South Carolina, Berkeley County and/or the City of Hanahan. Contractor is required to be licensed as a General Contractor by the State of South Carolina and shall supply a copy of all licensing.

TRANSMITTAL LETTER

The transmittal letter and attachments must include:

- Name of the firm responding, including mailing address, telephone number, fax number and email address.
- A statement that the offer submitted as a result of this solicitation is binding on the Bidder for 90 calendar days following the Bid due date.
- Signed by authorized person
- Contractor's Licenses and Certificates held by you and/or your company and subcontractors.
- Executed/Signed Terms and Conditions
- Proposal Transmittal Agreement
- Price Proposal - **Cost Sheet must be in a separate envelope.**
- Bid Security
- Construction Schedule
- Subcontractor's List
- Statement of Non-Collusion
- Compliance with Illegal Immigration Act
- Equal Employment Opportunity Certification
- Debarment Form

SECTION 4 – BID TRANSMITTAL AND AGREEMENT

The undersigned, having fully familiarized themselves with the information contained within this Invitation for Bids, (including the General Information, Terms and Conditions, General Conditions, Special Conditions (if applicable), Requirements, Bid Sheets, Affidavits of Bidder, and subsequently received written Amendment as listed below), submit the attached Bid.

I verify, to the best of my knowledge and belief, this Bid to be true and correct. All requirements of the Invitation for Bids are hereby incorporated into the Bid/proposal submitted and shall be incorporated by reference into the Purchase Contract or Agreement.

Respectfully submitted by: _____
(FIRM NAME)

Signature: _____

Representative Name: _____

Title: _____

Address: _____

City, State, Zip: _____

Date: _____

Telephone No: _____

Email: _____

ATTACHMENT #1 – PRICE PROPOSAL

"HANAHAN STEWARD STREET PARK"

Please provide sufficient detail to show all cost.
(Detail cost must be submitted in a separate sheet and envelope and attached with this Section Sheet).

Note: The SOW is not a comprehensive list of all Work Materials or Labor that will be required. Contractor must visit site to ascertain materials and scope of work that may be in addition to what is listed in this Invitation to Bid. Refer to Exhibits A and B attached and incorporated into this solicitation.

The undersigned acknowledges receipt of addenda numbered:

Addendum No. _____ Date: _____

Addendum No. _____ Date: _____

Addendum No. _____ Date: _____

The undersigned has examined the complete IFB and requirements contained in the solicitation for Construction of the **HANAHAN STEWARD STREET PARK** and is submitting this Bid in full compliance with those requirements.

_____
Company Name

_____
Representative/Title

_____
Signature of Authorized Representative

_____
Date

"HANAHAN STEWARD STREET PARK"

BASE BID:

$_____

_____Dollars
(Written)

ALTERNATES:

The undersigned Bidder proposes the amount below be added to the Base Bid if particular alternates are accepted by Owner. Amounts listed for each alternate include costs of related coordination, modification, or adjustment.

Alternate No. 1: Trex Decking. $_____
_____ Dollars

Alternate No. 2: Pavilion Fireplace. $_____
_____ Dollars

Alternate No. 3: Kayak Launch and Ramp. $_____
_____ Dollars

Alternate No. 4: Additional Site Furnishings. $_____
_____ Dollars

Alternate No. 5: Flagpole – 30 foot, illuminated. $_____
_____ Dollars

Alternate No. 6: Wood Fence. $_____
_____ Dollars

UNIT PRICES:

The undersigned Bidder proposes the amounts below be added to or deducted from the Contract Sum on performance and measurement of the individual items of Work and for adjustment of the quantity given in the Unit-Price for the actual measurement of individual items of the Work.

Unit Price No. 1: Earth Moving - Removal of unsuitable materials and replacement with controlled fill. Base Bid includes 1,500 CY for removal of unsuitable materials and replacement with controlled fill.

$_____per CY

_____Dollars/CY
(Written)

Unit Price No. 2: Storm Drainage Utilities - Removal of unsuitable materials and replacement with granular bedding. Base Bid includes 50 CY for removal of unsuitable materials and replacement with granular bedding.

$_____per CY)

_____Dollars/CY
(Written)

BID PROPOSAL SUMMARY WORKSHEET:

Attached to be included with Bid Form

DOCUMENT EXCHANGE:

The successful Bidder shall include in their Base Bid the cost for a Submittal Exchange online software program for all submittals, RFIs, ASIs, construction schedules, and other documentation throughout the duration of construction.

BID SECURITY:

Amount Enclosed (5% of Bid) $_____ (Bid Bond or Cashier's Check)

BUSINESS LICENSE:

Does your business have a valid City of Hanahan Business License? ☐ No ☐ Yes #_____

Note: Work performed inside the corporate limits of a municipality will necessitate a business license for that municipality.

CITY OF HANAHAN INVITATION FOR BID
HANAHAN STEWARD STREET PARK

Please submit three (3) originals of the solicitation's "Procurement Forms" with the Bid. Bids presented on digital media (disk, flash drive, etc.) will not be accepted.

Respectfully submitted this_____day of _____, 2023.

Company Name: _____

By: _____ _____
Signature Print Name

Title: _____ (e.g. Owner, Partner, Corporate Officer, etc.)

Mailing Address: _____

City: _____ **State:** _____ **Zip:** _____

Remittance Address: _____

City: _____ **State:** _____ **Zip:** _____

Telephone: _____ **Fax:** _____ **FEIN:** _____

Email Address: _____

Vendor / Bidder is a: ☐ Sole Proprietorship ☐ Partnership ☐ LLC ☐ Corporation
List the state of incorporation _____

SC Contractor's License No. _____

Contractor's Federal Tax I.D. No. _____

ATTACHMENT #2 - NONCOLLUSION AFFIDAVIT OF BIDDER

(1) _____ (*owner, partner, officer, representative or agent*) of _____ (*company*) is the Bidder that has submitted the attached Bid:

(2) They are fully informed regarding the preparation and contents of the attached Bid and of all pertinent circumstances regarding such Bids;

(3) Such Bid is genuine and is not a collusive or sham Bid;

(4) Neither the said Bidder not any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affidavit, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted or to refrain from quoting in connection with such Contract, or has in any manner directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm or person to fix the price or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit or cost element of the Bid price or the Bid price of any other Bidder or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the City of Hanahan, South Carolina, or any person interested in the proposed contract; and

(5) The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affidavit.

SIGNED: _____

TITLE: _____

EXHIBIT A – SPECIFICATIONS

Steward Street Park

Hanahan, South Carolina
Berkeley County

Specifications

May 12, 2023 – 100% Construction Documents

Project Manager: W. Warren Pruitt, ASLA
warrenp@adcengineering.com
ADC Project No. 20381

ADC ENGINEERING

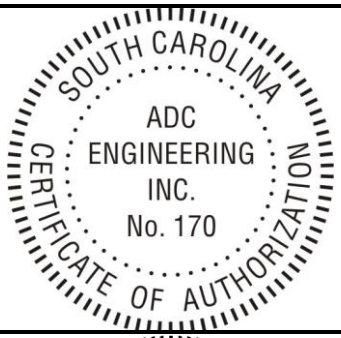
1226 YEAMANS HALL ROAD, HANAHAN, SC 29410
843-566-0161
ADCENGINEERING.COM

SECTION 000107 - SEALS PAGE

LANDSCAPE ARCHITECT

ADC Engineering, Inc.
1226 Yeamans Hall Road
Hanahan, SC 29410

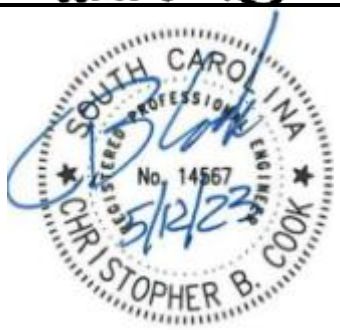
W. Warren Pruitt, ASLA

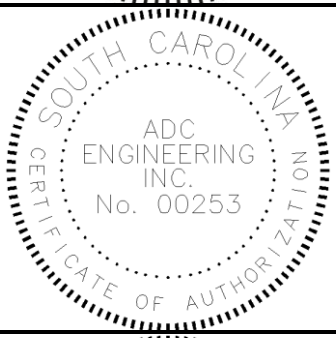


CIVIL ENGINEER

ADC Engineering, Inc.
1226 Yeamans Hall Road
Hanahan, SC 29410

Christopher B. Cook, P.E.

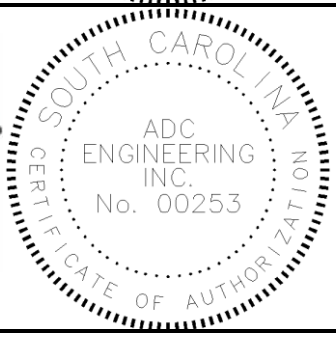




STRUCTURAL ENGINEER

ADC Engineering, Inc.
1226 Yeamans Hall Road
Hanahan, SC 29410

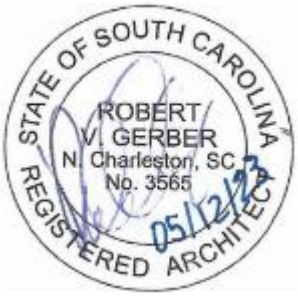
Christopher J. Gilger, P.E.



ARCHITECT

GJS Architecture, LLC
3251 Landmark Drive, Suite 241
North Charleston, SC 29418

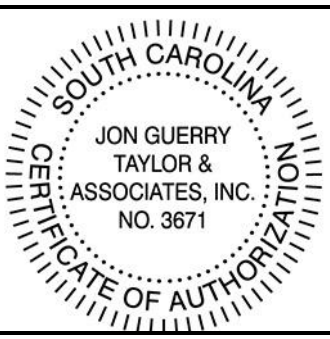
Robert V. Gerber, AIA NCARB, CSI, CDT



MARINE ENGINEER

Jon Guerry Taylor & Associates, Inc.
P.O. Box 1082
Mount Pleasant, SC 29465

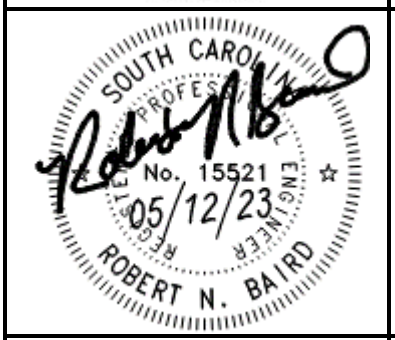
Christopher W. Moore, P.E.



ELECTRICAL ENGINEER

Live Oak Consultants, LLC
4214 Fellowship Road
North Charleston, SC 29418

Robert N. Baird, P.E.



MECHANICAL ENGINEER

Live Oak Consultants, LLC
4214 Fellowship Road
North Charleston, SC 29418

Gerald R. Ulmer, P.E.

END OF SECTION 000107

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DOCUMENT 003132 - GEOTECHNICAL DATA

1.1 GEOTECHNICAL DATA

A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information. This Document and its attachments are not part of the Contract Documents.

B. Because subsurface conditions indicated by the soil borings are a sampling in relation to the entire construction area, and for other reasons, the Owner, the Engineer, the Architect, the Architect's consultants, and the firm reporting the subsurface conditions do not warranty the conditions below the depths of the borings or that the strata logged from the borings are necessarily typical of the entire site. Any party using the information described in the soil borings and geotechnical report shall accept full responsibility for its use.

C. A geotechnical investigation report for Project, prepared by **S&ME, Inc., dated August 24, 2021**, is available for viewing as appended to this Document.

1. The opinions expressed in this report are those of a geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by a geotechnical engineer. Owner is not responsible for interpretations or conclusions drawn from the data.
2. Any party using information described in the geotechnical report shall make additional test borings and conduct other exploratory operations that may be required to determine the character of subsurface materials that may be encountered.

D. Related Requirements:

1. Document 002113 "Instructions to Bidders" for the Bidder's responsibilities for examination of Project site and existing conditions.

END OF DOCUMENT 003132

Geotechnical Exploration Report
Steward Street Park - 20381
Hanahan, South Carolina
S&ME Project No. 216018

PREPARED FOR:

ADC Engineering
1226 Yeamans Hall Road
Hanahan, South Carolina

PREPARED BY:

S&ME, Inc.
620 Wando Park Boulevard
Mount Pleasant, SC 29464

August 24, 2021

August 24, 2021

ADC Engineering
1226 Yeamans Hall Road
Hanahan, South Carolina

Attention: Mr. Warren Pruitt, Jr., ASLA

Reference: **Geotechnical Exploration Report**
Steward Street Park - 20381
Hanahan, South Carolina
S&ME Project No. 216018

Dear Mr. Pruitt:

We have completed our geotechnical exploration for the referenced project on Steward Street in Hanahan, South Carolina. Our services were performed pursuant to S&ME Proposal No. 216018 and our Professional Services Agreement dated August 12, 2021. The purpose of our services was to explore the subsurface conditions at the site, evaluate those conditions, and provide recommendations for site preparation and foundation support. This report presents our understanding of the project, the site and subsurface conditions encountered, and our conclusions and recommendations.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, please contact us.

Sincerely,

S&ME, Inc.

SOUTH CAROLINA
S&ME, INC.
No. C00473
CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA
REGISTERED PROFESSIONAL ENGINEER
8-24-21
No. 21394
AARON DURAND GOLDBERG

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Report at a Glance

Key geotechnical findings based on our current understanding of the proposed project are presented in the table below. These findings are presented as an overview and should not be used in place of the more detailed recommendations presented in the remainder of this report.

Category	Key Geotechnical Finding
Subsurface Conditions	• Topsoil = 3 to 5 in. • Traces of crushed stone indicating existing fill or disturbed soils throughout the site. • Very soft to Stiff natural coastal plain soils consisting of sandy silt near the surface (<15 ft). • Cooper Marl ranged in elevations from -23 ft near the proposed bathroom to elevations of -46 ft and -60 ft near the proposed boardwalk. • Groundwater approximately 1½ to 7 below existing grade. • Saturated soils and wet conditions near ground surface throughout site.
Site Development Challenges	The site is generally consistent with other sites in the area and amenable to the proposed development. Specific geotechnical issues identified on this site that should be considered include: • High plasticity, clayey subgrade soils that are moisture sensitive, difficult to work, and can become unstable when wet. • On-site soils unsuitable for re-use as fill. • Potential remediation of localized uncontrolled existing fill. • Potential to encounter buried obstructions associated with previous site development.
Excavation Conditions	• Difficult to excavate materials not anticipated. • Shallow groundwater may be encountered during wet weather conditions if proper drainage is not established. • Excavations may encounter soft, unstable excavation bottoms.
Seismic Considerations	• Seismic Design Category D. • Seismic Site Class F. • Liquefaction risk is low and liquefaction-induced damage is not expected.
Foundation Type	Shallow spread footings for bathroom, timber piles for boardwalk and pier.
Slab Support	On-grade.

Project Information

We understand plans are to build a park at the end of Steward Street in Hanahan, South Carolina. The park will include a boardwalk, pile-supported fishing pier, kayak launch, and a covered roof area on the pier. Located on the mainland, there will be a new pavilion, bathroom, entry plaza, playground, and associated paved area. We were asked to explore the proposed boardwalk, pier, bathroom and parking areas.

Specific structural information was not available at the time of this report, but we assume turndown slabs or shallow foundations will be used to support the bathroom structure. We assume a maximum slab-on-grade area load of 300 psf will be distributed over a maximum of 50 x 50 ft area, and a maximum column load 30 kips and wall load of 2 kip/ft will act on the individual spread footings. We also understand the minimum pile load will be approximatey10 kips per pile and lateral loading will be minimal.

Initial project information is based on an email from Mr. Warren Pruitt of ADC to Mr. Aaron Goldberg of S&ME on June 17, 2021. A June 1, 2021 copy of the park masterplan by ADC was provided with the email. A March 2001 WWTP Demolition and Grading Plan was provided by Berkeley County via email on August 19, 2021. Deep foundation information was provided in an email exchange by Mr. Christopher Moore and Warren Pruitt of ADC to Mr. Andre Kruk of S&ME on August 24, 2021.

The project information and assumptions presented herein should be reviewed and confirmed by the appropriate team members. Modifications to our conclusions and recommendations may be required if the actual conditions vary substantially from the project information and assumptions stated herein.

Methods of Exploration

Field Exploration

Our field exploration included a site reconnaissance by a geotechnical engineer, cone penetration test (CPT) soundings, and hand-auger borings. One CPT sounding was performed adjacent to the proposed bathroom to a depth of 26 ft below ground surface. Two soundings were performed at the proposed boardwalk ingress/egress to depths ranging from approximately 53 to 70 ft bgs.

We performed a 4-ft deep hand-auger boring adjacent to each sounding and at three additional locations within the proposed parking area. The adjacent boring for sounding C-1 was offset to the nearest grassed area. Two borings refused shallow due to the presence of crushed stone within the surficial soils. Representative samples of the soils encountered within the proposed parking area were collected for laboratory testing.

The test locations were located in the field using a hand-held GPS device and are shown on the Test Location Plan (Figures 1 and 2) included in the Appendix. A more detailed description of our field-testing procedures and the CPT sounding and hand-auger boring logs are also provided in the Appendix.

Laboratory Testing

Two representative soil samples were obtained in the proposed pond area and subjected to laboratory natural moisture content and grain size (finer than the #200 sieve) testing. Atterberg Limit Testing was performed on one sample to determine the plasticity of the surficial fill soils. The intent of the laboratory testing was to confirm soil classifications for our pavement recommendations.

Laboratory testing was performed in general accordance with applicable ASTM standards by S&ME in our Mount Pleasant laboratory. A summary of the laboratory test data, individual data sheets, and a description of our testing procedures are provided in the Appendix.

♦ Site and Subsurface Conditions

Area Geology

The project site is located within the Atlantic Coastal Plain Physiographic Province. The Pre-Cretaceous basement rocks are up to approximately 4,000 ft below the surface at the coastline and are overlain by the Middendorf, Black Creek, and PeeDee Formations of the late Cretaceous period and the Black Mingo Formation, Santee Limestone Formation, and Cooper Group of the Tertiary period. These form a successively overlapping wedge which thickens coastward from its origin along the Fall Line near the middle of the state.

The sediments within the Coastal Plain primarily consist of unconsolidated siliciclastic materials and carbonates with varying quantities of terrigenous matter (Horton and Zullo, 1991)[1]. With respect to geotechnical characterization, the materials generally classify as intermediate geomaterials (i.e., in between soil and rock), although some soft rock lenses may be encountered.

The Cooper Group is the most significant unit of the above because it is encountered relatively shallow, beneath a relatively thin layer of upper sediments of recent to Pleistocene age, and probably extends to depths in excess of 100 ft at the project site. Geologically, the Cooper Group consists of the Ashley Formation, the Parkers Ferry Formation, and the Harleyville Formation. The different formations of the Cooper Group are associated with various depositional environments. For engineering purposes, all of the formations of the Cooper Group are commonly referred to as the Cooper Marl, or more simply marl. The Cooper Marl is described as a phosphatic limestone consisting of calcium carbonate, quartz sand, clay, phosphatic sand and pebbles, and small amounts of glauconite, shell hash, and mica. Its color ranges from pale green to yellowish-gray to olive brown and becomes lighter when dried. The Cooper Marl typically classifies as an over-consolidated, high-plasticity, sandy silt or clay, but can also be classified as a silty sand.

[1] Horton, J. Wright, Jr. and Zullo, Victor A., (1991), "An Introduction to the Geology of the Carolinas", The Geology of the Carolinas: Carolina Geological Society 50th Anniversary Volume, edited by J. Wright Horton, Jr. and Victor A. Zullo. pp 1-10, University of Tennessee Press, Knoxville, TN.

Site Conditions

The subject site is a developed parcel located off of Steward Street in Hanahan, South Carolina. The site is bordered by Goose Creek to the north and a creek and marsh to the west. Residential housing is located to the south and east. A pump station for Berkeley County is located on the site along with a one-story building, an open carport, and associated paved driving and parking area. The remaining areas of the site were grassed with the exception of some vegetation on the eastern portion nearest Goose Creek. The site is currently used by Berkeley County for a pump station area and vehicle storage. Based on the provided demolition and grading plans[2] the site was previously used as a wastewater treatment plant. The southern-most area consisted of heavily loaded WWTP structures (lift station, clarifier, aeration tanks, digester and container storage).

At the time of our exploration, the ground surface appeared saturated. Based on the provided survey drawing[3], the existing ground elevation ranges from +3.0 to +10.0 (NAVD88) and gently slopes from south to north and east.

Subsurface Conditions

Details of the subsurface conditions encountered by the soundings and borings are shown on the logs in the Appendix. These logs represent our interpretation of the subsurface conditions based upon field data. Stratification lines on the logs represent approximate boundaries between soil types[4]; however, the actual transition may be gradual. The general subsurface conditions and their pertinent characteristics are discussed in the following paragraphs.

The exploration initially encountered approximately 3 to 5 in. of organic laden topsoil. The exploration encountered clayey sand to clay, with sand layers and traces of crushed stone to depth of 3 ½ ft to at least 4 ft bgs. This indicates that existing fill or previously disturbed soils are present in these areas. The full extent of these soils is unknown; however, fill is common in previously developed sites. As such, fill soils of varying thickness and composition should be expected. Our experience is that there also remains a risk of encountering underground obstructions associated with previous site development.

Natural coastal plain soils were encountered beneath the near surface soils. The exploration encountered very soft to stiff sandy silt to an elevation of -7 ft, followed by silty sand to an elevation of -12 ft. Sounding C-1 encountered the Cooper Marl beneath this layer, which continued to termination elevation of -23 ft. Soundings C-2 and C-3 encountered firm to stiff sandy silt from the bottom of the silty sand to an elevation of -23 ft and soft to

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[2] *Hanahan WWTP Demolition and Grading Plan* dated March 2001 provided by Berkeley County

[3] Elevations were interpolated from the *Boundary & As-built Survey* dated February 17, 2021 provided by ADC. We assume these drawing reference the NAVD88 vertical datum.

[4] Soil Behavior Type is calculated based on empirical correlations with tip resistance, sleeve friction, and pore pressure. A CPT may define a soil based on its behavior as one type while its grain size and plasticity, the traditional basis for soil classification, may define it as a different type.

firm clay to elevations ranging from -43 ft to -60 ft, in soundings C-3 and C-2, respectively. Cooper Marl[5] was encountered beneath this layer and continued to termination.

Groundwater

Groundwater was measured in the borings and soundings upon completion and in some boring locations 24-hours after completion. Groundwater measurements ranged from approximately 1 ½ ft to 7 ft bgs. Groundwater levels at the site will fluctuate during the year due to such things as seasonal and climatic variations and the construction activity in the area.

♦ Conclusions and Recommendations

The exploration indicates the site is adaptable for the proposed construction. The proposed pier and boardwalk may be supported on timber piles, and the proposed pavilion may be supported on shallow foundations following proper site preparation and fill placement and compaction recommendations.

The existing subgrade soils primarily consist of high plasticity, clayey soils. These soils are moisture sensitive, difficult to work, and can become unstable when wet. Thorough subgrade evaluation will be required to ensure a stable subgrade for fill placement and compaction. If site grading takes place during wet weather conditions, significant undercutting or stabilization measures may be required to provide stable subgrades. These measures should be considered in the bidding phase of the project.

The following presents our geotechnical recommendations regarding site grading and structural support. During review of these recommendations, it should be kept in mind that subsurface conditions will vary between our test locations. Existing fill and/or disturbed soils were encountered throughout the site. As such, unexpected subsurface conditions such as deeper, poorly-compacted fill deposits and buried debris may be encountered. These variable conditions can normally be handled during construction by field engineering evaluation.

A one-page summary of our recommendations organized by discipline (Summary by Discipline) is provided in Appendix I for quick reference.

Civil-Related Recommendations

Drainage Improvements

Prior to mass clearing and grading, we recommend that drainage improvements be made to remove any ponded water and handle rainfall runoff during construction. Site drainage can be established by excavating gravity-drained ditches to divert water flow away from construction areas. Ditches should be excavated as deep as practical and as far ahead of general site work as possible. If enough fall is not available, ditches should be tied to

[5] Cooper Marl, locally referred to as "marl", is a relatively incompressible, thick (≥ 200 ft) stratum which underlies the area and is typically the bearing stratum for deep foundations in Charleston.

sumps and pumped. Even during dry weather conditions, ditches and drainage improvements should be in place to handle any heavy rainfall that might occur during construction.

Site Preparation

Site preparation should continue with demolition of the existing structure, and removing foundations, utilities to be abandoned, and other subsurface structures. Site preparation in new building and pavement areas should continue with clearing and grubbing vegetation and roots, stripping organic-laden topsoil and removal of unsuitable surface materials. The excavations resulting from demolition and grubbing should be cleaned of any unsuitable materials and backfilled with well-compacted controlled fill.

The exposed subgrade should be evaluated by proofrolling with a heavily loaded, tandem-axle dump truck or similar rubber-tired equipment under the observation of the Geotechnical Engineer. Proofrolling will expose unstable subgrade areas. Areas that pump or rut excessively should be densified in place or undercut and replaced with well-compacted controlled fill or crushed stone as recommended by the Geotechnical Engineer. Undercutting should be observed by the Geotechnical Engineer to determine that all unsuitable materials are removed and to prevent removal of suitable materials.

The existing subgrade soils primarily consist of high plasticity, clayey soils. These soils are moisture sensitive, difficult to work, and can become unstable when wet. Thorough subgrade evaluation will be required to ensure a stable subgrade for fill placement and compaction. Based on our experience in the area, if site grading takes place during wet weather conditions, significant undercutting or stabilization measures will be required to provide stable subgrades. If large areas are unstable under proofrolling, it may be uneconomical to undercut and replace *en masse*, and significant stabilization measures will be required.

Actual stabilization measures will be dependent on final grades, the climactic conditions during construction, the aggressiveness of the earthwork schedule, site drainage, and the grading contractor's means and methods. The stabilization measures used are best determined in the field at the time of construction with joint consultation between the Grading Contractor and the Geotechnical Engineer.

During hot, dry weather conditions, soft, wet subgrade area should be disked, allowed to dry, and compacted as much as possible without destabilizing it. Sheepsfoot type compaction equipment should be used on the clayey subgrade soils. If the subgrade is stable, fill should be placed and compacted as recommended in the "Controlled Fill" section of this report.

Controlled Fill

Off-Site Borrow Material

Off-site borrow material should be cohesionless soil containing no more than 15 percent fines (material passing the No. 200 sieve) by weight and having a maximum dry density of at least 100 pcf as determined by a laboratory modified Proctor compaction test (ASTM D1557). The soil should be relatively free of organics, deleterious matter, and elongated or flat particles susceptible to degradation.

Use of On-Site Soils

The hand-auger borings typically encountered shallow soils consisting of high plasticity, clayey soil. On-site soils are unsuitable for re-use as controlled fill.

Placement and Compaction

All fill should be placed in uniform lifts of 10 in. or less (loose measure) and compacted to at least 95 percent of the modified Proctor maximum dry density. Fill placement should be observed by a qualified engineering technician working under the direction of the Geotechnical Engineer. In addition to this visual evaluation, the technician should perform a sufficient number of in-place field density tests to confirm the contractor's equipment and methods are capable of achieving the required degree of compaction.

Excavations and Dewatering

Subsurface water was encountered at depths of 1½ to 7 ft bgs. Saturated soils and wet conditions were encountered near the existing ground surface indicating poor drainage and perched water within the slow draining, clayey subgrade soils.

Depending on conditions at the time of construction, excavations may encounter subsurface or perched water. Water levels should be maintained at least 1 ft below excavations to help maintain bottom stability. Groundwater should be lowered according to our Drainage Improvement section prior to excavations. Water within the excavation can probably be controlled locally by pumping from sumps. The contractor should be responsible for determining groundwater control measures based on the site conditions encountered during construction, and the contractor is responsible for evaluating the effects of lowering groundwater levels.

The exploration indicates that excavations below the existing ground surface will encounter low to moderate consistency soils. These soils can be excavated using typical earthmoving equipment and techniques. Based on the exploration, we do not anticipate difficult to excavate materials will be encountered, except the potential for buried debris throughout the site. Excavations may encounter soft soils and/or unstable excavation bottoms. Unstable bottoms can be stabilized with placement of a non-woven geotextile and/or 12 to 18 in. of crushed stone. This will aid in dewatering and provide a stable working platform and bedding layer.

All excavations should be sloped or shored in accordance with local, state, and federal regulations, including OSHA (29 CFR Part 1926) excavation trench safety standards. The contractor is solely responsible for site safety. This information is provided only as a service, and under no circumstances should S&ME be assumed to be responsible for construction site safety.

Structural-Related Recommendations

Seismic Considerations

We performed a liquefaction analysis based on the design earthquake prescribed by the 2018 edition of the International Building Code (IBC 2018)[6]. This analysis indicates the 3-ft thick sand layer below the water table located at a depth of about 13 feet has the potential to liquefy during the design seismic event[7]. The analysis predicts approximately 2 in. of liquefaction-induced settlement are possible.

To help evaluate the consequences of liquefaction, we have computed the Liquefaction Potential Index (LPI), which is an empirical tool used to evaluate the potential for liquefaction to cause damage.[8] The LPI considers the factor of safety against liquefaction, the depth to the liquefiable soils, and the thickness of the liquefiable soils to compute an index that ranges from 0 to 100. An LPI of 0 means there is no risk of liquefaction; an LPI of 100 means the entire profile is expected to liquefy. The level of risk is generally defined as:

- ***LPI* < 5** – surface manifestation and liquefaction-induced damage not expected.
- ***5* ≤ *LPI* ≤ 15** – moderate liquefaction with some surface manifestation possible.
- ***LPI* > 15** – severe liquefaction and foundation damage is likely.

The LPI for this site is 9, which indicates that the liquefaction risk is moderate and structural damage is possible.

Observations from past earthquakes are helpful to put the liquefaction risk in perspective. Post-earthquake reconnaissance observations indicate that structures can survive substantial liquefaction-induced settlement without suffering a collapse or catastrophic failure; however, the performance may be significantly compromised, and the damage may be such that the structure must be replaced. Considering the IBC requirements for a Seismic Design Category D[9] and the performance of structures that survived with less stringent ductility and detailing requirements, we believe that a code-compliant structure constructed on this site could survive the predicted liquefaction and meet the collapse-prevention objectives of the building code, albeit with some associated cracking and distortion. If the proposed buildings cannot be designed to accommodate the predicted settlements without collapse or if the buildings are to be designed to a higher performance level, ground improvement should be performed to allow shallow foundation support. Ground improvement options (i.e. earthquake drains) can be specified if risks associated with liquefaction are not found acceptable.

Section 1613.2.2 of the IBC 2018 classifies sites with the potential for liquefaction as Seismic Site Class F. However, the IBC 2018 allows the design spectral response accelerations for a site to be determined without regard to liquefaction provided the structure has a fundamental period of less than or equal to 0.5 seconds and the risks of liquefaction are considered in design. We assume the proposed structure will meet these criteria; however, this

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[6] Liquefaction, the loss of a soil's shear strength due to the increase in porewater pressure resulting from seismic vibrations, is always a potential concern in coastal South Carolina. Analysis was performed using the "simplified procedure" presented by Youd et al. (2001).

[7] The IBC design earthquake has a 2% probability of exceedance in 50 years. This is statistically equivalent to an event that occurs about once every 2,500 years. Our liquefaction analysis was based on an earthquake with a magnitude of 7.3 and ground surface acceleration of 1.298g.

[8] Iwasaki et al. 1982, Toprak & Holzer (2003).

[9] The base hazard in the Charleston area is such that structures generally fall under Seismic Design Category D.

must be confirmed by the Structural Engineer. Provided the above criteria are met, the design accelerations may be calculated using Site Class D site coefficients as shown in Table 1, but the Site Class is still F.

Table 1 – Spectrum Response Acceleration

Code	Site Class	S_s	S_1	F_a	F_v	PGA_M	S_{DS}	S_{D1}
IBC 2018	F	1.745g	0.509g	1.0	1.79*	1.298g	1.163g	0.607g*

* The acceleration parameters should only be used when calculating the Seismic Response Coefficient (C_s) per the exception to the site-specific ground motion procedures requirement detailed in section 11.4.8 of ASCE 7-16.

The 1-second spectral acceleration (S_1) for this site is 0.509g. IBC 2018 requires site-specific ground motion procedures to be followed when S_1 is greater than or equal to 0.2g (see ASCE 7-16 section 11.4.8). However, the code provides an exception to this requirement in ASCE 7-16 section 11.4.8 if certain conditions are met when determining the Seismic Response Coefficient (C_s). As with the liquefaction-related exception, Site Class D site coefficients and corresponding spectral accelerations, as presented in Table 1, may be used for purposes of computing C_s in accordance with the S_1 exception.

Shallow Foundation Recommendations

The proposed structures can be supported by turndown slabs and/or shallow foundations. The slab and spread footing foundations may be designed for maximum allowable bearing capacity of 300 psf and 2,000 psf, respectively, provided our site preparation and controlled fill placement and compaction recommendations are completed as recommended. Footings should bear a minimum of 12 in. below finished grade, and wall and column footings should be a minimum of 18 and 24 in. wide, respectively.

Our analysis indicates that total static (i.e., not seismically-induced), post-construction settlement due to the assumed structural loads will be approximately 1 in. Differential settlement is typically assumed to be about half of the total settlement. If actual building loads or fill height will be greater than those assumed in this report (i.e,. 300 psf for the slab, 30 kips for columns, and 1 kips/ft for walls, and less than 1 ft of fill), we should be provided with this information so that we can reevaluate settlement. This is important because higher loads will cause additional settlement.

All foundation excavation bottoms must be evaluated by a representative of the Geotechnical Engineer prior to reinforcing steel and concrete placement. This evaluation should include probing, hand-auger boring, and/or dynamic cone penetrometer (DCP) testing, as deemed appropriate by the Geotechnical Engineer. This evaluation will help determine if individual footings are directly underlain by suitable bearing material. Any loose material should be properly compacted or undercut and replaced with well-compacted controlled fill or crushed stone aggregate such as No. 57 stone. Slag is not recommended as backfill due to its potentially expansive nature.

If practical, concrete placement should be completed the same day as the footing excavation. .

Timber Piles

We understand the boardwalk and pier will be supported on driven, timber piles. Our analyses indicate an 8-in. minimum-tip diameter timber pile bearing 30 ft below the ground surface or mudline will provide an allowable axial compression resistance of 7 tons with suitable factors of safety in static and seismic conditions. Load testing is not required by the building code for piles with loads less than 40 tons and we have used a factor of safety of 3.0 in our analysis considering no load testing.

Piles should be installed with an impact hammer. Jetting and vibratory installation of piles should be prohibited. Pile capacity will develop with time following driving as pore pressures in the soil dissipate over about 3 to 5 days. An Engineering Technician, under the direction of a Geotechnical Engineer, should monitor all pile driving to verify that the piles are encountering the expected driving resistances.

Floor Slabs

Floor slabs may be soil-supported provided our site preparation, fill placement and compaction, and ground improvement recommendations are followed. A subgrade modulus (k) of 125 pci is available for design. This recommended modulus is representative of a 30-in. diameter plate load test and is only applicable for light point loads. This modulus must be reduced for wide area loads.

Based on the results of our exploration, the floor slab will not be subjected to hydrostatic pressure from groundwater. However, water vapor transmission through the slab is still a design consideration. Evaluating the need for and design of a vapor retarder or vapor barrier for moisture control is outside our scope of services and should be determined by the project architect/structural engineer based on the planned floor coverings and the corresponding design constraints, as outlined in ACI 302.1R-04 Guide for Concrete Floor and Slab Construction.

Pavement Recommendations

We have evaluated new flexible (asphalt) pavement using the *SCDOT Pavement 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 passenger cars and light truck traffic and heavy-duty pavements will be subjected to heavy truck traffic.

A CBR value of 8% was used in the design of all pavement sections. This value is based our experience with sites that have similar soils and subgrades consisting of at least 24 in. of well-compacted controlled fill. The CBR values should be confirmed during grading by engineering evaluation and field and laboratory testing. Table 2 presents our recommendations for minimum pavement sections.

Table 2 – Minimum Recommended Pavement Sections

Material	Flexible Pavement		Rigid Pavement	
	Heavy Duty	Standard Duty	Heavy Duty	Standard Duty
Asphaltic Concrete Surface Course	3 in.	2 in.	-	-
Graded Aggregate Base Course	8 in.	6 in.	5 in.	5 in.
Portland Cement Concrete	-	-	6 in.	5 in.
Compacted/Proofrolled Subgrade	24 in.			

Our analyses indicate the standard duty pavement section has an allowable traffic volume of approximately 20,000 ESALs[10], and the allowable traffic volume for the heavy-duty pavement section is approximately 165,000 ESALs. Based on our experience, this should be adequate for the assumed traffic and a typical 15-year pavement life. Construction traffic has not been included in our analysis, 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.

A rigid pavement section is recommended in dumpster pad areas to support, at a minimum, the front wheels of the truck. Rigid pavements should also be used in areas subjected to repeated lateral loading (turning, stopping, starting) such as any truck loading and turning areas.

All materials and workmanship should be in accordance with the South Carolina Department of Transportation's *Standard Specifications for Highway Construction*, 2007 Edition.

A stable subgrade is very important to pavement performance. Immediately prior to paving, the subgrade should be proofrolled, and any unstable areas should be repaired. The base course should be compacted to at least 98% of the maximum dry density as determined by the modified Proctor compaction test (ASTM D 1557). In-place field density tests should be performed by a qualified Materials Technician, and the area should be methodically proofrolled under their evaluation to confirm that the base course has been uniformly compacted. The thickness should not be deficient in any area by more than ½ in. The asphalt pavement thickness should not be deficient by more than ¼ in. in any area.

The performance of asphalt pavements will be dependent upon a number of factors including subgrade conditions at the time of paving, drainage, and traffic. The geometric design should provide positive drainage for the pavement surface and subgrades. This is very important and may require the use of underdrains in sags and low areas.

[10] Equivalent 18-kip single axle load (ESAL). For example, a legally-loaded tandem axle tractor-trailer has an ESAL of up to 2.5, while a passenger car has an ESAL of approximately 0.0002.

Pavement design typically has relatively low factors of safety; therefore, it will be very important that the specifications are followed closely during pavement construction. Our analysis was based on a 15-year design life; however, some isolated areas could require repair in a shorter period of time

♦ Limitations of Report

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The conclusions and recommendations contained in this report are based upon applicable standards of our practice in this geographic area at the time this report was prepared. No other representation or warranty either express or implied, is made.

We relied on project information given to us to develop our conclusions and recommendations. If project information described in this report is not accurate, or if it changes during project development, we should be notified of the changes so that we can modify our recommendations based on this additional information if necessary.

Our conclusions and recommendations are based on limited data from a field exploration program. Subsurface conditions can vary widely between explored areas. Some variations may not become evident until construction. If conditions are encountered which appear different than those described in our report, we should be notified. This report should not be construed to represent subsurface conditions for the entire site.

Unless specifically noted otherwise, our field exploration program did not include an assessment of regulatory compliance, environmental conditions or pollutants or presence of any biological materials (mold, fungi, bacteria). If there is a concern about these items, other studies should be performed. S&ME can provide a proposal and perform these services if requested.

S&ME should be retained to review the final plans and specifications to confirm that earthwork, foundation, and other recommendations are properly interpreted and implemented. The recommendations in this report are contingent on S&ME's review of final plans and specifications followed by observation and monitoring of earthwork and foundation construction activities.

Appendix

Summary by Discipline

Figures 1 & 2 - Test Location Plan

CPT Sounding Logs

Hand Auger Logs

CPT Procedure

CPT Legend

Laboratory Test Results Summary

Individual Laboratory Test Results

♦ Summary by Disciplines

Project Basics

Address Steward Street, Hanahan, South Carolina Lat. 32.916519° Long. -79.999263°

Building Code IBC 2018

Loading (Assumed)

2 k/lf walls, 30 kip columns, 300 psf slab load

Grading (Provided)

Existing Ground Surface Elev. +3.0 to 10.0 ft New Fill <1 ft

Structural-Related Summary

Seismic Design Parameters

Site Class D S_{DS} = 1.163g S_{D1} = 0.6073g

Seismic Design Category = D (Risk Category I-IV)

Foundations

Bathroom: Shallow Spread Footing

Allowable Bearing Pressure = 2.0 ksf Min Dimensions = 24" columns, 18" strip

Bearing Material – controlled fill or in-situ clayey sand fill Min Bearing Depth = 12"

Estimated Settlement (max load of 30 kips) = ≤1" static

Boardwalk / Pier: Driven Timber Piles

Recommended Bearing Depth= 30 ft below ground or mudline Allowable Pile Compressive Resistance = 7 ton

Bearing Material – soft to firm clay Assumed Tip Diameter = 8"

C**oncrete Slabs**: subgrade reaction modulus = 125 pci

Bearing Material – Approved controlled fill

Civil-Related Summary

Site Preparation

Drain site, clear, grub, raze existing structures, remove utilities, backfill voids

Proofroll subgrades, undercut and backfill as needed

NOTE: Subgrade soils consist of moderately plastic, clayey soils that are moisture-sensitive, difficult to work, and can become unstable when wet. Thorough subgrade evaluation will be important. If site grading takes place during wet weather conditions, significant undercutting or stabilization measures may be required prior to fill placement. Maintain site drainage and limit construction traffic to reduce required undercutting.

Controlled Fill

Requirements granular, ≤15% fines, max dry unit weight of at least 100 pcf by ASTM D1557

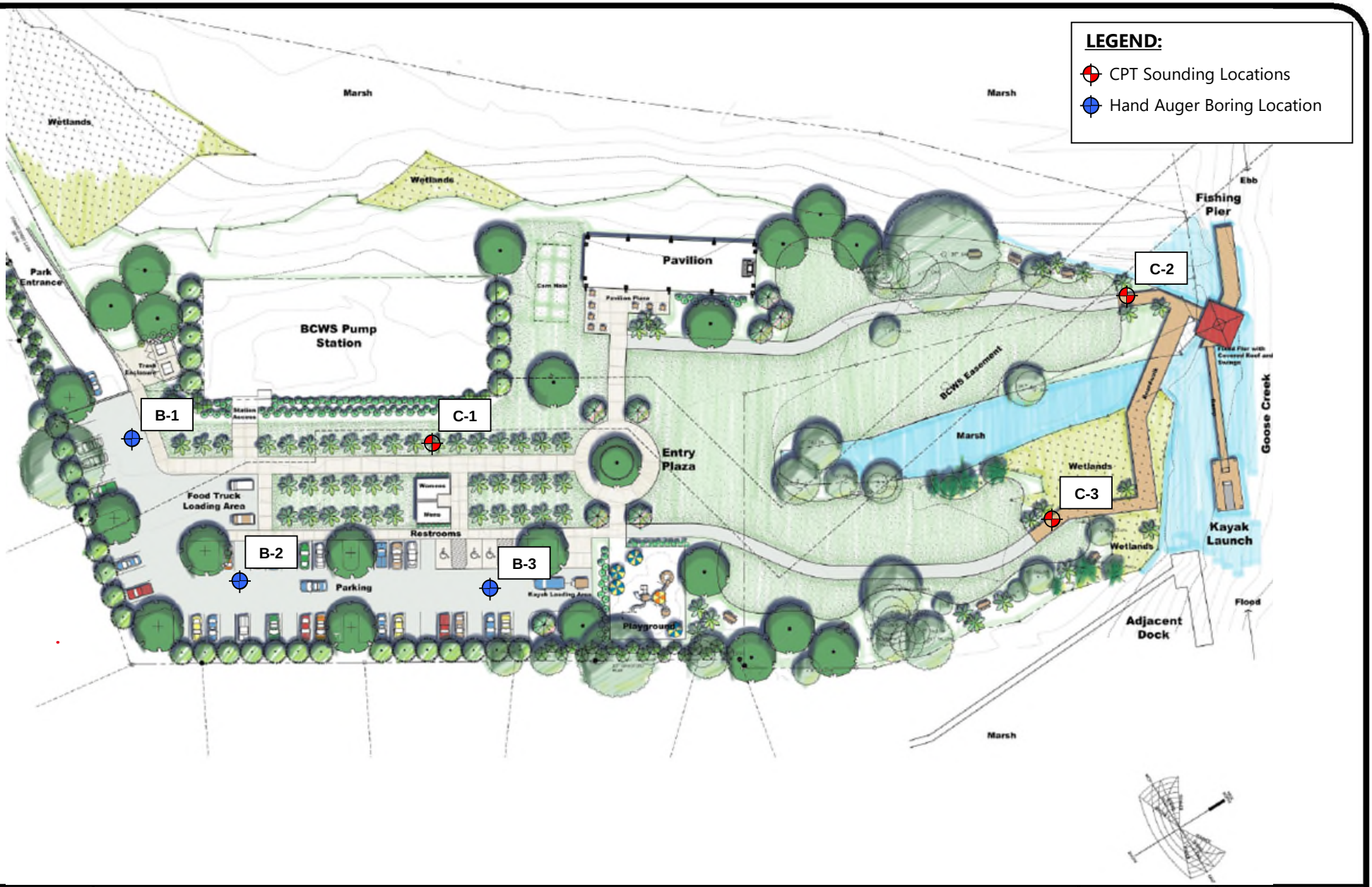
Onsite Borrow potential clayey sand subsoils are unsuitable for re-use as controlled fill

Compaction 95% Modified Proctor MDD, 10-inch lifts or less

Pavement

Assigned a CBR value of 8%

Typical heavy duty and light duty pavement and concrete designs are applicable



TEST LOCATION PLAN

Steward Street Park – Provided Site Plan Overlay
Hanahan, South Carolina

SCALE:	FIGURE NO.
NOT TO SCALE	1
DATE: 8/16/2021	
PROJECT NUMBER 216018	

TEST LOCATION PLAN

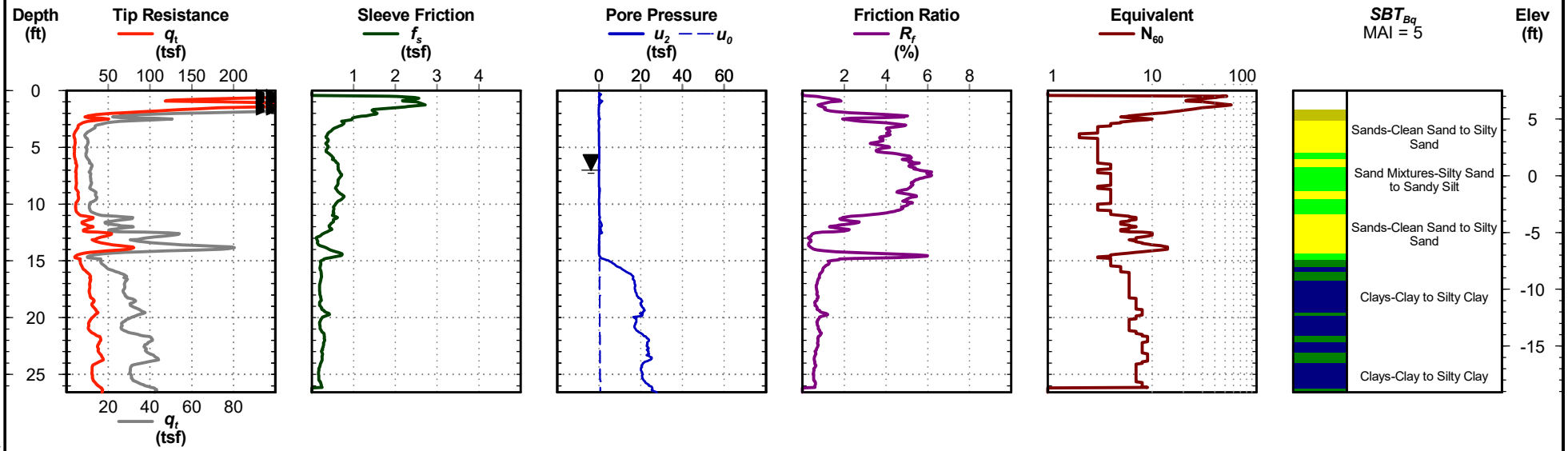
Steward Street Park – Google Earth Aerial
Hanahan, South Carolina

SCALE:	FIGURE NO.
NOT TO SCALE	2
DATE: 8/16/2021	
PROJECT NUMBER 216018	

Sounding ID: C-1

Steward Street Park
Hanahan, South Carolina
S&ME Project No: 216018

Date:	Aug. 19, 2021	**Total Depth:**	26.6 ft
Estimated Water Depth:	7 ft	**Termination Criteria:**	Target Depth
Rig/Operator:	Marooka/M. Wright	**Cone Size:**	1.75



Cone Penetration Test

Electronic Filename: C-1.DAT

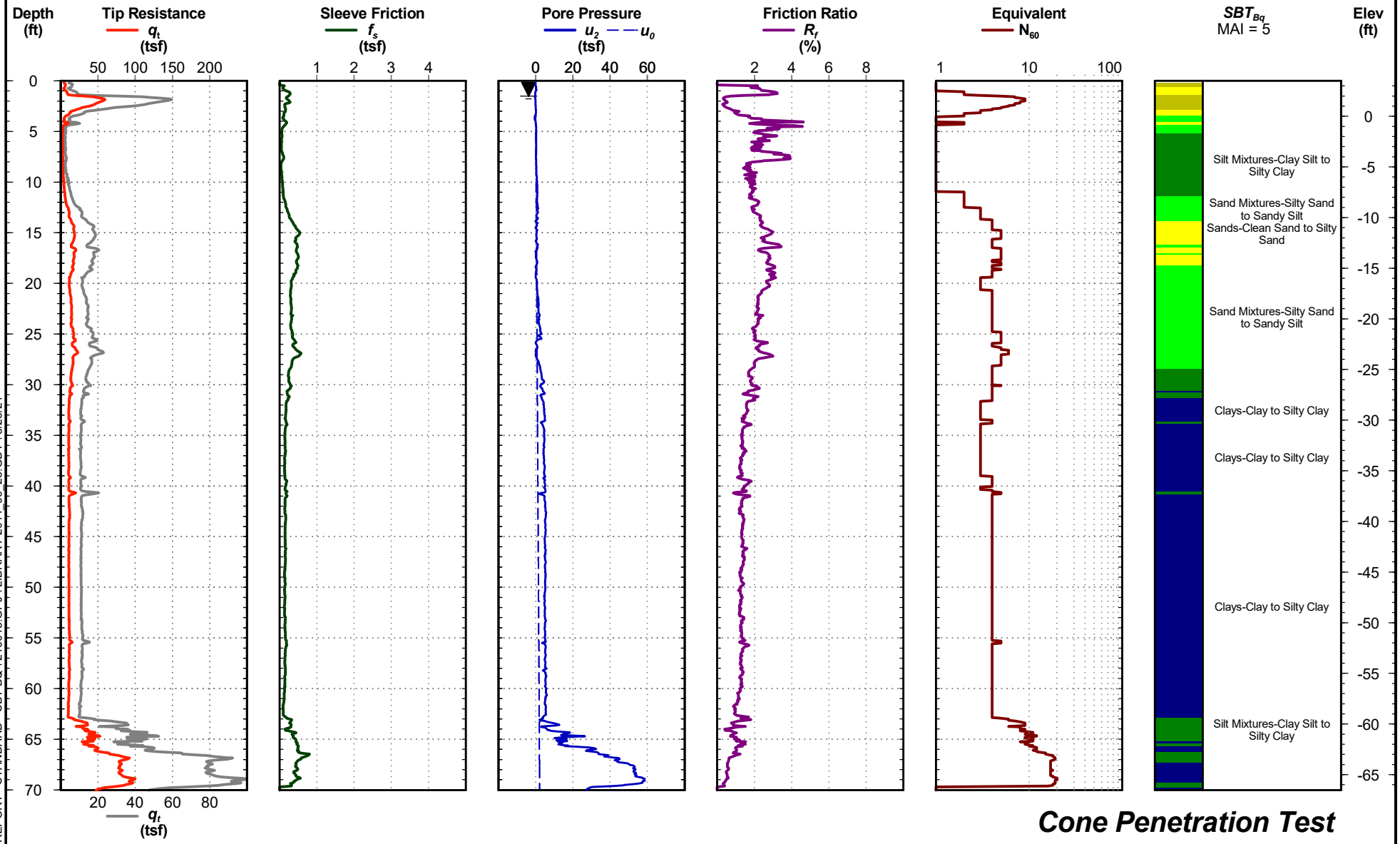
CPT REPORT - STANDARD - SBT BQ \ 216018.GPJ \ LIBRARY 2011_06_28.GDT \ 8/23/21

Steward Street Park
Hanahan, South Carolina
S&ME Project No: 216018

Sounding ID: C-2

Date: Aug. 23, 2021
Estimated Water Depth: 1.5 ft
Rig/Operator: Marooka/M. Wright

Total Depth: 70.0 ft
Termination Criteria: Target Depth
Cone Size: 1.75



Cone Penetration Test

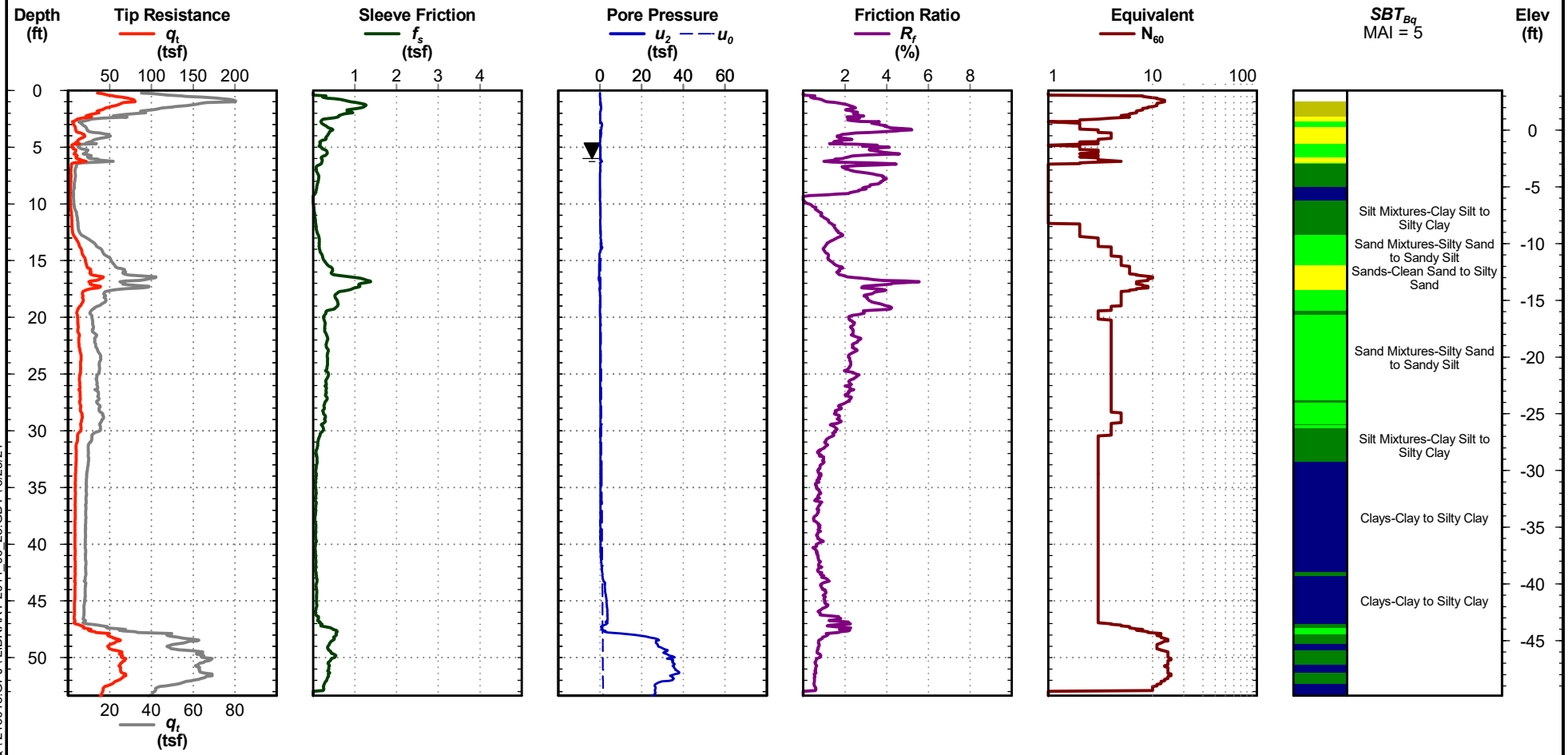
CPT REPORT - STANDARD - SBT BQ \ 216018.GPJ \ LIBRARY 2011_06_28.GDT \ 8/23/21

Electronic Filename: C-2.DAT

Sounding ID: C-3

Steward Street Park
Hanahan, South Carolina
S&ME Project No: 216018

Date:	Aug. 19, 2021	**Total Depth:**	53.4 ft
Estimated Water Depth:	6 ft	**Termination Criteria:**	Target Depth
Rig/Operator:	Marooka/M. Wright	**Cone Size:**	1.75



Cone Penetration Test

Electronic Filename: C-3.DAT

CPT REPORT - STANDARD - SBT BQ \ 216018.GPJ \ LIBRARY 2011_06_28.GDT \ 8/23/21

PROJECT:	Steward Street Park - 20381 Hanahan, South Carolina S&ME Project No. 216018	HAND AUGER LOG: B-1 *Sheet 1 of 1*

DATE: 08/19/2021	**ELEVATION:** 8.0 ft	**NOTES:** Elevation interpolated from provided *Boundary & As-built Survey* dated February 17, 2021 provided by ADC.	
EQUIPMENT: AMS Hand Auger	**DATUM:** NAVD88		
OPERATOR: Andre Kruk	**DEPTH:** 4.0 ft		
	CLOSURE:		
DRILLING METHOD:	**LOGGED BY:** Andre Kruk	**LATITUDE:**	**LONGITUDE:**
SAMPLING METHOD:	**PROJECT COORDINATE SYSTEM -** World Geodetic System Longitude / Latitude (WGS 84)		

Depth (feet)	NOTES	DEPOSITIONAL ENVIRONMENT	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION
0		Fill			TOPSOIL = 3 in.		8
					CLAYEY SAND (SC), some high plasticity fines, brown with gray and orange, fine grained sand, moist, trace to few crushed stone.		
1							7
					POORLY GRADED SAND (SP), brown, fine grained, moist, trace crushed stone.		
2					CLAYEY SAND (SC), little high plasticity fines, brown with gray and orange, fine grained sand, moist, few light gray clay lenses, trace crushed stone.		6
3							5
		Coastal Plain			CLAYEY SAND (SC), some high plasticity fines, orange, brown and gray, fine grained sand, moist, trace roots.		
4	Terminated at 4.0 feet						4
5							

GROUNDWATER		DATE/TIME	DEPTH (FT)	REMARKS
DURING ADVANCE	▽	08/19/2921	3.5	
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Vertical Accuracy: Land Survey

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED.

LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), HC = Hole Cave

PROJECT:	Steward Street Park - 20381 Hanahan, South Carolina S&ME Project No. 216018	HAND AUGER LOG: B-2 *Sheet 1 of 1*

DATE: 08/18/2021	**ELEVATION:** 9.5 ft	**NOTES:** Elevation interpolated from provided *Boundary & As-built Survey* dated February 17, 2021 provided by ADC. Mc=Moisture content, -200=percent finer than 200 sieve, PI=plasticity index, LL=liquidity index.
EQUIPMENT: AMS Hand Auger	**DATUM:** NAVD88	
OPERATOR: Andre Kruk	**DEPTH:** 4.0 ft	
	CLOSURE:	
DRILLING METHOD:	**LOGGED BY:** Andre Kruk	**LATITUDE:** **LONGITUDE:**
SAMPLING METHOD:	**PROJECT COORDINATE SYSTEM -** World Geodetic System Longitude / Latitude (WGS 84)	

Depth (feet)	NOTES	DEPOSITIONAL ENVIRONMENT	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION
0					TOPSOIL = 5 in.		
					LEAN CLAY WITH SAND (CL), little fine grained sand, light gray to light brown, medium plasticity, moist, trace crushed stone.		9
1							8
2					*wet*		
					Mc=39.5%, -200=76.8%		7
3		Fill					6
4	Terminated at 4.0 feet						5
5							

GROUNDWATER		DATE/TIME	DEPTH (FT)	REMARKS
DURING ADVANCE	▽	08/19/2921	3.0	
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Vertical Accuracy: Land Survey

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED.

LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), HC = Hole Cave

PROJECT:	Steward Street Park - 20381 Hanahan, South Carolina S&ME Project No. 216018	HAND AUGER LOG: B-3 *Sheet 1 of 1*

DATE: 08/18/2021	**ELEVATION:** 10.0 ft	**NOTES:** Elevation interpolated from provided *Boundary & As-built Survey* dated February 17, 2021 provided by ADC. Mc=Moisture content, -200=percent finer than #200 sieve
EQUIPMENT: AMS Hand Auger	**DATUM:** NAVD88	
OPERATOR: Andre Kruk	**DEPTH:** 3.0 ft	
	CLOSURE:	
DRILLING METHOD:	**LOGGED BY:** Andre Kruk	**LATITUDE:** **LONGITUDE:**
SAMPLING METHOD:	**PROJECT COORDINATE SYSTEM -** World Geodetic System Longitude / Latitude (WGS 84)	

Depth (feet)	NOTES	DEPOSITIONAL ENVIRONMENT	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION
0					TOPSOIL = 4 in.		10
					SANDY FAT CLAY (CH), some fine grained sand, dark gray, high plasticity fines, moist, trace roots.		
1					CLAYEY SAND (SC), some high plasticity fines, brown with gray and orange, fine grained sand, moist, trace to few crushed stone.		9
					Mc=23.0%, -200=48.1%, PI=19, LL=36		
2		Fill			*little high plasticity fines*		8
3	Auger refusal at 3.0 feet						7
4							6
5							

GROUNDWATER		DATE/TIME	DEPTH (FT)	REMARKS
DURING ADVANCE	▽	08/19/2921	2.0	
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Vertical Accuracy: Land Survey

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED.

LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), HC = Hole Cave

PROJECT:	Steward Street Park - 20381 Hanahan, South Carolina S&ME Project No. 216018	HAND AUGER LOG: C-1 *Sheet 1 of 1*

DATE: 08/19/2021	**ELEVATION:** 7.5 ft	**NOTES:** Elevation interpolated from provided *Boundary & As-built Survey* dated February 17, 2021 provided by ADC.
EQUIPMENT: AMS Hand Auger	**DATUM:** NAVD88	
OPERATOR: Andre Kruk	**DEPTH:** 4.0 ft	
	CLOSURE:	
DRILLING METHOD:	**LOGGED BY:** Andre Kruk	**LATITUDE:** **LONGITUDE:**
SAMPLING METHOD:	**PROJECT COORDINATE SYSTEM -** World Geodetic System Longitude / Latitude (WGS 84)	

Depth (feet)	NOTES	DEPOSITIONAL ENVIRONMENT	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION
0		Fill			TOPSOIL = 4 in.		
					CLAYEY SAND (SC), some high plasticity fines, brown with gray and orange, fine grained sand, moist, trace to few crushed stone.		7
1							
							6
2							
							5
3					*gray, brown and orange, trace crushed stone*		
		Coastal Plain			CLAYEY SAND (SC), little high plasticity fines, gray and dark gray, fine grained sand, moist.		4
4	Terminated at 4.0 feet						
							3
5							

GROUNDWATER		DATE/TIME	DEPTH (FT)	REMARKS
DURING ADVANCE	▽	08/19/2921		not encountered
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Vertical Accuracy: Land Survey

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED.

LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), HC = Hole Cave

PROJECT:	Steward Street Park - 20381 Hanahan, South Carolina S&ME Project No. 216018	HAND AUGER LOG: C-2 *Sheet 1 of 1*

DATE: 08/18/2021	**ELEVATION:** 3.5 ft	**NOTES:** Elevation interpolated from provided *Boundary & As-built Survey* dated February 17, 2021 provided by ADC.
EQUIPMENT: AMS Hand Auger	**DATUM:** NAVD88	
OPERATOR: Andre Kruk	**DEPTH:** 4.0 ft	
	CLOSURE:	
DRILLING METHOD:	**LOGGED BY:** Andre Kruk	**LATITUDE:** **LONGITUDE:**
SAMPLING METHOD:	**PROJECT COORDINATE SYSTEM -** World Geodetic System Longitude / Latitude (WGS 84)	

Depth (feet)	NOTES	DEPOSITIONAL ENVIRONMENT	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION
0					TOPSOIL = 4 in.		
					CLAYEY SAND (SC), some high plasticity fines, gray, brown and orange, fine grained sand, moist, trace crushed stone.		3
1							
					POORLY GRADED SAND WITH SILT (SP-SM), dark gray to gray, fine grained, wet, trace crushed stone.		2
2					POORLY GRADED SAND (SP), gray to yellow brown, fine grained, wet, trace crushed stone.		
		Fill					1
3							
							0
4	Terminated at 4.0 feet						
							-1
5							

GROUNDWATER		DATE/TIME	DEPTH (FT)	REMARKS
DURING ADVANCE	▽	08/19/2921	2.0	
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Vertical Accuracy: Land Survey

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED.

LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), HC = Hole Cave

PROJECT:	Steward Street Park - 20381 Hanahan, South Carolina S&ME Project No. 216018	HAND AUGER LOG: C-3 *Sheet 1 of 1*

DATE: 08/19/2021	**ELEVATION:** 3.5 ft	**NOTES:** Elevation interpolated from provided *Boundary & As-built Survey* dated February 17, 2021 provided by ADC.
EQUIPMENT: AMS Hand Auger	**DATUM:** NAVD88	
OPERATOR: Andre Kruk	**DEPTH:** 4.0 ft	
	CLOSURE:	
DRILLING METHOD:	**LOGGED BY:** Andre Kruk	**LATITUDE:** **LONGITUDE:**
SAMPLING METHOD:	**PROJECT COORDINATE SYSTEM -** World Geodetic System Longitude / Latitude (WGS 84)	

Depth (feet)	NOTES	DEPOSITIONAL ENVIRONMENT	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION
0		Fill			AGGREGATE BASECOURSE = 1 ft		3
1					SILTY SAND (SM), few low plasticity fines, very dark gray to gray, fine grained sand, moist, few crushed stone.		2
2	Auger refusal at 2.0 feet						1
3							0
4	Terminated at 4.0 feet						-1
5							

GROUNDWATER		DATE/TIME	DEPTH (FT)	REMARKS
DURING ADVANCE	▽	08/19/2921		not encountered
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

Vertical Accuracy: Land Survey

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED.

LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), HC = Hole Cave

FIELD TESTING PROCEDURES

Cone Penetrometer Test (CPT) Sounding

The cone penetrometer test soundings (ASTM D 5778) were performed by hydraulically pushing an electronically instrumented cone penetrometer through the soil at a constant rate. As the cone penetrometer tip was advanced through the soil, nearly continuous readings of point stress, sleeve friction and pore water pressure were recorded and stored in the on-site computers. Using theoretical and empirical relationships, CPT data can be used to determine soil stratigraphy and estimate soil properties and parameters such as effective stress, friction angle, Young's Modulus and undrained shear strength.

The consistency and relative density designations, which are based on the cone tip resistance, q_t for sands and cohesive soils (silts and clays) are as follows:

SANDS		**SILTS AND CLAYS**	
Cone Tip Resistance, q_t (tsf)	**Relative Density**	**Cone Tip Resistance, q_t (tsf)**	**Consistency**
<20	Very Loose	<5	Very Soft
20 – 40	Loose	5 – 10	Soft
40 – 120	Medium Dense	10 – 15	Firm
		15 – 30	Stiff
120 – 200	Dense	30 –60	Very Stiff
>200	Very Dense	>60	Hard

CPT Correlations

References are in parenthesis next to the appropriate equation.

General

p_a = atmospheric pressure (for unit normalization)
q_t = corrected cone tip resistance (tsf)
f_s = friction sleeve resistance (tsf)
$R_f = 100\% * (f_s/q_t)$
u_2 = pore pressure behind cone tip (tsf)
u_0 = hydrostatic pressure
$B_q = (u_2-u_0)/(q_t-\sigma_{v0})$
$Q_t = (q_t-\sigma_{v0})/ \sigma'_{v0}$
$F_r = 100\% * f_s/(q_t- \sigma_{v0})$
$I_c = ((3.47-\log Q_t)^2+(\log F_r+1.22)^2)^{0.5}$

N-Value
$N_{60} = (q_t/pa)/[8.5(1-I_c/4.6)]$ (6)

(6) Jefferies, M.G. and Davies, M.P., (1993), "Use of CPTu to estimate equivalent SPT N60", ASTM Geotechnical Testing Journal, Vol. 16, No. 4

CPT Soil Classification Legend

Zone	Q_t/N	Description
1	2	Sensitive, Fine Grained
2	1	Organic Soils-Peats
3	1.5	Clays-Clay to Silty Clay
4	2	Silt Mixtures-Clayey Silt to Silty Clay
5	3	Sand Mixtures-Silty Sand to Sandy Silt
6	4.5	Sands-Clean Sand to Silty Sand
7	6	Gravelly Sand to Sand
8	1	Very Stiff Clay to Clayey Sand*
9	2	Very Stiff, Fine Grained*

(*) Heavily Overconsolidated or Cemented

Robertson's Soil Behavior Type (SBT), 1990			
Group #	**Description**	**Ic**	
		Min	**Max**
1	Sensitive, fine grained	N/A	
2	Organic soils - peats	3.60	N/A
3	Clays - silty clay to clay	2.95	3.60
4	Silt mixtures - clayey silt to silty clay	2.60	2.95
5	Sand mixtures - silty sand to sandy silt	2.05	2.60
6	Sands - clean sand to silty sand	1.31	2.05
7	Gravelly sand to dense sand	N/A	1.31
8	Very stiff sand to clayey sand (High OCR or cemented)	N/A	
9	Very stiff, fine grained (High OCR or cemented)	N/A	

Soil behavior type is based on empirical data and may not be representative of soil classification based on plasticity and grain size distribution.

Relative Density and Consistency Table			
SANDS		SILTS and CLAYS	
Cone Tip Stress, qt (tsf)	Relative Density	Cone Tip Stress, qt (tsf)	Consistency
Less than 20	Very Loose	Less than 5	Very Soft
20 - 40	Loose	5 - 15	Soft to Firm
40 - 120	Medium Dense	15 - 30	Stiff
120 - 200	Dense	30 - 60	Very Stiff
Greater than 200	Very Dense	Greater than 60	Hard

Form No: TR-D2216-T265-1
Revision No. 1
Revision Date: 08/16/17

LABORATORY DETERMINATION OF WATER CONTENT

ASTM D 2216 ☑ *AASHTO T 265* ☐

S&ME, Inc. - Charleston: 620 Wando Park Boulevard, Mt. Pleasant, SC 29464

Project #:	216018	Report Date:	8/20/2021
Project Name:	Steward Street Park	Test Date(s):	8/19/2021
Client Name:	ADC Engineering Specialists		
Client Address:	1226 Yeamans Hall Rd., Hanahan, SC 29410		
Sample by:	Andre K.	Sample Date(s):	8/18/2021
Sampling Method:	N/A	Drill Rig :	N/A

Method: **A (1%)** ☐ **B (0.1%)** ☑

Balance ID.	6976	Calibration Date:	1/7/2021
Oven ID.	13796	Calibration Date:	8/3/2021

Boring No.	Sample No.	Sample Depth	Tare #	Tare Weight	Tare Wt.+ Wet Wt	Tare Wt. + Dry Wt	Water Weight	Percent Moisture	Note
		ft. or m.		grams	grams	grams	grams	%	
B-3		1'-1.5'	95	60.31	270.01	230.73	39.28	23.0%	
B-2		2.5'-3.0'	10	60.47	272.22	212.28	59.94	39.5%	

Notes / Deviations / References

Rafael Burkett	Rafael Burkett	Supervising Technician	8/20/2021
Technical Responsibility	*Signature*	*Position*	*Date*

Form No: TR-D1140-2
Revision No. 1
Revision Date: 8/2/17

MATERIAL FINER THAN THE #200 SIEVE

ASTM D1140

S&ME, Inc. - Charleston:	620 Wando Park Boulevard, Mt. Pleasant, SC 29464		
Project #:	216018	Report Date:	8/23/2021
Project Name:	Steward Street Park	Test Date(s):	8/20/2021
Client Name:	ADC Engineering Specialists		
Client Address:	1226 Yeamans Hall Rd., Hanahan, SC 29410		
Sample by:	Andre K.	Sample Dates:	8/18/2021
Sampling Method:	N/A	Drill Rig :	N/A

Boring No.	B-3	Sample No.	-	Sample Depth:	1.0'-1.5'
Sample Description	Tan, Brown Clayey Sand (SC)				
☐ *Auxiliary*		*#200 Wash*	Method A ☐	Method B ☒	
	Tare #:	95	Soaked ☒	*Soak Time*	24 hrs.
	Tare Wt. (T)	60.31	Original Dry Mass of Sample (B)		**170.42**
	Wet Wt + T	270.01	After 200 Wash + Tare Wt. (C_T)		148.70
	Dry Wt + T	230.73	Dry Mass Retained on #200 Sieve (C)		**88.39**
	Moisture Content (MC)	**23.0%**	**% Passing #200 Sieve (A)**		**48.1%**

Boring No.	B-2	Sample No.	-	Sample Depth:	2.5'-3.0'
Sample Description	Light Tan Sandy Silt (SM)				
☐ *Auxiliary*		*#200 Wash*	Method A ☐	Method B ☒	
	Tare #:	10	Soaked ☒	*Soak Time*	24 hrs.
	Tare Wt. (T)	60.47	Original Dry Mass of Sample (B)		**151.81**
	Wet Wt (W) + T	272.22	After 200 Wash + Tare Wt. (C_T)		95.68
	Dry Wt (D) + T	212.28	Dry Mass Retained on #200 Sieve (C)		**35.21**
	Moisture Content (MC)	**39.5%**	**% Passing #200 Sieve (A)**		**76.8%**

Boring No.		Sample No.		Sample Depth:	
Sample Description					
☐ *Auxiliary*		*#200 Wash*	Method A ☐	Method B ☐	
	Tare #:		Soaked ☐	*Soak Time*	24 hrs.
	Tare Wt. (T)		Original Dry Mass of Sample (B)		
	Wet Wt (W) + T		After 200 Wash + Tare Wt. (C_T)		
	Dry Wt (D) + T		Dry Mass Retained on #200 Sieve (C)		
	Moisture Content (MC)		**% Passing #200 Sieve (A)**		

Balance ID.	*6976*	*Calibration Date:*	*1/7/2021*	*#200 Sieve*	*10661*	*Calibration Date:*	*12/7/2021*

Notes / Deviations / References:

Rafael Burkett	Rafael Burkett	Supervising Technician	8/23/2021
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 1
Revision Date: 7/26/17

LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX

ASTM D 4318 ☒ AASHTO T 89 ☐ AASHTO T 90 ☐

S&ME, Inc. - Charleston: 620 Wando Park Boulevard, Mt. Pleasant, SC 29464

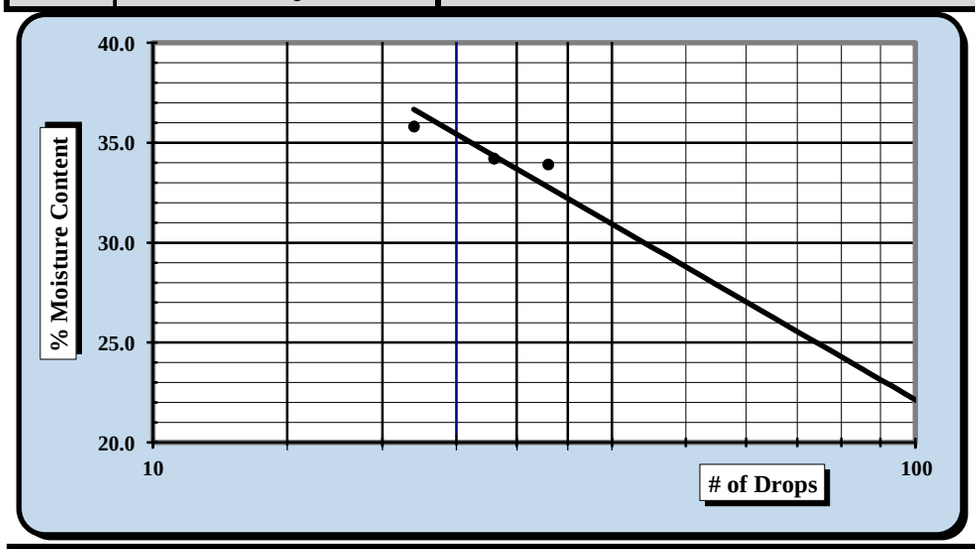
Project #:	216018	Report Date:	8/23/2021
Project Name:	Steward Street Park	Test Date(s)	8/20-8/23/2021
Client Name:	ADC Engineering Specialists		
Client Address:	1226 Yeamans Hall Rd., Hanahan, SC 29410		

Boring #:	B-3	Sample #:	-	Sample Date:	8/18/2021
Location:	N/A	Offset: N/A		Depth/Elev.:	1.0'-1.5'

Sample Description: Tan Brown Clayey Sand (SC)

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	6976	1/7/2021	Grooving tool	10569	7/31/2021
LL Apparatus	6238	7/31/2021	Grooving tool		
Oven	13796	8/3/2021	Grooving tool		

Pan #	31	Liquid Limit						Plastic Limit		
	Tare #:	T4	V5	L5				T13	U6	
A	Tare Weight	19.80	21.22	20.03				21.82	20.43	
B	Wet Soil Weight + A	31.78	32.06	32.39				28.29	26.51	
C	Dry Soil Weight + A	28.75	29.30	29.13				27.36	25.62	
D	Water Weight (B-C)	3.03	2.76	3.26				0.93	0.89	
E	Dry Soil Weight (C-A)	8.95	8.08	9.10				5.54	5.19	
F	% Moisture (D/E)*100	33.9%	34.2%	35.8%				16.8%	17.1%	
N	# OF DROPS	33	28	22				*Moisture Contents determined by ASTM D 2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**17.0%**		



One Point Liquid Limit

N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐

Liquid Limit	**36**
Plastic Limit	**17**
Plastic Index	**19**
Group Symbol	**CL**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☐

Notes / Deviations / References: NP - Non-plastic; ND - Non-determined

Rafael Burkett
Technical Responsibility

8/23/2021
Date

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LABORATORY TESTING PROCEDURES

Atterberg Limits Test (ASTM D-4318)

Atterberg Limits tests were performed to determine the soil plasticity characteristics. The soil plasticity index (PI) is representative of this characteristic and is bracketed by the liquid limit (LL) and the plastic limit (PL). The liquid limit is the moisture content at which the soil will flow as a heavy viscous fluid. The plastic limit is the moisture content at which the soil begins to lose its plasticity. The difference between the liquid limit and plastic limit is the plasticity index.

Grain Size Test (ASTM D 1140)

Grain size tests were performed to determine the soil particle size distribution. The amount of material finer than the #200 sieve was determined by washing the sample over that particular size sieve.

Natural Moisture Content Test (ASTM D 2216)

Moisture content tests were conducted to determine the ratio, expressed as a percentage, of the weight of water in a given amount of soil to the weight of the solid particles.

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Work covered by Contract Documents.
2. Work by Owner.
3. Owner-furnished/Contractor-installed (OFCI) products.
4. Contractor's use of site and premises.
5. Work restrictions.
6. Specification and Drawing conventions.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. The City of Hanahan is constructing Steward Street Park located in Hanahan, South Carolina. Park will include: the demolition of the existing pumphouse and operations building and removal of asphalt pavement and concrete slabs. The project includes a new restroom building, renovation of the existing storage shed into a park pavilion, a wood boardwalk, a new covered fishing pier and a floating kayak launch. The site infrastructure will include vehicle parking, food truck service, pedestrian walks and plaza and stormwater, site utilities and other Work indicated in the Contract Documents.

B. Type of Contract:

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

1.3 WORK BY OWNER (IF APPLICABLE)

A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying Work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.

1.4 OWNER-FURNISHED/CONTRACTOR-INSTALLED (OFCI) PRODUCTS (IF APPLICABLE)

A. General: Owner will furnish products indicated. The Work includes receiving, unloading, handling, storing, protecting and installing Owner-furnished products and making building service connections.

1.5 CONTRACTOR'S USE OF SITE AND PREMISES

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

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

1.6 WORK RESTRICTIONS

A. Comply with restrictions on construction operations.

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

B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

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

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

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

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

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

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

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

1.7 SPECIFICATION AND DRAWING CONVENTIONS

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

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

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

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012200 - UNIT PRICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

B. Related Requirements:

1. Section 312000 "Earth Moving" for detailed description of associated unit pricing.
2. Section 334100 “Site Storm Drainage Utilities” for detailed description of associated unit pricing.

1.2 DEFINITIONS

A. Unit price is an amount incorporated into the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.3 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. Unit Price No. 1: Removal of unsuitable material and replacement with controlled fill.

1. Description: According to Section 312000 "Earth Moving".
2. Unit of Measurement: Cubic Yards (CY).

B. Unit Price No. 2: Removal of unsuitable material and replacement with granular material.

1. Description: According to Section 334100 "Storm Utility Drainage Piping".
2. Unit of Measurement: Cubic Yards (CY).

END OF SECTION 012200

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Execute accepted alternates under the same conditions as other work of the Contract.

C. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1: Add Trex Decking.

1. Base Bid: Boardwalk is wood decking as indicated on Drawings.
2. Alternate: Boardwalk is Trex decking in lieu of wood decking.

B. Alternate No. 2: Add Pavilion Fireplace.

1. Base Bid: No fireplace located within Pavilion as indicated on Drawings.
2. Alternate: Add masonry fireplace to Pavilion.

C. Alternate No. 3: Add Kayak Launch and Ramp.

1. Base Bid: No Kayak Launch and Ramp included as indicated on Drawings.
2. Alternate: Add kayak launch and ramp.

D. Alternate No. 4: Additional Site Furnishings.

1. Base Bid: Bicycle racks and bollards included as indicated on Drawings.
2. Alternate: Add table and chair sets, rocking chairs, picnic tables, benches and trash containers.

E. Alternate No. 5: Add Flagpole.

1. Base Bid: No Flagpole included as indicated on Drawings.
2. Alternate: Add 30 foot, illuminated, Flagpole.

F. Alternate No. 6: Add Wood Fence.

1. Base Bid: No wood fence included as indicated on Drawings.
2. Alternate: Add approximately 552.5 feet of an 8 foot wood fence.

END OF SECTION 012300

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

1.2 DEFINITIONS

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

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.3 ACTION SUBMITTALS

A. Substitution Requests: Digitally submit each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use form acceptable to Owner.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.

k. Cost information, including a proposal of change, if any, in the Contract Sum.

l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.

m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.

1.4 QUALITY ASSURANCE

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

1.5 PROCEDURES

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

1.6 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

B. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 days after commencement of the Work. Requests received after that time may be considered or rejected at discretion of Architect.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time.

1. Work Change Proposal Requests issued by Owner and/or Architect are not instructions either to stop work in progress or to execute the proposed change.

1.3 PROPOSAL REQUESTS

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

1. Work Change Proposal Requests issued by Owner and/or Architect are not instructions either to stop work in progress or to execute the proposed change.
2. Within time specified in Proposal Request or 10 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
c. Include costs of labor and supervision directly attributable to the change.
d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

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

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use a Form acceptable to the Owner.

1.4 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Change Proposal Request, Architect will assist Owner to issue a Change Order for signatures of Owner, Architect and Contractor.

1.5 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Owner or Architect may issue a Construction Change Directive. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

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

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

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 SCHEDULE OF VALUES

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

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

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

1. Arrange schedule of values consistent with format of AIA Document G703.
2. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
3. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

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

4. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
5. Overhead Costs: Include total cost and proportionate share of general overhead and profit for each line item.
6. Overhead Costs: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
7. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
8. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.3 APPLICATIONS FOR PAYMENT

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

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

C. Application for Payment Forms: Use AIA Document G702 and AIA Document G70 as form for Applications for Payment.

1. Other application for payment forms proposed by the Contractor may be acceptable to Architect and Owner. Submit forms for approval with initial submittal of schedule of values.

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

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

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

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

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

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

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

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).
4. Products list (preliminary if not final).
5. Sustainable design action plans, including preliminary project materials cost data.
6. Schedule of unit prices.
7. Submittal schedule (preliminary if not final).
8. List of Contractor's staff assignments.
9. List of Contractor's principal consultants.
10. Copies of building permits.
11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
12. Initial progress report.
13. Report of preconstruction conference.
14. Certificates of insurance and insurance policies.
15. Performance and payment bonds.
16. Data needed to acquire Owner's insurance.

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

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

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

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

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

1. General coordination procedures.
2. Coordination drawings.
3. RFIs.
4. Project meetings.

1.2 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

1.3 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

1.4 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
b. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

B. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within plenums to accommodate layout of light fixtures and other components indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
6. Review: Architect will review coordination drawings to confirm that, in general, the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make suitable modifications and resubmit.

C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:

1. File Submittal Format: Submit or post coordination drawing files using PDF format.

1.5 REQUEST FOR INFORMATION (RFI)

A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Owner name.
2. Owner's Project number.
3. Name of Architect.
4. Architect's Project number.
5. Date.
6. Name of Contractor.
7. RFI number, numbered sequentially.
8. RFI subject.
9. Specification Section number and title and related paragraphs, as appropriate.
10. Drawing number and detail references, as appropriate.
11. Field dimensions and conditions, as appropriate.
12. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
13. Contractor's signature.
14. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

C. RFI Forms: AIA Document G716 or form with substantially the same content as indicated above, acceptable to Architect.

D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.

1. The following Contractor-generated RFIs will be returned without action:

    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for approval of Contractor's means and methods.
    d. Requests for coordination information already indicated in the Contract Documents.
    e. Requests for adjustments in the Contract Time or the Contract Sum.
    f. Requests for interpretation of Architect's actions on submittals.
    g. Incomplete RFIs or inaccurately prepared RFIs.

2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architectof additional information.
3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."

    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Include the following:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.

F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

1.6 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

B. Preconstruction Conference: Architect will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.

1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:

   a. Responsibilities and personnel assignments.
   b. Tentative construction schedule.
   c. Phasing.
   d. Critical work sequencing and long lead items.
   e. Designation of key personnel and their duties.
   f. Lines of communications.
   g. Use of web-based Project software.
   h. Procedures for processing field decisions and Change Orders.
   i. Procedures for RFIs.
   j. Procedures for testing and inspecting.
   k. Procedures for processing Applications for Payment.
   l. Distribution of the Contract Documents.
   m. Submittal procedures.
   n. Sustainable design requirements.
   o. Preparation of Record Documents.
   p. Use of the premises.
   q. Work restrictions.
   r. Working hours.
   s. Owner's occupancy requirements.
   t. Responsibility for temporary facilities and controls.
   u. Procedures for moisture and mold control.
   v. Procedures for disruptions and shutdowns.
   w. Construction waste management and recycling.
   x. Parking availability.
   y. Office, work, and storage areas.
   z. Equipment deliveries and priorities.
   aa. First aid.
   bb. Security.
   cc. Progress cleaning.

3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.

2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

    a. Contract Documents.
    b. Options.
    c. Related RFIs.
    d. Related Change Orders.
    e. Purchases.
    f. Deliveries.
    g. Submittals.
    h. Sustainable design requirements.
    i. Review of mockups.
    j. Possible conflicts.
    k. Compatibility requirements.
    l. Time schedules.
    m. Weather limitations.
    n. Manufacturer's written instructions.
    o. Warranty requirements.
    p. Compatibility of materials.
    q. Acceptability of substrates.
    r. Temporary facilities and controls.
    s. Space and access limitations.
    t. Regulations of authorities having jurisdiction.
    u. Testing and inspecting requirements.
    v. Installation procedures.
    w. Coordination with other work.
    x. Required performance results.
    y. Protection of adjacent work.
    z. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Progress Meetings: Conduct progress meetings at regular intervals.

1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

    a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

        1) Review schedule for next period.

    b. Review present and future needs of each entity present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Resolution of BIM component conflicts.
4) Status of submittals.
5) Status of sustainable design documentation.
6) Deliveries.
7) Off-site fabrication.
8) Access.
9) Site use.
10) Temporary facilities and controls.
11) Progress cleaning.
12) Quality and work standards.
13) Status of correction of deficient items.
14) Field observations.
15) Status of RFIs.
16) Status of Proposal Requests.
17) Pending changes.
18) Status of Change Orders.
19) Pending claims and disputes.
20) Documentation of information for payment requests.

3. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

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

E. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 90 days prior to the scheduled date of Substantial Completion.

1. Conduct the conference to review requirements and responsibilities related to Project closeout.
2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:

   a. Preparation of Record Documents.
   b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
   c. Procedures for completing and archiving Project site data files.
   d. Submittal of written warranties.
   e. Requirements for completing sustainable design documentation.
   f. Requirements for preparing operations and maintenance data.
   g. Requirements for delivery of material samples, attic stock, and spare parts.
   h. Requirements for demonstration and training.
   i. Preparation of Contractor's punch list.
   j. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
   k. Submittal procedures.
   l. Coordination of separate contracts.
   m. Owner's partial occupancy requirements.
   n. Installation of Owner's furniture, fixtures, and equipment.
   o. Responsibility for removing temporary facilities and controls.

4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Contractor's Construction Schedule.
2. Construction schedule updating reports.
3. Daily construction reports.
4. Site condition reports.

1.2 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

D. Event: The starting or ending point of an activity.

E. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

1.3 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. Working electronic copy of schedule file.
2. PDF file.

B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.

C. Construction Schedule Updating Reports: Submit with Applications for Payment.

D. Daily Construction Reports: Submit at weekly intervals.

E. Site Condition Reports: Submit at time of discovery of differing conditions.

1.4 COORDINATION

A. Coordinate Contractor's Construction Schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

1.5 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

B. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
3. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.

C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.
2. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
4. Work Restrictions: Show the effect of the following items on the schedule:

a. Coordination with existing construction.
b. Uninterruptible services.
c. Use-of-premises restrictions.
d. Provisions for future construction.
e. Seasonal variations.
f. Environmental control.

D. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

1. Unresolved issues.
2. Unanswered Requests for Information.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.
5. Pending modifications affecting the Work and the Contract Time.

E. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate final completion percentage for each activity.

F. Recovery Schedule: When periodic update indicates the Work is 30 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.

G. Distribution: Distribute copies of approved schedule to Architect Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

1.6 GANTT-CHART SCHEDULE REQUIREMENTS

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within 30 days of date established for the Notice to Proceed.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

1.7 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain or snow.
7. Testing and inspection.
8. Accidents.
9. Meetings and significant decisions.
10. Stoppages, delays, shortages, and losses.
11. Meter readings and similar recordings.
12. Emergency procedures.
13. Orders and requests of authorities having jurisdiction.
14. Change Orders received and implemented.
15. Construction Change Directives received and implemented.
16. Services connected and disconnected.
17. Equipment or system tests and startups.
18. Partial completions and occupancies.
19. Substantial Completions authorized.

B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013200

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Submittal schedule requirements.
2. Administrative and procedural requirements for submittals.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.3 SUBMITTAL SCHEDULE

A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1.4 SUBMITTAL FORMATS

A. Submittal Information: Include the following information in each submittal:

1. Project name.
2. Date.
3. Name of Architect.
4. Name of Contractor.
5. Name of firm or entity that prepared submittal.
6. Names of subcontractor, manufacturer, and supplier.
7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
8. Category and type of submittal.
9. Submittal purpose and description.
10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
11. Drawing number and detail references, as appropriate.
12. Indication of full or partial submittal.
13. Location(s) where product is to be installed, as appropriate.
14. Other necessary identification.
15. Remarks.
16. Signature of transmitter.

B. Options: Identify options requiring selection by Architect.

C. Electronic Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

1.5 SUBMITTAL PROCEDURES

A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Email: Prepare submittals as PDF package, and transmit to Architect by sending via email. Include PDF transmittal form. Include information in email subject line as requested by Architect.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Resubmittal Review: Allow 15 days for review of each resubmittal.
3. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.

D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

1.6 SUBMITTAL REQUIREMENTS

A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

a. Manufacturer's catalog cuts.

b. Manufacturer's product specifications.
c. Standard color charts.
d. Statement of compliance with specified referenced standards.
e. Testing by recognized testing agency.
f. Application of testing agency labels and seals.
g. Notation of coordination requirements.
h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

a. Wiring diagrams that show factory-installed wiring.
b. Printed performance curves.
c. Operational range diagrams.
d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before Shop Drawings, and before or concurrent with Samples.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

a. Identification of products.
b. Schedules.
c. Compliance with specified standards.
d. Notation of coordination requirements.
e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

2. Paper Sheet Size: Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.

a. PDF electronic file.

C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Permanently attach label on unexposed side of Samples that includes the following:

a. Project name and submittal number.
b. Generic description of Sample.
c. Product name and name of manufacturer.
d. Sample source.
e. Number and title of applicable Specification Section.
f. Specification paragraph number and generic name of each item.

3. Email Transmittal: Provide PDF transmittal. Include digital image file illustrating Sample characteristics, and identification information for record.
4. Paper Transmittal: Include paper transmittal including complete submittal information indicated.

5. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

    a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
    b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

6. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

    a. Number of Samples: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

7. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

    a. Number of Samples: Submit one sets of Samples. Architect will retain Sample sets; remainder will be returned.

        1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
        2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

G. Certificates:

1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

H. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for substrate preparation and primers required.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

    a. Name of evaluation organization.
    b. Date of evaluation.
    c. Time period when report is in effect.
    d. Product and manufacturers' names.
    e. Description of product.
    f. Test procedures and results.
    g. Limitations of use.

1.7 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

1.8 CONTRACTOR'S REVIEW

A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

1.9 ARCHITECT'S REVIEW

A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return it.

1. PDF Submittals: Architect will indicate, via markup on each submittal, the appropriate action.

B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Architect will discard submittals received from sources other than Contractor.

F. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013300

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

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

B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

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

1.2 DEFINITIONS

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

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

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

1. Use of trade-specific terminology in referring to a Work result does not require that certain construction activities specified apply exclusively to specific trade(s).

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

1. Laboratory Mockups: Full-size physical assemblies constructed and tested at testing facility to verify performance characteristics.
2. Integrated Exterior Mockups: Mockups of the exterior envelope constructed on-site as freestanding temporary built elements, consisting of multiple products, assemblies, and subassemblies, with cutaways enabling inspection of concealed portions of the Work.
3. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes; doors; windows; millwork; casework; specialties; furnishings and equipment; and lighting.
4. Product Mockups: Mockups that may include multiple products, materials, or systems specified in a single Section.
5. In-Place Mockups: Mockups constructed on-site in their actual final location as part of permanent construction.

E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria. Unless otherwise indicated, copies of reports of tests or inspections performed for other than the Project do not meet this definition.

F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

G. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.

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

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

J. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect.

1.3 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Services Statement: Submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.4 CONFLICTING REQUIREMENTS

A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the Architect regarding the conflict and obtain clarification prior to proceeding with the Work. Refer conflicting requirements that are different, but apparently equal, to Architect for clarification before proceeding.

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

1.5 CONTRACTOR'S QUALITY CONTROL PLAN

A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice to Proceed, and not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's Construction Schedule.

B. Quality-Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.

C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:

1. Contractor-performed tests and inspections including Subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. Distinguish source quality-control tests and inspections from field quality-control tests and inspections.
2. Special inspections required by authorities having jurisdiction and indicated on the Statement of Special Inspections.
3. Owner-performed tests and inspections indicated in the Contract Documents.

E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.

F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.6 ACTION SUBMITTALS

A. Mockup Shop Drawings:

1. Include plans, sections, elevations, and details, indicating materials and size of mockup construction.
2. Indicate manufacturer and model number of individual components.
3. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

1.7 INFORMATIONAL SUBMITTALS

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

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

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

1.8 REPORTS AND DOCUMENTS

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

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

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Statement on condition of substrates and their acceptability for installation of product.
2. Statement that products at Project site comply with requirements.
3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
5. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Statement that equipment complies with requirements.
2. Results of operational and other tests and a statement of whether observed performance complies with requirements.
3. Other required items indicated in individual Specification Sections.

1.9 QUALITY ASSURANCE

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

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.

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

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

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

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

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing and Inspecting Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to ASTM E329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

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

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

1. Contractor responsibilities include the following:

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

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

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

1. Build mockups of size indicated.
2. Build mockups in location indicated or, if not indicated, as directed by Architect.
3. Notify Architect seven days in advance of dates and times when mockups will be constructed.
4. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed to perform same tasks during the construction at Project.
5. Demonstrate the proposed range of aesthetic effects and workmanship.
6. Obtain Architect's approval of mockups before starting corresponding work, fabrication, or construction.

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

7. Promptly correct unsatisfactory conditions noted by Architect's preliminary review, to the satisfaction of the Architect, before completion of final mockup.
8. Approval of mockups by the Architect does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
9. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
10. Demolish and remove mockups when directed unless otherwise indicated.

K. Integrated Exterior Mockups: Construct integrated exterior mockup according to approved Shop Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials. Comply with requirements in "Mockups" Paragraph.

1.10 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
2. Costs for retesting and reinspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.

1. Engage a qualified testing agency to perform quality-control services.

   a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

2. Notify testing agencies at least 72 hours in advance of time when Work that requires testing or inspection will be performed.
3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
4. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

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

1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected Work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.

5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform duties of Contractor.

E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."

F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

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

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
6. Security and protection for samples and for testing and inspection equipment at Project site.

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

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

I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's Construction Schedule. Update as the Work progresses.

1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.11 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Owner will engage a qualified testing agency/special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, as indicated in the **Statement of Special Inspections attached to this Section**, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.

5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Owner's, Architect's and authorities' having jurisdiction reference during normal working hours.

1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

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

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

Statement of Special Inspections

Project: Steward Street Park Permit Number: _____

Project Location: _____

Owner/Address: _____ City _____ Zip _____

Registered Design Professional
In Responsible Charge: Christopher Gilger, PE

Address: 1226 Yeamans Hall Rd

City: Hanahan State: SC Zip: 29410 Phone: 843-566-0161

E-mail: chrisg@adcengineering.com

This statement of Special Inspections attached is submitted as a condition for permit issuance in accordance with Section 1704 of the 2021 International Building Code. It includes a Schedule of Special Inspection Services applicable to the above referenced project as well as the identity of the individuals, agencies, or firms (completed by others) intended to be retained for conducting these inspections. The Special Inspection Coordinator (Registered Design Professional In Charge of Administering Special Inspections) shall keep records of all inspections and shall furnish interim inspection reports to the Engineer of Record (Registered Design Professional in Responsible Charge of Construction Documents) at a frequency agreed upon by the permit applicant and Building Official prior to the start of work. Discrepancies shall be brought to the immediate attention of the Contractor and the Engineer of Record for correction. If the discrepancies are not corrected, the Special Inspection Coordinator shall bring the discrepancies to the attention of the Building Official and the Engineer of Record prior to the completion of that phase of work. The Special Inspection Coordinator shall submit a Final Report of Special Inspections to the building official at the conclusion of the project and before a certificate of occupancy will be issued.

Statement of Special Inspections encompass the following disciplines:

☒ Structural ☐ Mechanical/Electrical/Plumbing
☐ Architectural ☐ Other: _____

Prepared by:

Christopher Gilger, PE
Type or Print Name

Signature

May 12, 2023
Date

SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER No. 28196 CHRISTOPHER J. GILGER

Preparer's Seal and Signature Required

To be filled out by the jurisdiction and returned to applicant
Building Official's Acceptance of Special Inspections
☐ ☐

Frequency of Interim reports: Monthly Bi-Monthly ☐ Upon Completion ☐ Per Attached Schedule

Signature Date TMS Permit Number

Schedule of Inspection and Testing Agencies

This Statement of Special Inspections includes the following building systems:

- ☒ Soils and Foundations
- ☒ Cast-in-Place Concrete
- ☐ Precast Concrete
- ☒ Masonry
- ☒ Structural Steel
- ☒ Cold-Formed Steel Framing
- ☒ Wood Construction
- ☒ Architectural Components
- ☐ Mechanical & Electrical Systems
- ☐ Storage Racks
- ☐ Spray Fire Resistant Material
- ☒ Special Cases

Special Inspection Agencies	**Firm**	**Address, Telephone, e-mail**
1. **Special Inspection Coordinator (Registered Professional in Responsible Charge of Administering Special Inspections)**		
2. Inspector		
3. Inspector		
4. Testing Agency		
5. Testing Agency		
6. Other		

Note: The inspectors and testing agencies shall be engaged by the Owner or the Owner's Agent, and not by the Contractor or Subcontractor whose work is to be inspected or tested. Any conflict of interest must be disclosed to the Building Official, prior to commencing work.

Qualifications of Inspectors and Testing Technicians

The qualifications of all personnel performing Special Inspection and testing activities are subject to the approval of the Building Official and shall be in accordance with the building code or any particular requirements of the specifications or material specific referenced standards. The credentials of all Inspectors and testing technicians shall be provided if requested.

Special Inspection Definitions

Continuous Special Inspection - Special inspection by the special inspector who is present when and where the work to be inspected is being performed.

Periodic Special Inspection - Special inspection by the special inspector who is intermittently present where the work to be inspected has been or is being performed. Unless noted otherwise 100% of the work designated for inspection shall be inspected.

MATERIAL / ACTIVITY	SCOPE OF SERVICE
1704.2.5 Special Inspection of Fabricated Items	
Metal Building Fabrication: Verify Fabrication/Quality Control Procedures	Verify Metal Building Fabricator is IAS AC472 Accredited
Prefabricated Wood Trusses: Verify Fabrication/Quality control Procedures	Verify Wood Truss plant is an active participant of TPI's Quality Assurance Program (QAP) and complies with TPI-1 Quality Assurance Requirements.
Structural Steel Fabrication: Verify Fabrication/Quality Control Procedures	Verify Steel Fabrication plant is AISC certified

MATERIAL / ACTIVITY	SCOPE OF SERVICE
1705.1.1 Special Cases	
Post Installed Anchors	
Installer Qualifications	**Review** installer training records to confirm they have received manufacturer training per the contract documents
Anchor Installation	**Continuously** inspect complete process of anchor installation in accordance with requirements of approved ICC ESR report. As minimum review installation procedures including drill bit type, drilling methods, hole preparation and cleaning, spacing, edge distance, embedment depth, adhesive installation, rod installation, curing time, and anchor torque to ensure compliance with manufacturer's instructions and construction documents. (**All anchor holes must be inspected during drilling, all anchor holes must be inspected prior to anchor installation, all anchors shall be inspected at final application of required torque)**
Concrete Finishing Tolerance	
Conduct Ff and Fl measurements	**Periodically** test concrete slabs on grade in accordance with ASTM E1155 for Ff and Fl measurements to confirm conformance to specified tolerances. **(100% testing rate of all slab pours)** **Periodically** test concrete slabs on deck and elevated formed slabs in accordance with ASTM E1155 for Ff measurements to confirm conformance to specified tolerances. **(100% testing rate of all slab pours)**

MATERIAL / ACTIVITY	SCOPE OF SERVICE
1705.2.1 Structural Steel	
Review fabricator's source quality assurance inspection and testing report submittals	**Periodically** review fabricator's source quality assurance inspection and test reports to ensure all inspection and testing is being completed as required and appropriate standards are being met. **(100% rate for all source quality control report submittals.)**
Conduct Inspections prior to field welding in accordance with AISC 360 Table N5.4-1	**Periodically** confirm welder qualification records and continuity records are current **Periodically** confirm that welding procedure specifications (WPS) are available and on site for type and configuration of weld being completed. **(100% rate for each type and configuration of weld immediately prior to the weld being completed)** **Periodically** confirm manufacturers certifications are available and on site for all welding consumables. **(100% rate for each type of consumable immediately prior to initial use of each consumable)** **Periodically** inspect material identification (type/grade) **Periodically** confirm that a welder identification system is in place for field welding and that the system is being used **(confirm system is in place prior to welding and 100% confirmation of system usage during welding inspection)** **Periodically** inspect fit-up of groove welds including joint preparation, dimensions, cleanliness, tacking, backing type and backing fit **(100% inspection rate of all groove weld joints immediately prior to completing weld)** **Periodically** inspect configuration and finish of weld access holes **(100% inspection rate of all weld access holes immediately prior to completing associated weld)** **Periodically** inspect fit-up of fillet welds including dimensions, cleanliness, and tacking **(Random inspection rate for general conformance with a minimum rate of once weekly during steel erection)**

MATERIAL / ACTIVITY	SCOPE OF SERVICE
1705.2.1 Structural Steel (Continued)	
Conduct inspections during field welding in accordance with AISC 360-10 Table N5.4-2	**Periodically** confirm that welders are qualified for welds which they are completing and they possess a valid welding certificate for that weld type and configuration **(Random inspection rate for general conformance with a minimum rate of once weekly during welding operations)** **Periodically** inspect control and handling of welding consumables including packaging and exposure control. **(Random inspection rate for general conformance with a minimum rate of once weekly during welding operations)** **Periodically** confirm that no welding is occurring over cracked tack welds. **(Random inspection rate for general conformance with a minimum rate of once weekly during welding operations)** **Periodically** confirm that environmental conditions are acceptable including wind speed limits, precipitation and temperature. **(Random inspection rate for general conformance with a minimum rate of once weekly during welding operations)** **Periodically/Continuously** confirm that weld procedure specifications (WPS's) are being followed including settlings of welding equipment, travel speed, selected welding materials, shielding gas type and flow rate, preheat applied, interpass temperature maintained, and proper position. **(Continuously inspect for groove welds, multi-pass welds, or welds greater than 5/16". Periodically inspect all other welds a minimum rate of once weekly during welding operations)** **Periodically/Continuously** confirm welding techniques including interpass and final cleaning, each pass with profile limitations, each pass meets quality requirements. **(Continuously inspect for groove welds, multi-pass welds, or welds greater than 5/16". Periodically inspect all other welds a minimum rate of once weekly during welding operations)** **Periodically** inspect placement and installation of steel headed stud anchors. **(Random inspection rate for general conformance with a minimum rate of once daily during welding operations)**

MATERIAL / ACTIVITY	SCOPE OF SERVICE
1705.2.1 Structural Steel (Continued)	
Conduct inspections after field welding in accordance with AISC 360-10 Table N5.4-3	**Periodically** confirm that welds have been cleaned. **(100% inspection rate with a minimum rate of once weekly during welding operations)** **Periodically** confirm weld size, length and location. **(100% inspection rate with a minimum rate of once weekly during welding operations)** **Periodically** confirm weld meets visual acceptance criteria including crack prohibition, weld/base-metal fusion, crater cross section, weld profiles, weld size, undercut, and porosity. **(100% inspection rate with a minimum rate of once weekly during welding operations)** **Periodically** inspect arc strikes. **(100% inspection rate with a minimum rate of once weekly during welding operations)** **Periodically** inspect k-area for cracks within 3” of welds when welding has been performed in k-area. **(100% inspection rate with a minimum rate of once weekly during welding operations)** **Periodically** confirm backing and weld tabs have been removed where required. **(100% inspection rate with a minimum rate of once weekly during welding operations)**
(Continued) Conduct inspections after field welding in accordance with AISC 360-10 Table N5.4-3	**Periodically** inspect repair activities. **(100% inspection rate with a minimum rate of once weekly during welding operations)** **Periodically** document acceptance or rejection of welded joint or member. **(100% inspection rate with a minimum rate of once weekly during welding operations)** **Periodically** inspect no prohibited welds have been added without the approval of the EOR. **(100% inspection rate with a minimum rate of once weekly during welding operations)**

MATERIAL / ACTIVITY	SCOPE OF SERVICE
1705.2.1 Structural Steel (Continued)	
Conduct Inspections prior to high strength bolting in accordance with AISC 360-10 Table N5.6-1	**Periodically** confirm manufacturers certifications are available each type of fastener material. **(100% rate for each type of fastener material immediately prior to initial use of each type of material)** **Periodically** confirm fasteners are marked in accordance with ASTM Standard. **(Random inspection rate for general conformance with a minimum rate of once weekly during bolting operations)** **Periodically** confirm correct fasteners are selected for the joint detail including grade, type, and bolt length (if threads are to be excluded from shear plane). **(100% inspection rate)** **Periodically/Continuously** confirm correct bolting procedure selected for joint detail. **(100% inspection rate, continuous inspection for slip critical joints, periodic inspection for all other joints with random inspection with a minimum rate of once weekly during bolting operations)** **Periodically/Continuously** inspect connection elements, including appropriate faying surface condition and hole preparation meet applicable requirements. **(continuous inspection for slip critical joints with 100% inspection rate, periodic inspection for all other joints with random inspection with a minimum rate of once weekly during bolting operations)** **Periodically/Continuously** Conduct Preinstallation verification testing by installation personnel and document for fastener assemblies and methods used for slip critical joints. **(Periodically, one time per installer for turn of nut, direct tension indicators, or tension controlled bolts. Periodically, once daily for calibrated wrench without match marking)** **Periodically** confirm protected storage provided for bolts, nuts, washers and other fastener components. **(Random inspection rate for general conformance with a minimum rate of once weekly during bolting operations)**

MATERIAL / ACTIVITY	SCOPE OF SERVICE
1705.2.1 Structural Steel (Continued)	
Conduct Inspections during high strength bolting in accordance with AISC 360-10 Table N5.6-2	**Periodically/Continuously** confirm fastener assemblies placed in all holes and washers are positioned as required. **(100% inspection rate, continuous inspection for slip critical joints, periodic inspection for all other joints with random inspection with a minimum rate of once weekly during bolting operations)** **Continuously** confirm joints are brought to the snug-tight condition prior to pretensioning operation **(100% inspection rate, continuous inspection for slip critical joints)** **Continuously** component not turned by the wrench is prevented from rotating **(100% inspection rate, continuous inspection for slip critical joints)** **Periodically/Continuously** confirm fasteners are pretensioned in accordance with the RCSC Specification, progressing systematically from the most rigid point toward the free edges **(100% inspection rate, continuous inspection for slip critical joints pretensioned with calibrated wrench or turn-of-the-nut without match marking. Periodic inspection for slip critical joints pretensioned with tension controlled bolts, direct tension indicators, or turn-of-the-nut with match marking**
Conduct Inspections after high strength bolting in accordance with AISC 360-10 Table N5.6-3	**Periodically** document acceptance or rejection of bolted connections. **(100% rate with a minimum rate of once weekly during welding operations)**
Other inspection Task	**Periodically** inspect placement of anchor rods and other embedded items prior to concrete/masonry grout placement operations. Confirm diameter, grade, type and length of the anchor rod or embedded item, and the extent or depth of embedment into concrete/masonry grout. **(100% inspection rate immediately prior to concrete/masonry grout placement operation)** **Periodically** inspect the steel frame to verify compliance with the details shown on the construction documents including braces, stiffeners, member locations, and proper application of joint details at each connection. **(100% inspection rate with a minimum rate of once weekly during steel erection operations)**

MATERIAL / ACTIVITY	SCOPE OF SERVICE
1705.3 Concrete Construction	
Inspection of reinforcing steel, and placement	**Periodically** inspect reinforcing steel placement in accordance with contract documents and approved shop drawings to confirm size, spacing, cover, positioning, bends, grade, laps, supports and anchorage. **(100% inspection rate immediately prior to placing concrete)**
Inspection of anchors cast in concrete	**Periodically** inspect size, positioning, embedment, and projection of anchor rods is in accordance with contract documents and approved shop drawings. **(100% inspection rate immediately prior to placing concrete)** **Continuously** inspect concrete placement and consolidation around anchors. **(100% inspection rate during concrete placement)**
Inspection of anchors post-installed in hardened concrete members.	**Review** installer training records to confirm they have received manufacturer training per the contract documents **Continuously** inspect complete process of anchor installation in accordance with requirements of approved ICC ESR report. As minimum review installation procedures including drill bit type, drilling methods, hole preparation and cleaning, spacing, edge distance, embedment depth, adhesive installation, rod installation, curing time, and anchor torque to ensure compliance with manufacturer's instructions and construction documents. (**All anchor holes must be inspected during drilling, all anchor holes must be inspected prior to anchor installation, all anchors shall be inspected at final application of required torque)**
Verifying use of required design mix	**Periodically** review batch tickets to confirm the appropriate approved mix design is being used for the location in which concrete is being placed **(100% review rate during concrete placement)** **Periodically** verify that water added at the site does not exceed that allowed by the batch ticket **(100% inspection rate during concrete placement)**

1705.3 Concrete Construction (Continued)	
Sample fresh concrete to fabricate specimens for strength tests, perform fresh unit weight density, slump and air content tests, and determine the temperature of concrete	**Continuously** test concrete compressive strength (ASTM C31 & C39), fresh unit weight density (ASTM C138), slump (ASTM C143), air-content (ASTM C231 or C173) and temperature (ASTM C1064). Samples for preparing unit weight density specimens and measuring air content shall be obtained at the point of placement. Slump measurements are for reference only and shall not be a basis of rejection. Threshold for fresh unit weight density shall be in accordance with approved mix design submittals (**Frequency of sampling and testing as required by section 21.16 of ACI 318)**
Inspection of concrete for proper application techniques	**Continuously** inspect concrete placement techniques to confirm compliance with section 26.5 of ACI 318.
Inspection for maintenance of specified curing temperatures and techniques	**Periodically** inspection curing temperatures and techniques to insure compliance with contract documents and sections 26.5.3, 26.5.4 and 26.5.5 of ACI 318-14
Inspection of formwork for shape, location and dimensions of concrete member being formed	**Periodically** inspect formwork to ensure compliance with dimensions of members indicated on contract documents **(100% inspection rate during concrete placement)**

MATERIAL / ACTIVITY	SCOPE OF SERVICE
1705.4 Masonry Construction	
Verify compliance with approved submittals	**Periodically** review batch tickets to confirm the appropriate approved grout mix design is being used. **(100% review rate during grout placement)** **Periodically** review mortar materials to confirm compliance with approved submittals. **(A minimum of once weekly during masonry construction)**
Verify proportions of site prepared mortar	**Periodically** inspect proportioning, mixing and re-tempering of mortar. **(A minimum of once daily during masonry construction)**
Inspect construction of mortar joints	**Periodically** inspect construction of mortar joints including tooling and filling of head joints. **(100% inspection rate a minimum of once daily during masonry construction)**
Inspect location of reinforcement and connectors	**Periodically** inspect placement, positioning and lapping of reinforcing steel **(100% inspection rate a minimum of once daily during masonry construction)** **Periodically** inspect size, grade and type of reinforcing. **(100% inspection rate a minimum of once daily during masonry construction)** **Continuously** inspect placement positioning and lapping of joint reinforcement. **(100% Inspection rate – inspector shall be in the area of masonry work to monitor installation)** **Periodically** inspect size, grade, type and location of anchor rods and embeds. **(100% inspection rate a minimum of once daily during masonry construction)**
Inspect Grout Space	**Periodically** grout spaces to ensure minimum clear grout spaces are achieved, and that grout spaces are free from debris, mortar fins and mortar droppings. Confirm mortar fins and mortar droppings are being manually removed as masonry is constructed. **(100% inspection rate a minimum of once daily during masonry construction)**
Verify proportions of site prepared grout	**Periodically** inspect proportioning, mixing and re-tempering of mortar. **(A minimum of once daily during masonry construction)**
Proportions of site prepared grout	**Continuously** inspect proportioning and mixing of site batched grout. Confirm acceptable measurement devices are being employed and that the mix proportions are in accordance with approved submittals.
Verify size and location of structural masonry elements	**Periodically** inspect the size and location of structural elements to comply with contract drawings. **(100% inspection rate a minimum of once daily during applicable portion of the work)**

MATERIAL / ACTIVITY	SCOPE OF SERVICE
1705.4 Masonry Construction (Continued)	
Verify protection of masonry during hot/cold weather	**Periodically** inspect protection of masonry during cold weather (temperature below 40 deg F) or hot weather (temperature above 90 deg F) **Periodically** verify that all wall cavities are protected against precipitation. **(100% inspection rate a minimum of once daily during applicable portion of the work)**
Verify grout placement complies with code and construction document provisions	**Continuously** inspect placement, consolidation and reconsolidation of grout. **(100% inspection rate)** **Continuously** verify grouting and grout consolidation procedures are in accordance with code and contract document provisions. **(100% inspection rate)**
Evaluation of grout Strength	**Continuously** Test compressive strength of grout samples (ASTM C1019). (**Sample and test grout for every 5000 sq ft. of wall, but not less than one set of samples for each day's worth of grouting)**

MATERIAL / ACTIVITY	SCOPE OF SERVICE
1705.5 Wood Construction	
Inspection of High-Load Diaphragms	**Periodically** inspect wood structural panel diaphragms to verify the sheathing material thickness and grade complies with the requirements of the construction documents. **(100% inspection rate)** **Periodically** inspect nominal size of wood framing members at adjoining panel edges, blocking as specified at panel edges, nail or staple diameter and length, number of fastener lines, and that spacing between fasteners at each line and at edge margins agrees with construction documents. **(100% inspection rate)**

MATERIAL / ACTIVITY	SCOPE OF SERVICE
1705.6 Soils	
Verify materials below shallow foundations are adequate to achieve the design bearing capacity	**Periodically** inspect soils within building footprint for adequate bearing capacity and consistency with the geotechnical report**.** **(100% inspection rate)**
Verify excavations are extended to proper depth and have reached proper material	**Periodically** inspect all footing excavations to ensure they are to proper depth and have reached proper material as indicated on contract documents and/or geotechnical report. **(100% inspection rate immediately prior to placement to reinforcing steel for foundations)** **Periodically** inspect all unsuitable material excavations to ensure they are to proper depth and have reached proper material as indicated on contract documents and/or geotechnical report. **(100% inspection rate of all areas of unsuitable fill removal immediately prior to placement of fill)**
Perform classification testing of compacted fill materials.	**Periodically** perform testing of fill materials to ensure compliance with contract documents and geotechnical report. Classification and testing shall be in accordance with the Geotechnical report. Where the geotechnical report does not specifically indicate testing, the minimum testing shall be sieve tests (ASTM D422 & D1140) and Standard Proctor tests (ASTM D98). **(Testing shall be completed for each source of material, or where obvious changes of properties of fill materials are realized)**
Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill	**Continuously** verify materials for compacted fill to ensure materials have been previously tested and are in compliance with the contract documents and geotechnical report. **(100% inspection rate)** **Periodically** test density of each lift of fill within the building footprint to confirm compliance with compaction requirements outlined in the contract documents and geotechnical report. **(Where inspection rates are not indicated in the geotechnical report, not less than one test per each lift per 2000 sq ft of fill placed)** **Continuously** verify lift thicknesses are during placement of compacted fill to ensure lift thickness is in compliance with the contract documents and geotechnical report. **(100% inspection rate)**
Prior to placement of compacted fill, inspect subgrade and verify that the site has been prepared properly.	**Periodically** inspect subgrade within the building footprint prior to placement of compacted fill to ensure subgrade complies with contract documents and geotechnical report. **(100% inspection rate of all areas immediately prior to placement of fill)**

MATERIAL / ACTIVITY	SCOPE OF SERVICE
1705.11 Special Inspections for Wind Resistance	
1705.11.1 Structural Wood (Main Wind Force Resisting System)	**Periodically** inspect nailing, bolting, anchoring and other fastening of components of the main wind force resisting system. Inspection shall include wood shear walls, wood diaphragms, drag struts/collectors, chords, braces, shear panels and hold downs. **(Random inspection rate for general conformance with a minimum rate of once weekly during construction of seismic force resisting system)**
1705.11.2 Cold Formed Steel Light Framed Construction (Main Wind Force Resisting System)	**Periodically** inspect screw attachment, bolting, anchoring and other fastening of components of the main wind force resisting system. Inspection shall include shear walls, wood diaphragms, drag struts/collectors, chords, braces, shear panels and hold downs. **(Random inspection rate for general conformance with a minimum rate of once weekly during construction of seismic force resisting system)**
1705.11.3 Wind Resisting Components	**Periodically** inspect the installation of Roof Cladding is in accordance with approved submittals and manufacturer's installation requirements **(Random inspection rate for general conformance with a minimum rate of once weekly during roof cladding installation)** **Periodically** inspect the installation of Wall Cladding is in accordance with approved submittals and manufacturer's installation requirements **(Random inspection rate for general conformance with a minimum rate of once weekly during wall cladding installation)**

MATERIAL / ACTIVITY	SCOPE OF SERVICE
1705.12 Special Inspections for Seismic Resistance	
1705.12.1 Structural Steel (Seismic Force Resisting System)	**Periodically** review fabricator's source quality assurance inspection and test reports to ensure all inspection and testing is being completed as required and appropriate standards are being met. **(100% rate for all source quality control report submittals.)** Special inspector shall submit a written quality assurance plan for field inspection in accordance with AISC 341-16 Chapter J3 Inspect field welding of Seismic Force Resisting System Weld Inspection in accordance with AISC 341-16 item J6 Inspect field bolting of Seismic Force Resisting System Bolting Inspection in accordance with AISC 341-16 item J7 Inspect other steel structure items in accordance with AISC 341-16 item J8 Inspect field construction of composite structures in accordance with AISC 341-16 item J9 Inspect field fabrication of steel piles in accordance with AISC 341-16 item J10
1705.12.2 Structural Wood (Seismic Force Resisting System)	**Periodically** inspect nailing, bolting, anchoring and other fastening of components of the seismic force resisting system. Inspection shall include wood shear walls, wood diaphragms, drag struts/collectors, chords, braces, shear panels and hold downs. **(Random inspection rate for general conformance with a minimum rate of once weekly during construction of seismic force resisting system)**
1705.12.3 Cold Formed Steel Light Frame Construction (Seismic Force Resisting System)	**Periodically** inspect screw attachment, bolting, anchoring and other fastening of components of the seismic force resisting system. Inspection shall include shear walls, wood diaphragms, drag struts/collectors, chords, braces, shear panels and hold downs. **(Random inspection rate for general conformance with a minimum rate of once weekly during construction of seismic force resisting system)**
1705.12.5 Architectural Components	**Periodically** inspect the erection and fastening of exterior wall cladding to ensure compliance with specifications, approved submittals and manufacturer's installation requirements. **(Random inspection rate for general conformance with a minimum rate of once weekly during cladding installation)** **Periodically** inspect the erection and fastening of interior and exterior veneers to ensure compliance with specifications, approved submittals and manufacturer's installation requirements. **(Random inspection rate for general conformance with a minimum rate of twice weekly during cladding installation)** **Periodically** inspect installation of interior and exterior nonbearing walls to ensure installation is in accordance with construction documents, specifications, and approved shop drawing submittals and/or manufacturer's instructions. Inspection shall include verifications of fastening of wall components and wall anchorages including number, type and spacing of fasteners as well as confirmation that installed connections allow for specified vertical and/or drift deflections. **(100% inspection rate with a minimum inspection rate of once weekly during nonbearing wall installation.)**

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 USE CHARGES

A. Installation, removal, and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.

1.3 INFORMATIONAL SUBMITTALS

A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.

B. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

1.4 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

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

1.5 PROJECT CONDITIONS

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

PART 2 - PRODUCTS

2.1 TEMPORARY FACILITIES

A. Field Offices: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:

1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
2. Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 4-foot-square tack and marker boards.
3. Drinking water and private toilet.
4. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
5. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.

2.2 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

3.2 INSTALLATION, GENERAL

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

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

3.3 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.

C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction as directed by authorities having jurisdiction.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, safety shower and eyewash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

E. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

1. Install electric power service underground unless otherwise indicated.

F. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

G. Electronic Communication Service: Provide secure WiFi wireless connection to internet with provisions for access by Architect and Owner.

3.4 SUPPORT FACILITIES INSTALLATION

A. Comply with the following:

1. Provide construction for temporary field offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E136. Comply with NFPA 241.
2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.

1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.

C. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

D. Parking: Provide temporary parking areas for construction personnel as indicated on the drawings.

E. Storage and Staging: Use designated areas of Project site for storage and staging as indicated on the drawings.

F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Identification Signs: Provide Project identification signs as indicated on Drawings.
2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.

a. Provide temporary, directional signs for construction personnel and visitors.

3. Maintain and touch up signs so they are legible at all times.

H. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."

I. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

J. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.

K. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

C. Temporary Erosion and Sedimentation Control: Comply with requirements of South Carolina Construction General Permit and authorities having jurisdiction, and requirements specified in Section 312523 "Erosion and Sediment Controls".

D. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings.

1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant-protection zones.
2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

E. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

F. Tree and Plant Protection: Comply with requirements specified in Section 015639 "Temporary Tree and Plant Protection."

G. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be

free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.

H. Site Enclosure Fence: Prior to commencing earthwork, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.

1. Extent of Fence: As indicated on Drawings.
2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.

I. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.

J. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

K. Temporary Egress: Provide temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction. Provide signage directing occupants to temporary egress.

L. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.

M. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.

1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.6 MOISTURE AND MOLD CONTROL

A. Moisture and Mold Protection: Protect stored materials and installed Work in accordance with Moisture and Mold Protection Plan.

B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:

1. Protect porous materials from water damage.
2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.
4. Remove standing water from decks.
5. Keep deck openings covered or dammed.

C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
2. Keep interior spaces reasonably clean and protected from water damage.
3. Periodically collect and remove waste containing cellulose or other organic matter.
4. Discard or replace water-damaged material.
5. Do not install material that is wet.
6. Discard and replace stored or installed material that begins to grow mold.
7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.

D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:

1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

3.7 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

SECTION 015639 - TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.

B. Related Requirements:

1. Section 311000 "Site Clearing" for removing existing trees and shrubs.

1.2 DEFINITIONS

A. Caliper: Diameter of a trunk measured by a diameter tape at a height 6 inches above the ground for trees up to and including 4-inch size at this height and as measured at a height of 12 inches above the ground for trees larger than 4-inch size.

B. Caliper (DBH): Diameter breast height; diameter of a trunk as measured by a diameter tape at a height 54 inches above the ground line for trees with caliper of 8 inches or greater as measured at a height of 12 inches above the ground.

C. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.

D. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and indicated on Drawings.

E. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:

a. Tree-service firm's personnel, and equipment needed to make progress and avoid delays.
b. Arborist's responsibilities.
c. Quality-control program.
d. Coordination of Work and equipment movement with the locations of protection zones.
e. Trenching by hand or with air spade within protection zones.
f. Field quality control.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Include plans, elevations, sections, and locations of protection-zone fencing and signage, showing relation of equipment-movement routes and material storage locations with protection zones.
2. Detail fabrication and assembly of protection-zone fencing and signage.
3. Indicate extent of trenching by hand or with air spade within protection zones.

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

1. Species and size of tree.
2. Location on site plan. Include unique identifier for each.
3. Reason for pruning.
4. Description of pruning to be performed.
5. Description of maintenance following pruning.

1.5 INFORMATIONAL SUBMITTALS

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

B. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.

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

D. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.

1. Use sufficiently detailed photographs or video recordings.
2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

E. Quality-control program.

1.6 QUALITY ASSURANCE

A. Arborist Qualifications: Licensed arborist in jurisdiction where Project is located.

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

C. Quality-Control Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work without damaging trees and plantings. Include dimensioned diagrams for placement of protection zone fencing and signage, the arborist's and tree-service firm's responsibilities, instructions given to workers on the use and care of protection zones, and enforcement of requirements for protection zones.

1.7 FIELD CONDITIONS

A. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Moving or parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

B. Do not direct vehicle or equipment exhaust toward protection zones.

C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Backfill Soil: Planting soil of suitable moisture content and granular texture for placing around tree; free of stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth.

1. Planting Soil: Planting soil as specified in Section 329115 "Soil Preparation (Performance Specification)."

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

1. Type: Shredded hardwood, Ground or shredded bark, Wood and bark chips, OR pinestraw.
2. Color: Natural.

C. Protection-Zone Fencing: Fencing fixed in position and meeting one of the following requirements:

1. Chain-Link Protection-Zone Fencing: Galvanized-steel fencing fabricated from minimum 2-inch opening, 0.148-inch-diameter wire chain-link fabric; with pipe posts, minimum 2-3/8-inch-OD line posts, and 2-7/8-inch-OD corner and pull posts; with 1-5/8-inch-OD top rails and 0.177-inch-diameter bottom tension wire; with tie wires, hog ring ties, and other accessories for a complete fence system.

a. Height: 48 inches.

2. Plastic Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with 2-inch maximum opening in pattern and weighing a minimum of 0.4 lb/ft.; remaining flexible from minus 60 to plus 200 deg F; inert to most chemicals and acids; minimum tensile yield strength of 2000 psi and ultimate tensile strength of 2680 psi; secured with plastic bands or galvanized-steel or stainless-steel wire ties; and supported by tubular or T-shape galvanized-steel posts spaced not more than 96 inches apart.

a. Height: 48 inches.
b. Color: High-visibility orange, nonfading.

3. Gates: Single- swing access gates matching material and appearance of fencing, to allow for maintenance activities within protection zones; leaf width 36 inches.

D. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes prepunched and reinforced; legibly printed with nonfading lettering and as follows:

1. Size and Text: As shown on Drawings.
2. Lettering: 3-inch- high minimum, white characters on red background.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

B. Prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

3.2 PREPARATION

A. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated. Flag each tree trunk at 54 inches above the ground.

B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

C. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated. Do not exceed indicated thickness of mulch.

1. Apply 4-inch uniform thickness of organic mulch unless otherwise indicated. Do not place mulch within 6 inches of tree trunks.
2. Install temporary root protection matting over mulch to the extent indicated.

3.3 PROTECTION ZONES

A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people and animals from easily entering protected areas except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.

1. Chain-Link Fencing: Install to comply with ASTM F567 and with manufacturer's written instructions.
2. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Architect.
3. Access Gates: Install where indicated; adjust to operate smoothly, easily, and quietly; free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Architect. Install one sign spaced approximately every 20 feet on protection-zone fencing, but no fewer than four signs with each facing a different direction.

C. Maintain protection zones free of weeds and trash.

D. Maintain protection-zone fencing and signage in good condition as acceptable to Architect and remove when construction operations are complete and equipment has been removed from the site.

1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

3.4 EXCAVATION

A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 312000 "Earth Moving" unless otherwise indicated.

B. Trenching within Protection Zones: Where utility trenches are required within protection zones, excavate under or around tree roots by hand or with air spade, or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots.

C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches back from new construction and as required for root pruning.

D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

3.5 ROOT PRUNING

A. Prune tree roots that are affected by temporary and permanent construction. Prune roots as follows:

1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
2. Cut Ends: Coat cut ends of roots more than 1-1/2 inches in diameter with an emulsified asphalt or other coating formulated for use on damaged plant tissues and that is acceptable to arborist.
3. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
4. Cover exposed roots with burlap and water regularly.
5. Backfill as soon as possible according to requirements in Section 312000 "Earth Moving."

B. Root Pruning at Edge of Protection Zone: Prune tree roots 12 inches outside of the protection zone by cleanly cutting all roots to the depth of the required excavation.

C. Root Pruning within Protection Zone: Clear and excavate by hand or with air spade to the depth of the required excavation to minimize damage to tree root systems. If excavating by hand, use narrow-tine spading forks to comb soil to expose roots. Cleanly cut roots as close to excavation as possible.

3.6 CROWN PRUNING

A. Prune branches that are affected by temporary and permanent construction. Prune branches as directed by arborist.

1. Prune to remove only injured, broken, dying, or dead branches unless otherwise indicated. Do not prune for shape unless otherwise indicated.
2. Do not remove or reduce living branches to compensate for root loss caused by damaging or cutting root system.
3. Pruning Standards: Prune trees according to ANSI A300 (Part 1).

B. Unless otherwise directed by arborist and acceptable to Architect, do not cut tree leaders.

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

D. Do not paint or apply sealants to wounds.

E. Provide subsequent maintenance pruning during Contract period as recommended by arborist.

F. Chip removed branches and dispose of off-site.

3.7 REGRADING

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

B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.

1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.

C. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

D. Minor Fill within Protection Zone: Where existing grade is 2 inches or less below elevation of finish grade, fill with backfill soil. Place backfill soil in a single uncompacted layer and hand grade to required finish elevations.

3.8 FIELD QUALITY CONTROL

A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.9 REPAIR AND REPLACEMENT

A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or to be relocated that are damaged by construction operations, in a manner approved by Architect.

1. Submit details of proposed pruning and repairs.
2. Perform repairs of damaged trunks, branches, and roots within 24 hours according to arborist's written instructions.
3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Architect.

B. Trees: Remove and replace trees indicated to remain that are more than 50 percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.

1. Plant and maintain new trees as specified in Section 329300 "Plants."

C. Excess Mulch: Rake mulched area within protection zones, being careful not to injure roots. Rake to loosen and remove mulch that exceeds a 4-inch uniform thickness to remain.

D. Soil Aeration: Where directed by Architect, aerate surface soil compacted during construction. Aerate 10 feet beyond drip line and no closer than 36 inches to tree trunk. Drill 2-inch- diameter holes a minimum of 12 inches deep at 24 inches o.c. Backfill holes with an equal mix of augered soil and sand.

3.10 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove excess excavated material, displaced trees, trash, and debris and legally dispose of them off Owner's property.

END OF SECTION 015639

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

1.2 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Salvaged items or items reused from other projects are not considered new products. Items that are manufactured or fabricated to include recycled content materials are considered new products, unless indicated otherwise.
3. Comparable Product: Product by named manufacturer that is demonstrated and approved through the comparable product submittal process described in Part 2 "Comparable Products" Article, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.

1. Evaluation of Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.

C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; submit a comparable product request or substitution request, if applicable.

D. Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:

1. Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
2. Data indicating compliance with the requirements specified in Part 2 "Comparable Products" Article.

E. Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 013300 "Submittal Procedures."

F. Substitution: Refer to Section 012500 "Substitution Procedures" for definition and limitations on substitutions.

1.3 QUALITY ASSURANCE

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

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products, using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

1.5 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written standard warranty form furnished by individual manufacturer for a particular product and issued in the name of the Owner or endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner and issued in the name of the Owner or endorsed by manufacturer to Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included in the Project Manual, prepare a written document, using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.

5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

B. Product Selection Procedures:

1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

   a. Sole product may be indicated by the phrase "Subject to compliance with requirements, provide the following."

2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

   a. Sole manufacturer/source may be indicated by the phrase "Subject to compliance with requirements, provide products by the following."

3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.

   a. Limited list of products may be indicated by the phrase "Subject to compliance with requirements, provide one of the following."

4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed or an unnamed product that complies with requirements.

   a. Non-limited list of products is indicated by the phrase "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following."
   b. Provision of an unnamed product is not considered a substitution, if the product complies with requirements.

5. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.

   a. Limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, provide products by one of the following."

6. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed or a product by an unnamed manufacturer that complies with requirements.

   a. Non-limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following."
   b. Provision of products of an unnamed manufacturer is not considered a substitution, if the product complies with requirements.

7. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications may additionally indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in

"Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

a. For approval of products by unnamed manufacturers, comply with requirements in Section 012500 "Substitution Procedures" for substitutions for convenience.

C. Visual Matching Specification: Where Specifications require the phrase "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or a similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with the following requirements:

1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those of the named basis-of-design product. Significant product qualities include attributes, such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects, with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

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

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Coordination of Owner-installed products.
6. Progress cleaning.
7. Starting and adjusting.
8. Protection of installed construction.

1.2 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For land Surveyor.

B. Certificates: Submit certificate signed by land surveyor, certifying that location and elevation of improvements comply with requirements.

C. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed.

D. Certified Surveys: Submit two copies signed by land surveyor.

1.4 QUALITY ASSURANCE

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

B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, or when encountering the need for cutting and patching of elements whose structural function is not known, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.

2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of specified products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials. Use materials that are not considered hazardous.

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

PART 3 - EXECUTION

3.1 EXAMINATION

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

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, gas service piping, and water-service piping; underground electrical services; and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work, including Specification Section number and paragraph, and Drawing sheet number and detail, where applicable.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect in accordance with requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks and existing conditions. If discrepancies are discovered, notify Architect promptly.

B. Engage a land surveyor experienced in laying out the Work, using the following accepted surveying practices:

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish limits on use of Project site.
3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
4. Inform installers of lines and levels to which they must comply.
5. Check the location, level and plumb, of every major element as the Work progresses.
6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

A. Identification: Owner will identify existing benchmarks, control points, and property corners.

B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

E. Final Property Survey: Engage a land surveyor to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.

1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.

3.5 INSTALLATION

A. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb, and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces, unless otherwise indicated on Drawings.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure satisfactory results as judged by Architect. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations, so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy of type expected for Project.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on-site and placement in permanent locations.

F. Tools and Equipment: Select tools or equipment that minimize production of excessive noise levels.

G. Templates: Obtain and distribute to the parties involved templates for Work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions with manufacturer.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed Work are not indicated, arrange joints for the best visual effect, as judged by Architect. Fit exposed connections together to form hairline joints.

J. Repair or remove and replace damaged, defective, or nonconforming Work.

1. Comply with Section 017700 "Closeout Procedures" for repairing or removing and replacing defective Work.

3.6 CUTTING AND PATCHING

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of Work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements in Section 011000 "Summary."

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as practicable, as judged by Architect. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

    a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

    a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch, corner to corner of wall and edge to edge of ceiling. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 COORDINATION OF OWNER'S PORTION OF THE WORK

A. Site Access: Provide access to Project site for Owner's construction personnel and Owner's separate contractors.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel and Owner's separate contractors.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.

3.8 PROGRESS CLEANING

A. Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

    a. Use containers intended for holding waste materials of type to be stored.

4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where Work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls."

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.9 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

3.10 PROTECTION AND REPAIR OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Repair Work previously completed and subsequently damaged during construction period. Repair to like-new condition.

C. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 017300

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of cleaning agent.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.3 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

C. Field Report: For pest-control inspection.

1.4 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's "punch list"), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction, permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.

5. Submit testing, adjusting, and balancing records.
6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
6. Advise Owner of changeover in utility services.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements.
10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1.5 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining Final Completion, complete the following:

1. Submit a final Application for Payment in accordance with Section 012900 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1.6 LIST OF INCOMPLETE ITEMS

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

1. Organize list of spaces in sequential order, starting with exterior areas first, listed by room or space number.

2. Organize items applying to each space by major element, including categories for ceilings, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

    a. Project name.
    b. Date.
    c. Name of Architect.
    d. Name of Contractor.
    e. Page number.

4. Submit list of incomplete items in the following format:

    a. PDF Electronic File: Architect will return annotated file.

1.7 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

C. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

    1. Submit on digital media acceptable to Architect.

D. Warranties in Paper Form:

    1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.

E. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

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

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site of rubbish, waste material, litter, and other foreign substances.
b. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
c. Remove debris and surface dust from limited-access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
d. Clean flooring, removing debris, dirt, and staining; clean according to manufacturer's recommendations.
e. Vacuum and mop concrete.
f. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
g. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
h. Remove labels that are not permanent.
i. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
j. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
k. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
l. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
m. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
n. Leave Project clean and ready for occupancy.

C. Pest Control: Comply with pest control requirements in Section 015000 "Temporary Facilities and Controls." Prepare written report.

D. Construction Waste Disposal: Comply with waste-disposal requirements in Section 015000 "Temporary Facilities and Controls."

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations required by Section 017300 "Execution" before requesting inspection for determination of Substantial Completion.

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

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

1. Operation and maintenance documentation directory manuals.
2. Emergency manuals.
3. Systems and equipment operation manuals.
4. Systems and equipment maintenance manuals.
5. Product maintenance manuals.

1.2 CLOSEOUT SUBMITTALS

A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Architect will comment on whether content of operation and maintenance submittals is acceptable.
2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operation and maintenance manuals in the following format:

1. Submit on digital media acceptable to Architect. Enable reviewer comments on draft submittals.
2. Submit one paper copy.

C. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.

1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.

D. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.3 FORMAT OF OPERATION AND MAINTENANCE MANUALS

A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create

composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

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

1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
2. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

1.4 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Architect.
7. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
8. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.5 EMERGENCY MANUALS

A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

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

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

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

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

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

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

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

1.6 SYSTEMS AND EQUIPMENT OPERATION MANUALS

A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.

B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

C. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.

2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

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

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

1.7 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds, as described below.

C. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

   a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

H. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1.8 PRODUCT MAINTENANCE MANUALS

A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for Project Record Documents, including the following:

1. Record Drawings.
2. Record specifications.
3. Record Product Data.

1.2 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit copies of Record Drawings as follows:

a. Initial Submittal:

1) Submit PDF electronic files of scanned record prints and one set(s) of file prints.
2) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.

b. Final Submittal:

1) Submit PDF electronic files of scanned Record Prints and three set(s) of file prints.
2) Print each drawing, whether or not changes and additional information were recorded.

B. Record Specifications: Submit annotated PDF electronic files and one paper copies of Project's Specifications, including addenda and Contract modifications.

C. Record Product Data: Submit annotated PDF electronic files and directories and one paper copies of each submittal.

1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

1.3 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation, where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an acceptable drawing technique.

c. Record data as soon as possible after obtaining it.
d. Record and check the markup before enclosing concealed installations.
e. Cross-reference record prints to corresponding photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:

a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Depths of foundations.
d. Locations and depths of underground utilities.
e. Revisions to routing of piping and conduits.
f. Revisions to electrical circuitry.
g. Actual equipment locations.
h. Duct size and routing.
i. Locations of concealed internal utilities.
j. Changes made by Change Order or Construction Change Directive.
k. Changes made following Architect's written orders.
l. Details not on the original Contract Drawings.
m. Field records for variable and concealed conditions.
n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record prints with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Format: Annotated PDF electronic file with comment function enabled.
2. Identification: As follows:

a. Project name.
b. Date.
c. Designation "PROJECT RECORD DRAWINGS."
d. Name of Architect.
e. Name of Contractor.

1.4 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation, where installation varies from that indicated in Specifications, addenda, and Contract modifications.

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

B. Format: Submit record specifications as annotated PDF electronic file.

1.5 RECORD PRODUCT DATA

A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and revisions to Project Record Documents as they occur; do not wait until end of Project.

B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

C. Format: Submit Record Product Data as annotated PDF electronic file or scanned PDF electronic file(s) of marked-up paper copy of Product Data.

1. Include Record Product Data directory organized by Specification Section number and title, electronically linked to each item of Record Product Data.

1.6 MAINTENANCE OF RECORD DOCUMENTS

A. Maintenance of Record Documents: Store Record Documents in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017839

SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Instruction in operation and maintenance of systems, subsystems, and equipment.
2. Demonstration and training video recordings.

1.2 INFORMATIONAL SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

1.3 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.

1. At completion of training, submit complete training manual(s) for Owner's use prepared in same paper and PDF file format required for operation and maintenance manuals specified in Section 017823 "Operation and Maintenance Data."

1.4 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.

C. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination."

1.5 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Architect.

1.6 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

    a. System, subsystem, and equipment descriptions.
    b. Performance and design criteria if Contractor is delegated design responsibility.
    c. Operating standards.
    d. Regulatory requirements.
    e. Equipment function.
    f. Operating characteristics.
    g. Limiting conditions.
    h. Performance curves.

2. Documentation: Review the following items in detail:

    a. Emergency manuals.
    b. Systems and equipment operation manuals.
    c. Systems and equipment maintenance manuals.
    d. Product maintenance manuals.
    e. Project Record Documents.
    f. Identification systems.
    g. Warranties and bonds.
    h. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

    a. Instructions on meaning of warnings, trouble indications, and error messages.
    b. Instructions on stopping.
    c. Shutdown instructions for each type of emergency.
    d. Operating instructions for conditions outside of normal operating limits.
    e. Sequences for electric or electronic systems.
    f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

    a. Startup procedures.
    b. Equipment or system break-in procedures.
    c. Routine and normal operating instructions.
    d. Regulation and control procedures.
    e. Control sequences.
    f. Safety procedures.
    g. Instructions on stopping.
    h. Normal shutdown instructions.

i. Operating procedures for emergencies.
j. Operating procedures for system, subsystem, or equipment failure.
k. Seasonal and weekend operating instructions.
l. Required sequences for electric or electronic systems.
m. Special operating instructions and procedures.

5. Adjustments: Include the following:

a. Alignments.
b. Checking adjustments.
c. Noise and vibration adjustments.
d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

a. Diagnostic instructions.
b. Test and inspection procedures.

7. Maintenance: Include the following:

a. Inspection procedures.
b. Types of cleaning agents to be used and methods of cleaning.
c. List of cleaning agents and methods of cleaning detrimental to product.
d. Procedures for routine cleaning.
e. Procedures for preventive maintenance.
f. Procedures for routine maintenance.
g. Instruction on use of special tools.

8. Repairs: Include the following:

a. Diagnosis instructions.
b. Repair instructions.
c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
d. Instructions for identifying parts and components.
e. Review of spare parts needed for operation and maintenance.

1.7 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."

B. Set up instructional equipment at instruction location.

1.8 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

C. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner with at least seven days' advance notice.

D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

E. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

1.9 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

1. At beginning of each training module, record each chart containing learning objective and lesson outline.

B. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full HD modewith vibration reduction technology.

1. Submit video recordings on CD-ROM or thumb drive.

C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.

D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.

E. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 017900

SECTION 024113 - SELECTIVE SITE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. This section covers all work associated with the demolition and removal of site features as indicated on the drawings, as specified herein and as otherwise required to accomplish other work associated with the contract.

1.2 LUMP SUM PRICE

A. The items listed in the proposal shall be considered sufficient to complete the work in accordance with the plans and specifications. Any portion of the work not specifically listed in the bid form shall be deemed a part of the item with which it is associated and shall be included in the lump sum price. The price shall be full compensation for all labor, materials, and equipment necessary to properly demolish and dispose of off-site all facilities shown to be removed on the construction plans and as specified herein including any testing, construction supervision and all other work required for satisfactory completion of site demolition operations.

B. Base bids on the following criteria:

1. Some existing structures have been removed by the Owner. Contractor shall visit the site to determine the level of required demolition.
2. The Owner assumes no responsibility for the condition of the structures to be relocated.
3. Explosives shall not be brought to the site.
4. Burning will not be allowed.
5. Contractor is responsible for permits, fees and licenses.

1.3 UNIT PRICES

A. None in this Section.

1.4 SUBMITTALS

A. None this section.

1.5 REGULATORY REQUIREMENTS

A. Comply with federal, state, and local demolition, hauling and disposal regulations.

1.6 QUALITY ASSURANCE

A. Materials: All material submittals shall be submitted by the contractor and reviewed and accepted in writing by the Engineer prior to ordering of any materials.

B. Manufacturer: Material and equipment shall be the standard products of a manufacturer who has manufactured them for a minimum of 2 years and who provides published data on the quality and performance of the projects.

C. Subcontractor: A subcontractor for any part of the work must have experience on similar work. At the option of the Owner and/or Engineer, a list of projects and the contacts who are familiar with his competence may be required to be submitted to verify experience.

D. Equipment: Shall be well maintained, suited for the intended work and capable of delivering the finished product to the standards shown on drawings and as specified herein.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 DEMOLITION

A. Demolish structures completely, safely, and remove from the site using methods required by governing regulations. Small structures may be removed intact when acceptable to the Owner and authorities having jurisdiction.

B. Proceed with demolition in a systematic manner.

C. Demolish concrete and masonry in small sections. Break up and remove concrete slabs-on-grade unless otherwise shown to remain.

D. Demolish and remove below grade construction and concrete slabs on grade as shown to a minimum depth of two feet below proposed subgrade**.** Contractor shall remove existing foundations and structures where required for the installation of the new construction.

E. Provide full depth sawcuts through all pavements to be removed. Sawcuts shall be neat, straight and vertical.

3.2 FILLING BASEMENTS AND VOIDS

A. Completely fill below grade areas and voids resulting from demolition or removal of structures (underground fuel storage tanks, wells, cisterns, etc.) using approved fill materials as specified in Section “EARTH MOVING”.

B. Ensure that areas to be filled are free of standing water, frost, frozen material, trash and debris prior to fill placement.

C. Place and compact fill materials as specified by Section “EARTH MOVING”.

D. Grade surface to match adjacent grades and to provide flow to surface drainage structures after fill placements and compaction.

3.3 DISPOSAL OF DEMOLISHED MATERIALS

A. Dispose of demolished materials in accordance with current local, state and federal regulations. All cost in connection with disposing of demolished materials will be the responsibility of the Contractor.

B. Do not burn any material, debris, or trash on-site.

3.4 PROTECTIONS

A. Ensure safe passage of persons around all areas.

B. Conduct operations to prevent damage to adjacent buildings, structures, or other facilities, trees, vegetation, or injury to persons, etc.

C. Promptly repair damages caused to adjacent facilities by demolition operations at no additional cost to the Owner.

D. Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition and/or relocation operations.

E. Prevent interruption of existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction.

F. Provide temporary services during interruptions to existing utilities as acceptable to governing authorities.

G. Before initiating demolition make arrangements for relocating, disconnecting, rerouting, abandoning, or similar action as may be required relative to utilities and other underground piping, to permit work to proceed without delay. Arrangements shall be made in accordance with the regulations of authorities of utilities concerned, including, but not limited to overhead and underground power and telephone lines and equipment, gas piping, storm sewers, sanitary sewers, or water piping. The Contractor shall not use water when it may create hazardous or objectionable conditions, such as ice, flooding, and/or pollution.

H. Use water sprinkling and other suitable methods to limit dust and dirt rising and scattering into the air to lowest practical level.

I. Comply with governing regulations pertaining to environmental protection.

3.5 INSPECTIONS

A. Notify the Owner, Project Representative and Engineer a minimum of 72 hours prior to all required observations, inspections or tests.

B. All work conducted and materials furnished shall be subject to review by the Engineer or the Project Representative. The Engineer will also have the right to require that any portion of the work be conducted in his presence.

1. If the work is covered after such instruction, it shall be exposed by the Contractor for observation.
2. However, if the Engineer is notified that such work is scheduled and the Engineer fails to appear within 72 hours, the Contractor may proceed without him.

C. All improper work shall be reconstructed and all materials which do not conform to the requirements of the specifications shall be removed from the work upon written notice.

1. The Engineer shall have the right to mark materials as rejected to distinguish them as such.

3.6 ACCEPTANCE

A. Final acceptance will be based on a satisfactory demolition as approved by the Owner and/or Engineer.

B. Demolition work shall be re-worked to the satisfaction of the Owner and/or Engineer until specified requirements are met. All additional work which is the result of a failed inspection or test shall be performed by the Contractor at no additional cost to the Owner.

END OF SECTION 024113

SECTION 024119 – SELECTIVE DEMOLITION

PART 1 - - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Removal of designated building equipment, materials and fixtures.
2. Removal of existing construction to accommodate new construction.
3. Disconnecting, capping and removal of identified utilities.
4. Design and installation of shoring, bracing, and related support systems to prevent structural damage, shifting, or collapse.
5. Salvage of indicated items.

B. Related Sections:

1. Section 017319 – Cutting and Patching.

C. General: Submit in accordance with Section 013300 for Submittal Procedures.

1.3 SUBMITTALS

A. General: Submit in accordance with Section 013300 for Submittal Procedures.

B. Informational Submittals: Submit following packaged separately from other submittals:

1. Qualified Data: Submit demolition contractor's qualifications

C. Project Record Drawings: Submit following packaged separately from other submittals:

1. Accurately record actual locations of capped utilities.
.

1.4 QUALITY ASSURANCE

A. Contractor's Qualifications: Company specializing in demolition work with minimum of three years documented experience.

B. Regulatory Requirements: Comply with applicable codes, ordinances, rules, regulations, and laws of local, municipal, state and federal authorities having jurisdiction.

1. Obtain and pay for necessary permits and notices: post where required.
2. Comply with safety requirements of Hanahan Fire Department.

C. Certifications:

1. Submit manufacturer's certifications that rodent and insect control measures and instructions for their application comply with US Environmental Protection Agency requirements.

D. Notify affected utility companies before starting work and comply with their requirements.

1.5 PRE-DEMOLITION CONFERENCE

A. Conduct conference in accordance with Section 013119 to discuss the following:

1. Present draft of demolition schedule for review.
2. Coordinate phasing requirements.
3. Identify items to be protected and preserved before proceeding with the work.
4. Conduct walking inspection to identify materials and equipment to be salvaged for owner use.
5. During walking inspection, photograph or otherwise determine and record existing physical conditions of boundary areas.
6. Agree upon location where items salvaged for Owner are to be delivered and stored.
7. Coordinate with waste management procedures: See Section 017419.

1.6 PROJECT CONDITIONS

A. Occupancy:

1. Owner will vacate demolition area prior to start of demolition work.

B. Condition of Structure: Owner assumes no responsibility for actual conditions of areas to be demolished.

1. Variations within demolition areas may occur because of Owner's salvage operations.

C. Hazardous Materials:

1. Owner will have hazardous materials removed by a qualified professional under a separate contract.
2. Inform Architect, Engineer and Owner immediately upon discovery of any ACM suspect materials.

D. Explosives: Not allowed.

E. Protection: Perform work in an manner to eliminate hazards to persons or property and avoid interference with adjacent areas, utilities and structures.

1.7 SCHEDULING

A. Schedule work to confirm to approved construction progress schedule specified in Section 013300.

1. Schedule work to coincide with new construction.
2. Describe demolition removal procedures and schedule.

B. Perform work during normal business hours. Noisy and disruptive work shall be scheduled to occur during hours as determined by owner.

PART 2 - - PRODUCTS – NOT USED

PART 3 - - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with Work in accordance with Section 017000 for Execution.

3.2 PREPARATION

A. Provide, erect and maintain temporary barriers and security devices at locations indicated on the civil engineering drawings.

B. Disconnect Utilities: Mark and identify locations of utilizes to be disconnected and or removed.

1. Notify affected utility company in advance of date and time when service needs to be disconnected.

2. Disconnect and Cap Utilities: Where indicated on the drawings, disconnect and cap utility services; comply with requirements of governing authority.
3. Disconnect and Remove Utilities: When indicated on the drawings, disconnect and remove utility services; comply with requirements of governing authority.
4. Do not commence demolition operations until associated disconnections have been completed and verified.

3.3 DEMOLITION

A. General: Conduct demolition to minimize interference with adjacent properties.
1. Sprinkle debris with water to minimize dust. Provide hoses and water connections as necessary.
2. Do not cause flooding or contaminated runoff.

B. Demolish existing construction as indicated in an orderly and careful manner to accommodate new work
1. Perform demolition in accordance with governing authorities.
2. Remove and immediately dispose of contaminated or vermin infested materials when encountered.
3. Remove demolition debris from site on a daily basis.
4. Waste Management Procedures: Comply with Section 017419.

C. Report to architect and engineer unanticipated elements which conflict with the intended function or design when encountered.
1. Submit report in writing
2. Rearrange demolition schedule as necessary to continue overall project progress without delay.

D. Do not burn or bury materials or debris on site. Leave structure and site in clean condition.

3.4 ADJUSTING

A. Repair demolition preformed in excess of that required. Return structure and surfaces to remain to conditions existing prior to commencement of selective demolitions work.

3.5 CLEANING

A. Comply with Section 017400. Broom clean demolition areas of dust, dirt, debris caused by demolition operations.

B. Remove temporary work and protection when no longer needed.

END OF SECTION

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:

1. Footings.
2. Slabs-on-grade.
3. Grade Beams and Tie Beams

B. Products installed, but not furnished, under this Section include the following:

1. Anchor rods and embed plates indicated to be cast into cast-in-place concrete, furnished under Division 05 Section "Structural Steel Framing"

C. Related Sections:

1. Division 01 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.

2. Division 03 Section "Architectural Concrete" for general building applications of specially finished formed concrete.
3. Division 32 Section "Concrete Paving" for concrete pavement and walks.
4. Division 32 Section "Decorative Concrete Paving" for decorative concrete pavement and walks.

1.3 PERFORMANCE REQUIREMENTS

A. Moisture level in finished concrete shall be within limits acceptable to types of finish flooring indicated. Test methods and acceptable limits shall be as specified in Division 09 finish flooring Sections, or as required by finish flooring manufacturer's written product data or certified written statement. General Contractor is responsible for choosing and implementing methods of limiting excessive moisture during construction and curing, or remedial treatment, process, or other means to bring moisture level within acceptable limits, and for assigning and contracting for these responsibilities to installers

1.4 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.5 SUBMITTALS

A. Contractor's Statement of Responsibility Per Division 01 Section "Collective Inspections and Structural Testing"

B. Product Data:

1. Bar supports
2. Mechanical Couplers
3. Mechanical End Anchors
4. Vapor retarders
5. Epoxy Bonding Adhesive
6. Cartridge Injection Adhesive
7. Form materials
8. Form-release agents
9. Waterstops
10. Evaporation retarder
11. Curing compound
12. Curing and sealing compound
13. Semirigid joint filler
14. Joint-filler strips

C. Contractor's Statement of Responsibility Per Division 01 Section "Collective Inspections and Structural Testing"

D. Design Mixtures: For each concrete mixture.

1. Indicate amounts of mixing water to be withheld for later addition at Project site.
2. Mix design submittals shall include test results and/or trial batch data that meet or exceed the required average compressive strength as required by ACI 301.
3. Trial batches shall consist of identical cementitious materials, fine and course aggregates, and admixtures to be used for mix design.
4. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

E. Steel Reinforcement Shop Drawings:

1. Drawings that detail fabrication, bending, and placement.
2. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
3. Identify all step footing locations and associated reinforcing
4. Identify and dimension all grade beam and tie beam construction joints
5. Include slab on grade construction joint reinforcement
6. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
   a. Location of construction joints is subject to approval of the Architect.

F. Mill Test Reports:
1. Submit mill test reports for ASTM A615 reinforcing steel indicating compliance with the ASTM and additional restrictions
2. Submit mill test reports for ASTM A706 reinforcing steel indicating compliance with the ASTM.

G. Qualification Data:

1. For ready-mix concrete manufacturer.
2. For Cartridge injection adhesive installer. Include manufacturer's training certificates or letter from manufacturer certifying training was complete with a list of individuals that were trained

H. Material Certificates: For each of the following indicating compliance with the required standards and signed by manufacturers:

1. Vapor retarders
2. Reinforcing Steel
3. Plain-Steel Welded Wire Reinforcement
4. Aggregates
   a. Material certificates shall be not be more than 90 days old and shall be more current than the submitted material test report.

5. Cementitious Materials
   a. Material certificates shall be not be more than 90 days old and shall be more current than the submitted material test report.

I. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:

1. Aggregates

   a. Submit material test reports in accordance with ACI 301 not more than 90 days old demonstrating compliance with the specified ASTM standards.

2. Cementitious materials.

   a. Submit material certificates in accordance with ACI 301 not more than 90 days old demonstrating compliance with the specified ASTM standards.

3. Capillary Barriers

J. Research/Evaluation Reports:

1. Submit ICC reports for the following:

   a. Cartridge Injection Adhesive
   b. Mechanical Couplers
   c. Mechanical End Anchors

K. Hot and Cold Weather Program: Describe in detail procedure for working in Hot and Cold Weather. Included detailed description of methods, materials, and equipment to be used to comply with requirements.

L. Substitutions for Cartridge Injection Adhesive:

1. Substitution requests may only be made using products with ICC-ESR reports for the product in the specific substrate.
2. Substitution request shall include signed and sealed calculations demonstrating that the product is capable of providing equivalent performance of the specified product for each specific location and condition when calculated using the data in the referenced ESR report and in accordance with the appropriate design procedure and standards required by the building code.
3. Substitution request shall specify the diameter and embedment depth of the substituted product
4. Any increase in material cost resulting from the substitution shall be the responsibility of the contractor.

M. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

A. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer.

B. Installer Qualifications: The installer shall be experienced placing, finishing, curing, treating and protecting concrete equal in material, design and scope to that required for this project

C. Cartridge Injection Adhesive Installer Training: Conduct a thorough training session with the manufacturer's representative. Each individual responsible for the installation of anchors shall attend the training session. Training shall consist of a review of the complete process for the installation of the anchors and the use of proper equipment for drilling and installing the anchors, to include but not limited to:

1. Hole drilling procedure. Clarify acceptability of rotary hammer drilling and/or core drilling.
2. Hole drilling equipment
3. Type and diameter of drill bits
4. Hole preparation and hole cleaning technique
5. Hole cleaning equipment
6. Adhesive injection technique
7. Adhesive injection equipment
8. Adhesive curing requirements

D. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

E. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.

F. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

G. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

H. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

I. Preinstallation Conference: Conduct conference at Project site.

1. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, joint-filler strips, semirigid joint fillers, forms and form removal limitations, shoring and reshoring procedures, capillary barrier requirements, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, cartridge injection adhesive installer requirements, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement:

1. Deliver, store, and handle steel reinforcement to prevent bending and damage.
2. Maintain reinforcement free of dirt and other deleterious materials.
3. Store reinforcing on dunnage or other supports up off of ground.

B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
1. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:

a. High-density overlay, Class 1 or better or at exposed locations.
b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed at concealed locations.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

D. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.

E. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

F. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars:

1. ASTM A706, Grade 60, deformed
2. ASTM A 615/A 615M, Grade 60, deformed.

a. With mill tested yield strength not exceeding specified yield by more than 18,000 psi.
b. With mill tested ultimate strength to mill tested yield strength not less than 1.25

B. Plain-Steel Wire: ASTM A 82/A 82M, as drawn.

C. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain, fabricated from as-drawn steel wire into flat sheets.

2.3 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.

B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

C. Cartridge Injection Adhesive: A two part adhesive injection system for anchorage of new reinforcing steel to existing concrete construction.

1. Where adhesive manufacturer is not indicated, subject to compliance with requirements and acceptance by the Architect, provide the following or approved equal:

a. Hilt HIT RE 500-SD Adhesive Anchorage System, ICC ESR-2322.

2. Where specifically indicated in the contract documents provide the following:

a. Hilti HIT –HY 200 Adhesive Anchorage System, ICC ESR-3187

2.4 CONCRETE MATERIALS

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

1. Portland Cement: ASTM C 150, Type I, Type I/II or Type III, Supplement with the following:

a. Fly Ash: ASTM C 618, Class F.

B. Normal-Weight Aggregates: ASTM C 33, Class 3M coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.

1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 94/C 94M and potable.

2.5 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

C. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.

2.6 WATERSTOPS

A. Flexible PVC Waterstops: CE CRD-C 572, with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

1. Profile: Ribbed without center bulb unless noted otherwise.
2. Dimensions: 4 inches by 3/16 inch thick unless noted otherwise; nontapered.

2.7 VAPOR RETARDERS

A. Sheet Vapor Retarder: ASTM E 1745, Class A, minimum 15 mil thickness.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Stego Industries LLC; Stego Wrap 15-Mil Vapor Barrier.
b. Fortifiber Corporation; Moistop Ultra A.
c. Raven Industries Inc.; Vapor Block 15.
d. Reef Industries, Inc.; Griffolyn Type-65G.
e. W.R. Meadows, Inc.; Sealtight Vapormat 15.

2. Seam Tape: Manufacturer's recommended adhesive or pressure-sensitive tape.

2.8 CAPILLARY BARRIERS:.

A. Clean mixture of (crushed stone, crushed gravel, and manufactured or natural sand); with 100 percent passing a 3/8-inch (9.5-mm) sieve, 10 to 30 percent passing a No. 100 sieve, and not more than 5 percent passing No. 200 sieve; complying with deleterious substance limits of ASTM C 33 for fine aggregates.

1. Compactable and trimmable.

B. Clean mixture of crushed stone or (crushed or uncrushed gravel); ASTM D 448, Size 57, with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

1. Compactable and trimmable.

2.9 CURING MATERIALS

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

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.

E. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

2.10 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: Provide one of the following.

1. Flexible lightweight, non-staining, polythelene, closed cell, non-absorbent, uv stable, compressible foam with a pre-scored removable strip to allow for clean and uniform sealant joint as follows:

a. Density: ASTM D1751
b. Compression: ASTM D3575

1) 10% Deflection: 10 psi maximum
2) 80% Deflection: 126 psi maximum

c. Water absorption: ASTM D3575, 0.5% volume maximum

2. Resilient, flexible, non-extruding, asphalt-saturated cellulosic fiber with preformed cap to allow for clean and uniform sealant joint

a. Density: ASTM D 1751

B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 per ASTM D 2240.

C. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Type V, for bonding freshly mixed concrete to hardened concrete.

D. Reglets: Fabricate reglets of not less than 0.022-inch thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

2.11 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: For exterior concrete limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash: 25 percent.
2. Combined Fly Ash and Pozzolan: 25 percent.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

D. Admixtures: Use admixtures as noted in mix design and according to manufacturer's written instructions.

1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

E. Color Pigment: Where colored concrete is indicated add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.12 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3000 psi at 28 days.
2. Slump Limit: 4 to 6 inches, 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture plus or minus 1 inch.
3. Air Content: 5 percent, plus or minus 1.5 percent at point of delivery.
4. Dry Unit Weight: 145 lb/cu. ft. plus or minus 3 lb/cu. ft.

B. Grade Beams and Tie Beams: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3000 psi at 28 days.
2. Slump Limit: 4 to 6 inches, 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture plus or minus 1 inch.
3. Air Content: 5 percent, plus or minus 1.5 percent at point of delivery.
4. Dry Unit Weight: 145 lb/cu. ft. plus or minus 3 lb/cu. ft.

C. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3000 psi at 28 days.
2. Slump Limit: 4 to 6 inches, 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture plus or minus 1 inch.
3. Air Content: 3 percent, plus 0 percent or minus 1.5 percent at point of delivery
4. Minimum Cementitious Materials Content: 540 lb/cu. yd.
5. Dry Unit Weight: 145 lb/cu. ft. plus or minus 3 lb/cu. ft.

D. Concrete Toppings: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3000 psi at 28 days.

2. Slump Limit: 4 to 6 inches, 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture plus or minus 1 inch.

3. Air Content: 3 percent, plus 0 percent or minus 1.5 percent at point of delivery
4. Dry Unit Weight: 145 lb/cu. ft. plus or minus 3 lb/cu. ft.

2.13 FABRICATING REINFORCEMENT

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

2.14 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. Unless a detailed hot weather concrete plan incorporating the recommendations of ACI 305 has been submitted and approved comply with the following:
   a. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes.
   b. When air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:

1. Smooth-formed finished surfaces: Class A, 1/8 inch
2. Rough-formed finished surfaces: Class D, 1 inch

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

1. Install keyways, reglets, recesses, and the like, for easy removal.
2. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

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

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
2. Anchor rods and embeds shall be securely fastened in formwork prior to placing concrete, and concrete vibrated around the anchor or embed to ensure proper flow of concrete around anchors and embeds.
3. Anchor rod sleeves (where required) shall be accurately located and fastened in formwork prior to placing concrete.
4. Wet setting of anchor rods and embeds is not permitted.
5. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
6. Install dovetail anchor slots in concrete structures as indicated.

3.3 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved its 28-day design compressive strength.
2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 SHORES AND RESHORES

A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.

B. In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.

C. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.5 VAPOR RETARDERS

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints per manufacturer, but not less than 6 inches and seal with manufacturer's recommended tape or adhesive.

3.6 CAPILLARY BARRIERS:

A. General: Place capillary barrier on compacted subgraded beneath vapor retarder for all slabs on grade unless noted otherwise.

1. Compact capillary barrier with mechanical equipment to an elevation tolerance of plus 0 and minus ¾ inch.
2. Capillary barriers are not required where mud slabs and below slab sheet waterproofing are indicated.
3. Ensure surface of capillary barrier is uniform to prevent damage to vapor retarders.
4. Ensure capillary barrier is compacted to a uniform surface free of ruts, divots or other anomalies from construction traffic. Repair any anomalies immediately prior to concrete placement.

3.7 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Anchorage of reinforcement into hardened concrete using cartridge injection adhesive anchors shall only be used where specifically indicated on plans or with written direction from the Engineer of Record for a specific location.

D. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

1. Foundation reinforcing steel may be supported on solid concrete brick units of strength equal to or greater than foundation concrete.

E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

F. Welded Wire Reinforcement:

1. Install welded wire reinforcement in longest practicable lengths
2. Locate welded wire reinforcement in top 1/3 of slab on grades unless noted otherwise
3. Locate welded wire reinforcement at mid-depth of concrete slab thickness over deck flutes unless noted otherwise.
4. Lap edges and ends of adjoining sheets at least one mesh spacing plus 2", but not less than 6". Lace overlaps with wire.
5. Slabs on Grade 4" or less in thickness: Support welded wire reinforcement on chairs, bolsters or bar supports spaced to minimize sagging, and as required to support construction traffic

    a. Alternately, welded wire reinforcement may be placed on grade and "hooked"/pulled to the proper location
    b. Placement of welded wire reinforcement after placement of concrete and "walking in" is not permitted.

6. Slabs on Grade greater than 4" in thickness: Support welded wire reinforcement on chairs, bolsters or bar supports spaced to minimize sagging, and as required to support construction traffic

    a. Placement of welded wire reinforcement on grade or deck and "hooked"/pulled up into slab as concrete is placed is not permitted.
    b. Placement of welded wire reinforcement after placement of concrete and "walking in" is not permitted.

7. Elevated slabs: Support welded wire reinforcement on chairs, bolsters or bar supports spaced to minimize sagging, and as required to support construction traffic

    a. Alternately, welded wire reinforcement may be placed on grade and "hooked"/pulled to the proper location
    b. Placement of welded wire reinforcement after placement of concrete and "walking in" is not permitted.

3.8 CARTRIDGE INJECTION ADHESIVE

A. Where manufacturer recommends the use of special tools for installation of anchors, such tools shall be used.

B. All facets of hole drilling, hole cleaning, anchor installation, anchor torqueing shall be in strict accordance with the ICC-ESR report and manufacturer's data.

C. Drill holes perpendicular to substrate surface.

D. Drill holes with rotary impact hammer drills using carbide-tipped bits or core drills using diamond core bits as indicated in the ICC-ESR report.

E. Drill bits and core bits shall be of diameters indicated in the ICC-ESR report.

F. All holes shall be cleaned with compressed air to remove all drilling dust and other deleterious substances.

G. Remove water from holes to attain a surface dry condition unless specifically permitted otherwise by ICC-ESR report.

H. Base Material Strength: Unless otherwise specified, do not drill holes in concrete or masonry until concrete has achieved full design strength.

I. Embedded Items: Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Exercise care in coring or drilling to avoid damaging existing reinforcing or embedded items. Notify the Engineer if

reinforcing steel or other embedded items are encountered during drilling. Take precautions as necessary to avoid damaging prestressing tendons, electrical and telecommunications conduit, and gas lines.

J. Inject adhesive into holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.

K. Follow manufacturer recommendations to ensure proper mixing of adhesive components.

L. Sufficient adhesive shall be injected in the hole to ensure that the annular gap is filled to the surface.

M. Remove excess adhesive from the surface.

N. Shim reinforcement with suitable device to center the reinforcement in the hole.

O. Do not disturb or load reinforcment before manufacturer specified cure time has elapsed.

P. Observe manufacturer recommendations with respect to installation temperatures.

3.9 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement.
2. Continue reinforcement across construction joints unless otherwise indicated.
3. Provide supplemental reinforcing and/or smooth dowels where indicated at joints.
4. Strip bulkheads from footings, beams, grade beams, tie beams, and slabs and roughen surface of concrete to a minimum 1/4" amplitude while concrete is still plastic.
5. Form keyed joints unless indicated otherwise. Embed keys at least 1-1/2 inches into concrete unless noted otherwise.
6. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
7. Locate joints in slabs on steel deck as follows:

    a. Joints parallel to joists (perpendicular to girders) shall be located at the midpoint between two adjacent joists.
    b. Joints parallel to girders (perpendicular to joists) shall be located at the midpoint of two adjacent girders.
    c. Stagger and offset joints as required to meet the requirements.

8. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
9. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
10. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least [one-fourth of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete.

    a. Cut joints as soon as cutting action will not tear, abrade, or otherwise damage surface , but not more than 12 hours after finished, and before concrete develops random contraction cracks.

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

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Division 07 Section "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

3.10 WATERSTOPS

A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.

3.11 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless specifically identified in the mix design and amount of withheld water is noted on batch ticket.

1. Do not add more water than is allowed in mix design.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301 and as follows.

1. Do not add water to concrete unless the batched water is specifically noted as less than the mix design and is indicated as such on the batch ticket.
2. Do not add more water than the amount of withheld water which is specifically identified on the batch ticket.
3. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of

vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.
5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

G. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Unless a detailed hot weather concrete plan incorporating the recommendations of ACI 305 has been submitted and approved; maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

H. Proximity to Pile Driving and Ground Modification installation:

1. Concrete placement shall be separated from deep foundation and ground modification activities such that fresh concrete and concrete less than 28 days old is not subject to ground vibrations exceeding 0.5 in/sec, but not less than 100 feet.

    a. Required separation distance shall be determined by monitoring ground vibrations during early stages of deep foundation and ground modification
    b. Contractor shall submit documentation to validate the required separation distance

2. Concrete placement shall be separated from pile driving such that no concrete cured or otherwise is closer than 30 feet to pile driving operations.

3.12 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces exposed to public view, to be covered with a coating or covering material applied directly to concrete coordinate with Architectural drawings and specifications.

C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.13 FINISHING FLOORS AND SLABS

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

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in one direction.

1. Apply scratch finish to surfaces to receive concrete floor toppings or to receive mortar setting beds for bonded cementitious floor finishes.

C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces to receive trowel finish, trowel and fine broom finish, or to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
2. Apply to mud slabs.

D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, epoxy terrazo or another thin-film-finish coating system.

2. FF FL 35/25

E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method without cleavage membrane. While concrete is still plastic, slightly scarify surface with a fine broom.

1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.14 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel finish concrete surfaces.

3.15 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Foundations:

1. Protect top sides of footings to receive masonry or concrete construction from dirt and debris.
2. Excavations:

    a. Do not allow excavations directly adjacent to or beneath footings to the absolute greatest extent possible.
    b. Where excavations must occur beneath in place footings or slabs the area shall be careful excavated as to not damage structural elements. The area shall be backfilled and compacted at the end of the work day.
    c. Areas excavated below footings shall be backfilled with Controlled Low-Strength Material.
    d. Areas excavated adjacent to and at or below footing elevation shall be backfilled with Controlled Low-Strength Material unless the area is large enough to be backfilled with control fill in lifts attaining proper compaction between lifts.

F. Slabs:

1. Protect slabs to remain expose, stained or receive other non-opaque floor coverings or treatments with impervious covers to prevent staining of the slab
2. Do not allow construction equipment or vehicles to drive on slabs.
3. Excavations:

    a. Do not allow excavations directly adjacent to or beneath slabs on grade to the absolute greatest extent possible.
    b. Where excavations must occur beneath in place footings or slabs the area shall be careful excavated as to not damage structural elements. The area shall be backfilled and compacted at the end of the work day.
    c. Areas excavated below slabs shall be backfilled with Controlled Low-Strength Material. Areas excavated adjacent to and at or below slab elevation shall be backfilled with Controlled Low-Strength Material unless the area is large enough to be backfilled with control fill in lifts attaining proper compaction between lifts.
    d. Repair vapor retarders per manufacturer's requirements

G. Cure concrete according to ACI 308.1, as follows:

1. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

    a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
    b. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.

2. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

    a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

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

    a. Apply curing and sealing compound to areas of exposed concrete not to receive any floor treatment, staining, painting or floor covering. Coordinate with finish schedule.

3.16 CONCRETE REPAIRS

A. Where deficient concrete is identified on the job all repairs shall be subject to the EOR and AOR approval.

B. The contractor shall be responsible for enlisting a concrete repair specialists with no less than 5 years of documented concrete repair service and having repaired deficient conditions similar to those identified on no less than 5 projects in the previous five years.

C. The contractor and repair specialists shall prepare a narrative of the proposed repair including detailed methods and material, and submit for EOR approval prior to commencing with repairs.

D. Where repair of deficient work is to remain exposed, the deficient work shall be removed and replaced as directed by the EOR.

3.17 JOINT FILLING

A. Fill all joints in exposed concrete slabs

B. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least one month(s). Do not fill joints until construction traffic has permanently ceased.

C. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

D. Install semirigid joint filler full depth in saw-cut joints and at least 1 deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.18 FIELD QUALITY CONTROL

A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports in accordance with the schedule of special inspections.

B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

END OF SECTION 033000

SECTION 042200 - UNIT MASONRY

PART 1 - - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Face Brick
2. CMU
   a. Regular
   b. Split Face
   c. Ground Face

B. Related Requirements: Comply with following:

1. Mortar and Masonry Grout: Section 040510 - Basis Masonry Materials and Methods.
2. Masonry Accessories: Section 040510 - Basis Masonry Materials and Methods.

C. Related Sections:

1. Section 013543 – Environmental Procedures: Waste management procedures.
2. Section 017419 – Construction Waste Management and Disposal: Waste management procedures.
3. Section 040510 – Basic Masonry Materials and Methods.

1.3 SUBMITTALS

A. General: Submit in accordance with Section 013300.

B. Product Data: For each type masonry unit, accessory, mortar, mortar color, masonry cleaning agent and other proprietary products.

C. Samples:

1. Face Brick: Three sets of five individual units of each type illustrating extreme variations in color and texture in manufacturer's standard range.

   a. Special and Standard Shapes: Two of each type of unit.

2. Unit Masonry: Three sets of each individual product.

3. Accessories: Coordinate submittal with Work of Section 040510.

D. Informational Submittals: Submit following packaged separately from other submittals:

1. Test Reports:

   a. Test reports, in triplicate, from independent testing laboratory certifying that materials meet or exceed specified requirements.
   b. Written results of testing specified as part of Field Quality Control article.

2. Certifications specified in Quality Assurance article.
3. Qualification Data: Installer's qualification data.
4. Manufacturer's instructions.

5. Manufacturer's certification of acceptable cleaning solution.

1.3 QUALITY ASSURANCE

A. Single Source Responsibility: Exposed CMU: Uniform texture and color from one manufacturer for each different product required for each continuous surface or visually related surfaces.

B. Face Brick: Uniform texture and color, or uniform blend within ranges accepted for these characteristics, from one manufacturer for each product required.

C. Installer Qualifications: Documented experience on at least three projects of similar nature in past two years.

D. Owner reserves right to hire independent masonry consultant to review submittals, procedures, and installation. Installation items subject to review includes, but is not limited to, foundations, flashing, weeps, cavities, joints, tolerances, and cleaning.

E. Certifications: Submit following:

1. Manufacturer's certificates attesting that materials furnished meet or exceed specified requirements.
2. Certification of acceptance of masonry cleaning agent by masonry unit, mortar, and mortar color manufacturer.

1.4 FIELD SAMPLES

A. General: Comply with Section 014000.

B. Sample Installation: Construct field sample – one column for Pavilion

1. Locate on site where directed.
2. Show construction techniques, including following:

a. Color range of exposed masonry and mortar joints;
b. Tooled joints;
c. Back-up metal stud wall conditions, including exposed joint work;
d. Base course with flashing and weeps;
e. Bituminous dampproofing;
f. Ties, anchors, and fasteners.

1.5 PRE-INSTALLATION CONFERENCE

A. Conduct in accordance with Section 013119.

1. Review requirements for inspection and testing, forecasted weather conditions, governing regulations, insurance requirements, and proposed installation procedures and sequencing.
2. Review anchor, tie, and flashing installation requirements.
3. Review requirements of field sample on site.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 016000.

B. Brick: Store masonry units off ground to prevent contamination by mud, dust or materials likely to cause staining or other defects.

1. Cover materials to protect from elements.
2. Handle units on pallets or flat bed wheel barrows.
3. Do not permit free discharge from conveyor units or transporting loose in mortar trays or buggies.

1.7 PROJECT CONDITIONS

A. Environmental Requirements, Hot and Cold Weather Conditions: Comply with ACI 530, ACI 530.1, and Recommended Practices and Specifications for Cold Weather Masonry Construction of International Masonry Industry All-Weather Council.

1. Cold Weather Protection: Mortar setting accelerators and admixtures for cold weather construction not allowed.
2. Hot Weather Protection: Protect masonry construction from direct exposure to wind and sun when erected in ambient air temperature of 99º F or greater in shade with relative humidity less than 50 percent.

    a. When ambient air temperature exceeds 99º F, or 90º F with wind velocity in excess of 8 MPH, limit installation of mortar to 4 feet ahead of masonry and install masonry within one minute of spreading mortar.

B. Surface and Ambient Conditions, Cleaning: Do not commence work until surface temperatures and ambient temperatures have continuously been above 40º F for not less than 24 hours prior to start of work.

1. Temperature: Do not proceed with work if ambient temperature is projected to fall below 40º F within 72 hours after completion of cleaning.

C. Cleaning, General: Comply with Recommended Practices and Specifications for Cold Weather Masonry Construction of IMI.

1. At concrete masonry, comply with NCMA Tek Notes, Series 8 – Maintenance and Cleaning.
2. At brick surfaces, comply with BIA Technical Note 20.

PART 2 - – PRODUCTS

2.1 BRICK

A. Face Brick (BR-1): ASTM C216 with following additional requirements: (1) Waiver of saturation coefficient requirement not allowed; (2) 50 cycle freezing and thawing test, ASTM C67, mandatory; and (3) Test results dated within last six months of submittal.

1. Type: FBS or FBA.
2. Grade: SW .
3. Size: Match existing..
4. Color: Match existing brick

B. Special Shape Brick: Where indicated and for application requiring masonry of form, size and finish on exposed surfaces which cannot be produced from standard brick sizes by sawing.

1. Provide 100 percent solid units without core holes where core holes or "frogs" would be exposed to view or weather when in final position, such as:

    a. Recessed units; units directly above and below recessed or korbelled units; soldier courses at jambs of openings; other locations where water infiltration is expected due to exposure of core to cavity; jamb, head, or sill conditions; units directly above or below shelf or relieving angles; units directly above or below loose steel lintels; units directly above flashing and at weeps or cavity vents.

2. Provide lipped brick plant fabricated from brick manufacturer only. Field cutting not permitted.

C. Schedule delivery of special shapes with that of other brick. Confirm matching color and texture.

2.2 MORTAR AND MASONRY GROUT MATERIALS AND MIXES

A. Mortar and Masonry Grout: Provide in accordance with Section 040510.

2.4 MASONRY ACCESSORIES

A. Anchors and Ties, Reinforcing, Joints, CMU Control Joint Strips, Masonry Flashing, Through-Wall Flashing, Masonry Flashing Mastic, Weeps, Cavity Vents, Cavity Drainage Materials, and Masonry Cleaning Agents: Provide in accordance with Section 040510.

PART 3 - - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with work in accordance with Section 017300.

1. Verify items provided by other Sections of work are properly sized and located.
2. Examine supporting members to ensure surfaces are at proper elevation and are free from dirt or other deleterious matter.

3.2 PREPARATION

A. Receive approval for required field sample before proceeding further.

B. Dovetail Anchor Slots: Coordinate placement with other trades

C. Establish lines, levels, and coursing; protect from disturbance.

1. Provide temporary bracing during erection of masonry work. Maintain in place until building structure provides permanent support.

3.3 INSTALLATION

A. General: Comply with NCMA.

B. Tolerances: Remove work not conforming to specified tolerances and reconstruct to proper tolerances.

1. Variation from Plumb: 1/4 inch per story non-cumulative; 3/8 inch maximum in two stories or more.
2. Variation from Level Coursing: 1/8 inch in 3 feet; 1/4 inch in 10 feet; 1/2 inch maximum.
3. Variation from Unit to Adjacent Unit: 1/32 inch maximum.
4. Variation from Plan Location: 1/4 inch in 10 feet and 1/2 inch maximum in 20 feet or more.
5. Alignment of Columns and Pilasters: Maximum 1/4 inch from true line.
6. Variation in Sizes of Wall Openings: Minus 0 inch to plus 1/4 inch.
7. Variation in Location of Wall Openings: Plus or minus 1/4 inch.
8. Variation of Joint Thickness: 1/8 inch in 3 feet.
9. Maximum Variation from Cross Sectional Thickness of Walls: Plus or minus 1/4 inch.

C. Masonry Flashing: Clean surfaces to receive flashing; remove rough projections to avoid damage to flashing.

1. Use longest pieces practicable.
2. Extend flashings through masonry veneer; turn up minimum of 8 inches in cavity. Secure flashing into reglet or mortar joint.
3. Lap joints minimum of 4 inches and seal with manufacturer's recommended materials.
4. Continue flashing around corners. Ensure flashing material is not interrupted in horizontal plane at corners.
5. Extend metal flashing 1/4 inch beyond outside face of brick and bend downward at 45 degree angle to create water drip.
6. Apply Masonry Flashing Mastic to surface to which flashing is to be applied to obtain watertight bond. Seam joints and penetrations in flashing, and at formed shapes such as end dams, with self-adhering termination tape. Prevent staining at face of masonry unit due to mastic.
7. Lay masonry units in full bed of mortar, applied directly on top of flashing which occurs over steel lintels or shelf angles. Do not sandwich flashing between layers of mortar.
8. Form watertight end dams at masonry openings and at terminations of copings, sills, lintels, and other discontinuous horizontal runs.

    a. Typically, form watertight end dams at each end of flashing into head joints.
    b. Where abutting adjacent vertical wall surfaces, extend flashing through control joint and turn flashing into adjacent wall to provide means to weep to exterior.
    c. Ensure end dams provide positive drainage to exterior.
    d. Anchor sills, lintels, copings, and other items with dowels through flashing. Seal penetrations as required by flashing manufacturer.

9. Jamb Flashing: At openings, extend continuously to form watertight seal from head flashing or underside of lintel to sill flashing or end dams at masonry openings. Seal to underside of head flashing or lintel and integrate with sill flashing or end dams to prevent flow of water beyond seam. Ensure proper flow to weeps. Set flanges in sealant beds. Extend leg past edge of veneer unit to ensure proper enclosure of cavity.
10. Through-Wall Flashing: Locate continuous under copings and at locations indicated.

    a. Extend flashing 1/4 inch beyond outside face of both sides of wall and bend downward at 45 degree angle to create water drip.
    b. Seal around penetrations, such as at reinforcing and at dowels used to anchor coping stones, sills, and lintels, for watertight installation.
    c. Install Termination Bar to secure top of flashing to substrate. Fasten at 16 inches oc. Seal top of termination bar in accordance with Section 079200.

D. Mortar Beds: Except as indicated otherwise, place masonry in full bed of mortar. Maintain uniform joint width.

1. Properly joint to adjacent work and to lines and levels indicated. Align head joints plumb within vertical tolerance.
2. Make vertical and horizontal joints equal and of uniform thickness.

E. Collar Joints: Keep cavity space to be grouted clean.

1. Remove protruding mortar fins in cavity to be grouted.
2. Solidly grout cavity in 4 feet maximum lifts.

3.4 ACCESSORIES

A. Anchors and Ties: Unless otherwise indicated, install within limits specified below.

1. Provide minimum of one anchor or tie for each 4 square feet of wall surface.
2. Maximum distance between adjacent ties or anchors:

    a. Vertically - 16.
    b. Horizontally - 16 inches.

B. Veneer Reinforcing: Comply with NCMA TEK 10-4: Crack Control For Concrete Brick And Other Concrete Masonry Veneers. Use two lengths of continuous wire reinforcing at veneer wythe, clipped to tie extending from wall back-up. Embed wire reinforcing fully in mortar. Space reinforcing at 16 inches oc maximum vertically.

C. Self-Drill Adjustable Veneer Anchors and Ties: Install in accordance with manufacturer's requirements.

1. Space at 16 inch OC maximum vertically and horizontally.
2. Predrill concrete and CMU.
3. Embed tie in midpoint of mortar joint.

E. Zee Strap Anchors: Install in bed joints at 4 feet OC vertically where indicated and where vertical control or expansion joints do not occur at intersection of load bearing walls.

1. Set turned ends of anchor into 8 inch deep grout filled core of masonry unit.
2. Place mesh joint reinforcement in course directly below anchor to support grout in core.
3. Do not place anchor in same mortar bed containing horizontal joint reinforcement.

3.6 ADJUSTING

A. Cut out and re-point defective mortar joints to match adjacent work.

1. During tooling of joints, enlarge voids and holes and completely fill with mortar matching adjacent.

2. Remove and replace masonry units which are loose, chipped, broken, stained, or otherwise damaged. Provide new units to match adjoining units and install in fresh mortar pointed to eliminate evidence of replacement.

3.7 CLEANING

A. General: Comply with Section 017400. Remove excess mortar and smears immediately.

1. Replace defective mortar. Match adjacent work.
2. Dry brush masonry surface after mortar has set at end of each working day.
3. Clean stained surfaces with non-acidic solution of type which will not harm masonry or adjacent materials. Follow manufacturer's instructions. Consult masonry manufacturer for acceptable cleaners.
4. Do not allow cleaning solution to etch mortar joints, or adjacent surfaces such as masonry, metal, stone, concrete surfaces, foundations, or windows. Protect adjacent surfaces. Immediately remove cleaning products from adjacent surfaces when deposits occur.
5. Protect plants, grasses, and other vegetation from damage due to cleaning materials and process. Thoroughly flush chemical cleaners with copious quantities of water to ensure that local fauna is not harmed due to ingesting runoff.
6. Cleaning tools: Non-metallic.

B. Clean-up debris and refuse created by masonry work and remove from site.

1. Waste Management Procedures: Comply with Section 013543.

3.9 PROTECTION

A. Protect finished work in accordance with Section 017300.

1. Protect sills, ledges, and projections from damage during construction.
2. Maintain protective boards at exposed external corners, sills, ledges, and projections to avoid damage by construction activities.
3. Wall Covers: Cover partially completed walls with impervious sheets when work is not in progress.

a. Extend cover down 24 inches minimum on both sides of wall and secure in-place to prevent moisture infiltration and protect from weather.

B. Protect wall at scaffold work platform. Turn-up scaffold boards at end of day to reduce mortar stains on walls during wet weather.

C. After completion of masonry work protect top of walls until wall cap [coping] and flashings are in place.

END OF SECTION

SECTION 042200 - CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Mortar
3. Grout.
4. Steel reinforcing bars.
5. Masonry joint reinforcement.
6. Ties and anchors.
7. Miscellaneous masonry accessories.

B. Products furnished, but not installed, under this Section include the following:

1. Anchor sections of adjustable masonry anchors for connecting to structural frame, installed under Division 05 Section "Structural Steel Framing."

C. Products installed, but not furnished, under this Section include the following:

1. Steel brick shelf angles, brick relieving angles and hung lintels anchored to masonry walls, furnished under Division 05 Section "Structural Steel Framing"
2. Loose steel lintels, furnished under Division 05 Section "Structural Steel Framing"
3. Anchor rods and embed plates indicated to be built into masonry, furnished under Division 05 Section "Structural Steel Framing"
4. Concealed lintel systems, furnished under Division 05 Section "Metal Fabrications"

D. Related Sections:

1. Division 01 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
2. Division 03 Section Division 05 Section "Cast-in-Place Concrete" for reinforcing steel dowels for anchoring concrete unit masonry to cast-in-place concrete.
3. Division 05 Section "Structural Steel Framing" for furnishing loose lintels.
4. Division 07 Section "Water Repellents" for water repellents applied to unit masonry.
5. Division 07 Section "Sheet Metal Flashing and Trim" for sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.

1.3 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 SUBMITTALS

A. Product Data:

1. Single Wythe Masonry Joint reinforcement
2. Multiwythe Cavity Wall Joint Reinforcement
3. Veneer Joint Reinforcement
4. Adjustable Anchors for Connecting to Structural Steel Framing
5. Partition Top Anchors
6. Rigid Anchors

B. Contractor's Statement of Responsibility Per Division 01 Section "Collective Inspections and Structural Testing"

C. Shop Drawings: For the following:

1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
2. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."

   a. Show elevations of all reinforced walls including reinforcing per typical details for all openings including but not limited to openings for ductwork and piping.
   b. Dowels shall match typical wall reinforcing unless noted otherwise.
   c. Dowels shall extend a lap distance above finished floor, unless top of footing is more than typical bar lift below finished floor. In such an instance dowel shall extend a lap distance out of footing.
   d. Coordinate bar lift detailing with sequencing requirements of part 3 of this specification section.
   e. Layout cmu control joints per contract documents and show associated typical reinforcing.
   f. General Contractor shall coordinate all necessary openings in masonry walls with all subcontractors and shall provide information to reinforcing steel detailer for preparation of shop drawings.
   g. Where above the ceiling coordination drawings are a project requirement the coordination drawings shall be provided to the reinforcing steel detailer to aid in developing elevation of reinforced walls.

D. Qualification Data:

1. Masonry Installer.
2. Post Installed Structural Anchor Installer

E. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:

1. Concrete Masonry Units.

   a. Submit material test reports for each type of mix to be use in production of block for the project.
   b. Submit material test reports not more than 180 days old demonstrating compliance with the specified ASTM standards and project requirements.

2. Concrete Masonry Unit Aggregates: For concrete masonry units containing recycled material or post-industrial waste for aggregates provide test reports in accordance with the quality assurance requirements below.
3. Mortar Aggregates
4. Grout Aggregates
5. Grout Cementitious Materials
6. Mortar Cementitious Materials

F. Material Certificates: For each of the following indicating compliance with the required standards and signed by manufacturers:

1. Concrete Masonry units (for each type and size):

   a. Include material test reports substantiating compliance with requirements.
   b. Include data and calculations establishing average net-area compressive strength of each size and profile of block to be used on the project.
   c. Include a statement confirming that cmu produced for the project will use materials identical to those used in producing the block for which test reports are submitted.

2. Grout Cementitious materials.

   a. Submit material certificates not more than 90 days old demonstrating compliance with the specified ASTM standards.

3. Mortar Cementitious materials.

   a. Submit material certificates not more than 90 days old demonstrating compliance with the specified ASTM standards.

4. Grout Coarse Aggregates

   a. Submit material certificates not more than 90 days old demonstrating compliance with the specified ASTM standards.

5. Grout Fine Aggregates.

   a. Submit material certificates not more than 90 days old demonstrating compliance with the specified ASTM standards.

6. Mortar Fine Aggregates

   a. Submit material certificates not more than 90 days old demonstrating compliance with the specified ASTM standards.

7. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.

8. Preblended Grout mixes. Include description of type and proportions of ingredients.

G. Design Mixtures:

1. Grout: For each type of grout

   a. Indicate amounts of mixing water to be withheld for later addition at Project site.
   b. Mix design submittals shall include test results and/or trial batch data that meet or exceed the required average compressive strengths required by ACI 301. In accordance with ASTM C476 all testing shall be completed per ASTM C10119.
   c. Trial batches shall consist of identical cementitious materials, fine and course aggregates, and admixtures to be used for mix design.
   d. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

2. Mortar: For each type of mortar

a. Indicate materials to be used
b. Indicate proportioning of ingredients.
c. Indicate repeatable means of measuring ingredient proportions.
d. When using the ASTM C270 property specification include test reports. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.

H. Research/Evaluation Reports:

1. Post installed structural anchors: See specification section 050520

I. Hot and Cold Weather Program: Describe in detail procedure for working in Hot and Cold Weather. Included detailed description of methods, materials, and equipment to be used to comply with requirements.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.

B. Masonry Installer: A single, experienced firm, or an approved joint venture, specializing in masonry construction with a minimum five- year record of successful completion of projects of similar scope, capable of providing labor and material and performance bonds for its portion of the Work that are acceptable to the Owner. Installer shall furnish all required materials and equipment and perform the work of this Section with its own regular employees.

1. The masonry supervisor/foreman shall have had at least 5 years of experience with at least 5 projects of similar size and nature; he shall not act as or become a production worker.
2. The lead/crew chief masons shall have had at least 3 years of experience with at least 5 projects of similar size and nature;
3. Installer shall have experienced masonry superintendent and crew chiefs on site supervising the work whenever work is in progress.
4. Contractor's Own Forces: Contractor may utilize own forces for work of this Section when Contractor and Contractor's masonry superintendent and crew chiefs meet the above qualifications.

C. Post Installed Structural Anchor Installer: See specification section 050520 for requirements

D. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

E. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

F. Limitations on Aggregates: For concrete masonry units containing recycled material or post-industrial waste, provide units free of impurities that will cause rusting, staining or popouts and with a record of successful in-service performance in conditions similar to those expected at Project site.

1. Ferrous material shall be removed by magnetic separation.
2. Aggregates shall contain no combustible materials.
3. Aggregates shall be graded and supplied in consist graduations from batch to batch.
4. Material shall be tested according to the following:

a. ASTM C40: Organic Impurities in Fine Aggregates for Concrete.
b. ASTM C 136: Sieve Analysis of Fine and Coarse Aggregate.
c. ASTM C 641: Staining Materials in Lightweight Concrete Aggregates.

d. ASTM C 151: Autoclave Expansion of Hydraulic Cement (for popouts.)

G. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

H. Grout Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design grout mixtures.

I. Daily Log: Maintain a daily log of masonry work in progress for inspection by Owner, Architect, Special Inspector or Authority Having Jurisdiction.

1. Indicate on small scale plans where masonry was erected.
2. Indicate on small scale plans where masonry was grouted.
3. Identify crew and assigned work area.
4. Certify that the following tasks have been performed.

a. Inspection of construction and verification of compliance with requirements as indicated in schedule of special inspections.
b. Daily Cleaning.

J. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire-resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

K. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1. Review construction sequencing and required time allotted for inspections prior to grouting.
2. Review ACI 530 tolerance for placement of reinforcing steel.
3. Review hot and cold weather procedures.
4. Review typical details for reinforcement requirements
5. Review requirements for horizontal joint reinforcement
6. Review reinforcement placement tolerance
7. Review reinforcement anchorage requirements
8. Review reinforcement lap requirements
9. Review reinforced masonry construction sequence
10. Review limits on embedded items in grouted masonry
11. Review grouting procedures and requirement for mechanical vibration.
12. Review requirements for masonry protection

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 PROJECT CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches down both sides of walls and hold cover securely in place.
2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

2.2 CONCRETE MASONRY UNITS

A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, bond beams and other special conditions.
2. Provide square edge units for outside corners unless otherwise indicated
3. Provide bullnose units for outside vertical corners except as follows:

    a. First course at finished floor
    b. Courses intersecting with ceiling plane

4. Provide bullnose units for sills unless otherwise indicated

B. Cell Layout:

1. All block shall be of standard two cell or open end configuration.
2. All block shall be configured such that it allows for both of the following:

    a. Placement of reinforcing as indicated with not less than 1/2" clear grout cover between the bar and the block.
    b. For the required bonding pattern the block will provide a minimum 3 inch by 3 inch continuous vertical column to receive grout.

C. Integral Water Repellent: Provide units made with integral water repellent for exterior wall units.

1. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested according to ASTM E 514 as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, shall show no visible water or leaks on the back of test specimen.

D. CMUs: ASTM C 90.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.
2. Density Classification:
    a. Lightweight unless otherwise indicated.

    b. Blended medium weight block to be used at food preparation areas receiving epoxy finish and where indicated.
        1) Provide units made with graded aggregates to achieve smoother surface texture for the application of paint finish. Match Architect’s sample for surface texture.

3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
4. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.

2.3 CONCRETE AND MASONRY LINTELS

A. Concrete Lintels: Where specifically indicated provide formed-in-place concrete lintels complying with requirements in Division 03 Section "Cast-in-Place Concrete," and with reinforcing bars indicated.

B. Masonry Lintels: Unless indicated otherwise provide built-in-place masonry lintels made from lintel or channel concrete masonry units for the bottom course, and bond beam units for additional courses indicated with reinforcing bars placed as indicated and filled with coarse grout. Temporarily support built-in-place lintels until cured.

2.4 MORTAR AND GROUT MATERIALS

A. Regional Materials: Provide aggregate for mortar and grout, cement, and lime that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.

B. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

C. Hydrated Lime: ASTM C 207, Type S.

D. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

E. Masonry Cement: Not Permitted

F. Mortar Cement: ASTM C 1329.

G. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979. Use only pigments with a record of satisfactory performance in masonry mortar.

H. Aggregate for Mortar: ASTM C 144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
3. White-Mortar Aggregates: Natural white sand or crushed white stone.
4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

I. Aggregate for Grout: ASTM C 404.

J. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

K. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent by same manufacturer.

L. Water: Potable.

2.5 REINFORCEMENT

A. Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60

B. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.

1. Finish: Hot Dip Galvanized
2. Wire Size for Side Rods: W1.7 or 0.148-inch diameter.
3. Wire Size for Cross Rods: W1.7 or 0.148-inch diameter.
4. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
5. Provide in lengths of not less than 10 feet **,** with prefabricated corner and tee units.

C. Masonry Joint Reinforcement for Single-Wythe Masonry: Ladder type with single pair of side rods.

D. Masonry Joint Reinforcement for Multiwythe Cavity Wall Masonry:

1. Adjustable (two-piece) type, ladder design

2. One side rod at each face shell of backing wythe
3. Separate adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches.
4. Tie Section:
    a. Size ties to extend at least halfway through facing wythe but with at least 5/8-inch cover on outside face.
    b. Provide rectangular units with closed ends and not less than 4 inches wide.
    c. Ties have hooks or clips to engage a continuous horizontal wire in the facing wythe.

2.6 TIES AND ANCHORS

A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.

1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 153/A 153M, Class B-2 coating.
2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.
3. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M. Hot-dip galvanized to comply with ASTM A 153/A 153M

B. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches parallel to face of veneer or anchored masonry.

C. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch diameter, hot-dip galvanized steel wire.
2. Tie Section: Triangular-shaped wire tie, sized to extend within halfway through anchored masonry, but with at least 5/8 inch cover on outside face, made from 0.187-inch diameter, hot-dip galvanized steel wire.

D. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch (25 mm) of masonry face, made from 0.25-inch hot-dip galvanized steel wire.

E. Partition Top anchors: 0.105-inch- thick metal plate with 3/8-inch diameter metal rod 6 inches long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.

A. Rigid Anchors: Fabricate from ASTM A 36 steel bars 1-1/2 inches wide by 1/4 inch thick by length required, with ends turned up 2 inches in alternate directionsCorrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M

B. Adjustable Masonry-Veneer Anchors:

2.7 MISCELLANEOUS ANCHORS

A. Post Installed Structural Anchors: See specification section 055020 for products

2.8 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.

B. Preformed Control-Joint Gaskets: Made from PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

A. Vertical Reinforcing Bar Positioners: Custom fabricated wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding vertical reinforcing bars in proper location of cells. Units are formed from 0.142-inch steel wire, hot-dip galvanized after fabrication.

1. Provide units with two loops for masonry walls indicated to have a single vertical reinforcing bar at each grout spacing.

   a. Loop layout shall allow for placement of vertical reinforcing in center of cmu wall thickness unless noted otherwise

2. Provide units with four loops or a pair of units with two loops for masonry walls indicated to have two vertical reinforcing bars at each grout spacing.

   a. Provide custom fabricated positioners with loop layout to allow for placement of vertical reinforcing as indicated in the contract documents.

B. Horizontal Reinforcing Bar Positioners: Custom fabricated wire units designed to fit into mortar bed joints spanning masonry unit cells and bent down for holding horizontal reinforcing bars at proper height in lintels and bond beam. Units are formed from 0.142-inch steel wire, hot-dip galvanized after fabrication.

   a. Provide custom fabricated positioners to allow for placement of horizontal reinforcing in lintels as indicated in the contract documents.

   b. Positioners for continuous bond beams shall center reinforcing in the depth of the bond beam unit unless noted otherwise.

2.9 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

2.10 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Use portland cement-lime or mortar cement mortar unless otherwise indicated.
3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Preblended, Dry Grout Mix: Furnish dry grout ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

D. Mortar for Unit Masonry: Provide "Type S" mortar complying with ASTM C 270, Proportion or Property Specification unless indicated otherwise.

E. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.

1. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
2. Pigments shall not exceed 10 percent of portland cement by weight.
3. Pigments shall not exceed 5 percent of mortar cement by weight.
4. Pigments containing carbon black must be limited to 2 percent of portland cement by weight or 1 percent of mortar cement by weight
5. Mix to match Architect's sample.
6. Application: Use pigmented mortar for exposed mortar joints with the following units:

    a. Decorative CMUs.

F. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.

1. Mix to match Architect's sample.
2. Application: Use colored aggregate mortar for exposed mortar joints with the following units:

    a. Decorative CMUs.

G. Grout for Unit Masonry: Comply with ASTM C 476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
2. Proportion grout in accordance with ASTM C 476, paragraph 4.2.2 as follows:

    a. 28-day compressive strength of 3000 psi unless noted otherwise.
    b. Provide grout with a slump of 8 to 11 as measured according to ASTM C 143/C 143M.

3. Ready-Mixed Grout: Measure, batch, mix, and deliver grout according to ASTM C 476, and furnish batch ticket information.

    a. Slump shall be adjusted on site as necessary, and grout shall be re-mixed at mixing speed for at least one minute before discharging to achieve the desired consistency.

4. Project-Site Mixed Grout: Mix preblended, dry grout mix according to ASTM C 476.

    a. Mix in a mechanical mixer for a minimum of 5 minutes with sufficient water to achieve the desired consistency.
    b. Hand mixing of grout is not permitted
    c. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
2. Verify that foundations are within tolerances specified.
3. Verify that foundations are "broom" clean and free of debris or other laitance that may compromise mortar bond.
4. Verify that reinforcing dowels are properly placed and extend to the proper elevation.

B. Before installation, examine rough-in and built-in construction for electrical, mechanical, piping and other systems to identify locations of built in construction..

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

3.2 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.

D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

1. Mix units from several pallets or cubes as they are placed.

F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

3.3 TOLERANCES

A. Comply with the construction tolerances in ACI 5301.1 unless modified herein.

B. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch.
2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.
3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

C. Lines and Levels:

1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet , 1/4 inch in 20 feet, or 1/2 inch (12 mm) maximum.
3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet , or 1/2 inch maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

D. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch , with a maximum thickness limited to 1/2 inch for typical bed joints.
2. For bed joints on foundations the minimum thickness shall be 1/4 inch and the maximum thickness shall be 3/4 inc.
3. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
4. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
5. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.]
6. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

C. Lay concealed masonry with all units in a wythe in running bond. Bond each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

D. Reinforced Masonry: Keep vertical cells aligned to maintain continuous unobstructed cells not less than 3 inches by 3 inches to receive reinforcing steel and grout.

E. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

F. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

G. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

H. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.

I. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

J. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above, leaving a minimum 1" clearance between masonry and structure above unless otherwise indicated.

1. Install compressible filler in joint between top of partition and underside of structure above.
2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1 inch clearance between end of anchor rod and end of tube. Space anchors 32 inches o.c. unless otherwise indicated.
3. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Division 07 Section "Fire-Resistive Joint Systems."

3.5 MORTAR BEDDING AND JOINTING

A. General: Prepare mortar in accordance with current Portland Cement Association publications.

B. Prepare fresh mortar at the rate it will be used, in order to maintain consistent color and workability. Do not use mortar that has stiffened because of hydration. Discard when not used within the time recommended by mortar manufacturer or PCA publications, whichever is shorter. Retemper mortar carefully to avoid color changes, no more than twice per batch.

C. Measure mortar materials using cubic foot measuring box or other approved container of known volume, of size appropriate for operation. Use a consistent ratio of water to mortar materials, within the range recommended by the mortar manufacturer's written instructions.

D. Lay hollow CMUs as follows:

1. Only lay cmu on foundations after they have achieved a "broom" clean condition and are free of debris or other laitance that may compromise mortar bond.
2. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
3. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
4. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
5. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
6. With head joints filled to a minimum thickness equal to the face shell of the unit on both faces of the unit.

E. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

F. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

G. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

H. Immediately after placing a course of masonry clean mortar drippings and fins from cells to receive reinforcing. Care shall be taken to collect the loose material and remove it from the cell and not allowing it to collect at the bottom of the cell.

3.6 CAVITY WALLS

A. Bond wythes of cavity walls together as follows:

1. Masonry Joint Reinforcement: Installed in horizontal mortar joints.

    a. Use adjustable (two-piece) type reinforcement to allow for differential movement regardless of whether bed joints align.

    b. Provide continuous horizontal wire in facing wythe attached to ties

B. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.

C. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, bond walls together as follows:

1. Provide rigid metal anchors not more than 16 inches o.c. If used with hollow masonry units, embed ends in mortar-filled cores.

D. Coat cavity face of backup wythe to comply with Division 07 Section "Bituminous Dampproofing."

E. Apply air barrier to face of backup wythe to comply with Division 07 Section "Modified Bituminous Sheet Air Barriers Fluid-Applied Membrane Air Barriers."

3.7 MASONRY-CELL INSULATION

A. Pour granular insulation into cavities to fill void spaces. Maintain inspection ports to show presence of insulation at extremities of each pour area. Close the ports after filling has been confirmed. Limit the fall of insulation to 1 story high, but not more than 20 feet.

3.8 MASONRY JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.

1. Space reinforcement not more than 16 inches o.c.
2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
3. Provide reinforcement not more than 8 inches above and below wall openings and extending 24 inches beyond openings in addition to continuous reinforcement.

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

3.9 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. Anchor masonry to structural steel and concrete where masonry abuts or faces structural steel or concrete to comply with the following:

1. Provide an open space not less than 1/2 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated, but not more than 16 inches o.c. vertically and 16 inches o.c. horizontally.

4. Provide anchors at each course of masonry where infilling the webs of steel beam lintels in masonry walls.

3.10 ANCHORING MASONRY VENEERS

3.11 CONTROL AND EXPANSION JOINTS

A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

B. Form control joints in concrete masonry as follows:

1. Install preformed control-joint gaskets designed to fit standard sash block.

3.12 LINTELS

A. Install loose steel lintels where indicated.

B. Install shelf angles/hung lintels where indicated

C. Built in Place Lintels:

1. Provide lintels where shown and where openings of more than 12 inches for block-size units are shown without structural steel or other supporting lintels.
2. Construct from closed bottom lintel or channel concrete masonry units for the bottom course with reinforcing steel placed as indicated, supported on positioners and anchored in place. Bond beam units are not permitted for bottom course.
3. Provide bond beam units for additional courses indicated with reinforcing steel placed as indicated supported on positioners and anchored in place.
4. Fill the entire depth and length of the lintel grout in one grout pour. Grout joints are not permitted in lintels.
5. Temporarily support built-in-place lintels until cured.
6. Provide minimum bearing of 16 inches at each jamb unless otherwise indicated.

3.13 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602 and as follows:

1. Center all vertical reinforcing steel on the thickness of the concrete masonry unit unless noted otherwise.
2. Bar positioners must be anchored in place with mortar.
3. Sequencing:

a. Reinforcing steel from previous grout lift extends a lap distance out of hardened grout.

b. No additional reinforcing is placed, and additional masonry is laid up, but not exceeded the grout pour height limit.
c. Reinforcing bar positioner is placed in the bed joint of the second course of additional masonry, and below the last bed joint of additional masonry with additional bar positioners installed such that spacing does not exceed 48 inches on center
d. The cells of additional masonry are cleaned of mortar droppings and mortar fins.
e. A lift of reinforcing steel is dropped into the previously laid masonry using the bar positioners to ensure proper location. The reinforcing steel shall extend above the proposed grout pour height by a minimum of one splice distance.
f. The grout lift is placed and consolidate.
g. The sequence is repeated.

4. Where a reinforced cell is noted to have the vertical reinforcing offset from the center of the concrete masonry unit then provide special two loop bar positioners to locate each vertical bar and the associated splice bar per the contract documents.

   a. Alternately a two loop bar positioner may be installed rotated parallel to the face shells to locate the vertical bar and the associated splice bar per the contract documents.

5. Where a reinforced cell is noted to have two vertical bars provide special four loop bar positioners to locate each vertical bar and the associated splice bar per the contract documents.

   a. Alternately a pair of two loop bar positioners may be installed rotated parallel to the face shells to locate each vertical bar and the associate splice bar per the contract documents.

6. A minimum of 1” clear shall be maintained between pairs of parallel bars occurring in the same vertical cell, lintel or bond beam.
7. A minimum of 1” clear shall be maintained between vertical bars or pairs of vertical bars and , piping or other embeds occurring in the same vertical cell.
8. A minimum of ½” shall be maintained between any reinforcing bar and the adjacent masonry unit.
9. Wet setting of reinforcing steel into previously placed grout is not permitted.

C. Conduits, Piping, Panels, Boxes and other Embedded Equipment

1. The maximum outside diameter of any vertical conduit or piping located in a grouted cell shall be as follows:

   a. 1.5 inches for 12 inch cmu
   b. 1.125 inches for 8 inch cmu
   c. 1 inch for 6 inch cmu
   d. Where vertically reinforced and grouted cells are not specifically located in the contract documents it is acceptable to relocate the vertically reinforced and grouted cell to the next adjacent cell to avoid a conduit or pipe of larger dimension than permitted. The typical center to center spacing of vertically reinforced and grouted cells shall be maintained.
   e. Where vertically reinforced and grouted cells are specifically located in the contract documents, conduit or pipes of dimensions larger than permitted shall be routed to avoid the vertically reinforced and grouted cells. In the case that the conduit or piping cannot be routed to avoid the vertically reinforced and grouted cell the Engineer shall be contacted for resolution.

2. Horizontal runs of conduit or pipe are not permitted in within lintels or bond beams
3. Horizontal runs of conduit or pipe passing through vertically reinforced and grouted cells are not permitted.
4. Piping containing either of the following shall not be located in grouted masonry:

   a. Liquid, gas or vapors at temperatures higher than 150 degrees Farenheit
   b. Under pressures in excess of 55 psi
   c. Containing water or other liquids when they are subject to freezing

5. Inset panels, boxes, fire extinguisher cabinets and other embedded items are not permitted in grouted cells.

    a. Where vertically reinforced and grouted cells are not specifically located in the contract documents it is acceptable to relocate the vertically reinforced and grouted cell to the next adjacent cell to avoid conflict with embedded equipment. The typical center to center spacing of vertically reinforced and grouted cells shall be maintained.
    b. Where vertically reinforced and grouted cells are specifically located in the contract documents and conflict with embedded equipment, the embedded equipment shall be surface mounted or relocated as allowed by the contract documents. Where contract documents do not allow for surface mounting or relocating the equipment the Engineer shall be contacted for resolution.

D. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Prior to grouting all grouted cells shall be inspected to ensure cells are free of loose mortar droppings or debris.

    a. All debris and mortar droppings shall be removed.
    b. All hardened mortar or mortar fins protruding more than 1/2 inch into cell shall be removed.

2. For grout pours of 60 inches or more, and other locations where specifically indicated provide cleanouts at the bottom of each grouted cell

    a. Where cleanout will is located at location and elevation where the finished wall is exposed the cleanout shall be created by removing the face shell of a full block to allow for a seamless appearance by patching with a full face shell.
    b. Where the cleanout will be concealed in finished construction the cleanout can be formed such that the grout will form the finished surface at the cleanout. Cleanout shall be a minimum of 4 inches by 4 inches.

3. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for grout properties and minimum grout space.
4. Limit height of vertical grout lifts and grout pours to not more than 60 inches.
5. Grout all courses of lintels and beams in one continuous operation for the full height of the lintel or beam. Do not allow cold joints in lintels and beams.
6. Grout lifts shall be terminated at top of walls shall be carefully consolidated to ensure grout is cured flush to top of masonry, and provides solid bearing beneath all bearing plates.
7. Grout lifts terminating at bond beams, except at top of wall shall stopped 1/2" down from top of bond beam
8. Typical grout lifts, not terminating at bond beam or top of wall shall be terminated a minimum of 1 1/2", but not more than 3" below a bed joint.
9. All grout lift terminations shall be coordinate with reinforcing steel layout to ensure proper lap distance of reinforcing steel. Grout pours shall not be terminated anywhere along the length of the splice.
10. All grout shall consolidated using internal vibration with a pencil type vibrator.

    a. Consolidate grout in each cell or bond beam immediately after placement. Top of bond beam or cell to desired height after initial consolidation.
    b. Reconsolidate grout in each cell or bond beam after initial water loss and settlement has occurred approximately 10 minutes after initial consolidation. Top of bond beam or cell to desired height after reconsolidation.

3.14 FIELD QUALITY CONTROL

A. Testing and Inspection: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports in accordance with the schedule of special inspections.

B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.15 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
6. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.16 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

END OF SECTION 042200

SECTION 050520 - POST INSTALLED STRUCTURAL ANCHORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Wedge anchors
2. Cartridge injection adhesive anchors

B. This specification section is only intended for use when specifically required by the drawings or other referencing specifications and structural applications. This section is not intended for use in non-structural applications or where not specifically referenced by the drawings or other specification sections.

C. Related Sections include the following:

1. Division 01 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
2. Division 05 Section "Structural Steel Framing" for anchorage of structural steel.
3. Division 06 Section "Rough Carpentry" for anchorage of wood framing

1.3 PERFORMANCE REQUIREMENTS

A. The basis of design products are as specified in this specification or the contract documents. Product substitutions must have capacities equal to or greater than values calculated for each specific condition calculated when calculated using the data in the referenced ESR report and in accordance with the appropriate design procedure and standards required by the building code. See requirements for substitution submittals.

1.4 DEFINITIONS

A. Post Installed Structural Anchors: Anchors supporting and/or anchoring structural elements of the building which are installed into hardened concrete or masonry and that are specified in the contract documents or performance based shop drawing design submittals for structural elements.

B. Wedge Anchors: A torque-controlled anchor, with an integral cone expander and single piece steel expansion clip providing 360-degree contact with the base material while not requiring oversized holes for installation and an impact section to prevent thread damage with required nuts and washers.

C. Cartridge Injection Adhesive Anchors: An anchor system consisting of rod insert, nut, washer and a cartridge type, two-component polymer or hybrid mortar adhesive system dispensed and mixed through a static mixing nozzle supplied by the manufacturer.

1.5 SUBMITTALS

A. Contractor's Statement of Responsibility Per Division 01 Section "Collective Inspections and Structural Testing"

B. Product Data:

1. Wedge Anchors
2. Cartridge Injection Adhesive Anchors

C. Research/Evaluation Reports:

1. Submit ICC reports for the following:

a. Wedge Anchors
b. Cartridge Injection Adhesive Anchors

D. Substitutions:

1. Substitution requests may only be made using products with ICC-ESR reports for the product in the specific substrate.
2. Substitution request shall include signed and sealed calculations demonstrating that the product is capable of providing equivalent performance of the specified product for each specific location and condition when calculated using the data in the referenced ESR report and in accordance with the appropriate design procedure and standards required by the building code.
3. Substitution request shall specify the diameter and embedment depth of the substituted product
4. Any increase in material labor cost resulting from the substitution shall be the responsibility of the contractor.

E. Manufacturer's Instruction: Manufacturer's Installation Instructions

F. Qualification Data: Submit installer qualification data as stated in Quality Assurance section. Qualifications shall be submitted in a letter format for each type of anchor to be installed, and shall include the following:

1. The specific product to be used
2. Complete description of installation procedure
3. Personnel to be trained on anchor installation
4. Date of Manufacturer training
5. Manufacturer's training certificates or letter from manufacturer certifying training was complete with a list of individuals that were trained.

1.6 QUALITY ASSURANCE

A. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

a. Coordinate meeting with individual preinstallation conferences for the following
b. Structural Steel Framing
c. Cold-Formed Metal Framing
d. Rough Carpentry

B. Installer Qualifications: The installer shall be experienced in installing anchors equal to type, and into the substrate material required for this project

C. Installer Training: Conduct a thorough training session with the manufacturer's representative. Each individual responsible for the installation of anchors shall attend the training session. Training shall consist of a review of the

complete process for the installation of the anchors and the use of proper equipment for drilling and installing the anchors, to include but not limited to:

1. Hole drilling procedure. Clarify acceptability of rotary hammer drilling and/or core drilling.
2. Hole drilling equipment
3. Type and diameter of drill bits
4. Hole preparation and hole cleaning technique
5. Hole cleaning equipment
6. Adhesive injection technique
7. Adhesive injection equipment
8. Anchor rod, nut and washer material requirements and associated cleaning requirements
9. Anchor and Anchor rod installation
10. Anchor tightening
11. Adhesive curing requirements

D. Certifications: All anchors shall have an ICC ESR Evaluation report indicating conformance with the current applicable Acceptance Criteria for the building code applicable to the project.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Keep anchors, rod materials, nuts and washers in manufacturer's packaging with label intact until needed for use.

B. Keep anchors free of dirt and debris.

C. Store anchors in a clean dry area

D. Protect anchors from corrosion and deterioration.

E. Store anchors and adhesives in strict accordance with manufacturer's requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Nuts: Having a proof load stress equal or greater than the minimum tensile strength of the associated anchor where type and strength is not specifically indicated by anchor or adhesive manufacturer.

B. Washers: Of type and material compatible with nuts unless specifically indicated by anchor or adhesive manufacturer.

C. Plate Washers: Provide ASTM A 36 plate washers of size and configuration specifically indicated.

2.2 CORROSION RESISTANCE

A. Anchors and Anchor Bodies

1. Uncoated Carbon Steel: Carbon steel anchors uncoated and free from oil, lubricants and other deleterious substances.Acceptable for use as follows:

a. Interior dry conditions

2. Zinc Plated: Zinc plating in accordance with ASTM B633, Type III Fe/Zn 5 (SC1) Acceptable for use as follows:

a. Interior dry conditions

3. Hot Dip Galvanized: Carbon steel anchors with hot-dipped galvanized in accordance with ASTM A 153. Acceptable for use as follows:

a. Interior dry conditions
b. Exterior conditions
c. Anchoring galvanized steel elements

4. Stainless Steel: AISI Type 316 stainless steel and complying with ASTM F 593. Acceptable for use as follows:

a. Anchoring treated lumber elements
b. Anchoring stainless steel elements
c. Anchoring aluminum elements or in contact with aluminum elements.

B. Nuts

1. Uncoated carbon steel: Acceptable for use as follows:

a. With Uncoated Anchors

2. Hot Dip Galvanized: Hot-dipped galvanized in accordance with ASTM A 153. Acceptable for use as follows:

a. With Zinc Plated Anchors
b. With Hot Dip Galvanized Anchors

3. Stainless Steel: ASTM F594. Acceptable for use as follows:

a. With Stainless Steel Anchors

C. Washers

1. Uncoated carbon steel: Acceptable for use as follows:

a. With uncoated anchors

2. Hot Dip Galvanized: Hot-dipped galvanized in accordance with ASTM A 153. Acceptable for use as follows:

a. With Hot Dip Galvanized Nuts

3. Stainless Steel: AISI Type 316 stainless steel. Acceptable for use as follows:

a. With Stainless Steel Nuts

D. Plate Washers:

1. Uncoated carbon steel: Acceptable for use as follows:

a. With Uncoated Nuts

2. Hot Dip Galvanized: Hot-dipped galvanized in accordance with ASTM A 153. Acceptable for use as follows:

    a. With Hot Dip Galvanized Nuts

2.3 WEDGE ANCHORS

A. Provide anchors with length identification markings conforming to ICC-ES AC01 or ICC-ES AC193 as appropriate based on the anchor substrate..

B. Size: As indicated on drawings

C. Embedment depth: As indicated on the drawings but not less than the manufacturer's documented minimum embedment depth. Where not specifically indicated use manufacturer's minimum documented embedment depth.

1. Embedment depth is from surface of concrete or masonry. Anchor lengths and extent of threads shall account for embedment depth, connected elements, plate washers, washers, nut and appropriate stick thru.

D. Concrete Anchors:

1. Anchors shall be tested in accordance with ACI 355.2 and the most recent issue of ICC-ES AC193 including the following:

    a. All mandatory testing
    b. Shear and tension in cracked concrete.
    c. Critical and minimum edge distances and spacing

2. Anchors design shall be in accordance with ACI 318 Chapter 17
3. Where not specifically indicated otherwise in contract documents or approved performance based shop drawings submittal anchors shall be as follows:

    a. Hilti Kwik Bolt TZ with nut and washer, of required finish, ICC ESR-1917
    b. Approved equal (See substitution requirements)

E. Masonry Anchors:

1. Anchors for masonry shall be tested in accordance with most recent edition of ICC-ES AC01 including the following

    a. All mandatory testing
    b. Seismic tension and shear
    c. Critical and minimum edge distances and spacing

2. Anchors design shall be in accordance with ACI 530
3. Where not specifically indicated otherwise in contract documents or approved performance based shop drawings submittal anchors shall be as follows:

    a. Hilti Kwik Bolt 3 with nut and washer, of required finish, ICC ESR-1385.
    b. Approved equal (See substitution requirements)

2.4 CARTRIDGE INJECTION ADHESIVE ANCHORS

A. Provide anchors with length identification markings conforming to ICC-ES AC58 or ICC-ES AC308.

B. Size: As indicated on drawings

C. Embedment depth: As indicated on the drawings but not less than the manufacturer's documented minimum embedment depth. Where not specifically indicated use manufacturer's minimum documented embedment depth.

1. Embedment depth is from surface of concrete or masonry. Anchor lengths and extent of threads shall account for embedment depth, connected elements, plate washers, washers, nut and appropriate stick thru.

D. Adhesive: Two component epoxy or two component hybrid system.

E. Concrete Anchors:

1. Anchors shall be tested in accordance with the most recent issue of ICC-ES AC308 including the following:

a. All mandatory testing
b. Shear and tension in cracked concrete.
c. Critical and minimum edge distances and spacing

2. Anchors design shall be in accordance with ACI 318 Chapter 17 as amended by the specific design provisions of ICC-ES AC308
3. Where not specifically indicated otherwise in contract documents or approved performance based shop drawings submittal anchors shall be as follows:

a. Rods, washers, and nuts of required finish with Hilti HIT RE 500 V3 Adhesive Anchorage System for anchorage to concrete, ICC ESR-3814.
b. Rods
1) Carbon Steel Rods: ASTM A193 B7 coated as required for use
2) Stainless Steel Rods: ASTM F593, CW

c. Approved equal (See substitution requirements)

4. Where Hilti HIT-HY 200, ICC ESR-3187 system is specifically indicated in contract documents or approved performance based shop drawings submittal anchors shall be as follows:

a. For anchors 3/8" to 3/4" diameter: HIT-Z Standard or HIT-Z-R SS rods, washers, and nuts of required finish.
b. Approved equal (See substitution requirements)

F. Masonry Anchors:

1. Anchors for masonry shall be tested in accordance with most recent edition of ICC-ES AC58 including the following

a. All mandatory testing
b. Seismic tension and shear
c. Critical and minimum edge distances and spacing

2. Anchors design shall be in accordance with ACI 530
3. Where not specifically indicated otherwise in contract documents or approved performance based shop drawings submittal anchors shall be as follows:

a. Grouted Masonry: HAS-E Standard or HAS SS rods, washers, and nuts of required finish with Hilti HIT HY 270 Adhesive Anchorage System for anchorage to masonry, ICC ESR-2682.
b. Approved equal (See substitution requirements)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.
2. Installation constitutes acceptance of existing conditions and responsibility of satisfactory performance.

3.2 INSTALLATION, GENERAL

A. Corrosion Resistance: Care shall be taken to ensure an anchor and associated accessories of the proper material and associated corrosion resistance are used for the specification application. See corrosion resistance requirements above.

B. Where manufacturer recommends the use of special tools for installation of anchors, such tools shall be used.

C. Match mark and drill, match drill or use other methods to ensure anchors are properly located.

D. Do not adjust anchor location after installation. Coordinate with EOR for modifications to connected element where anchors are incorrectly located.

E. All facets of hole drilling, hole cleaning, anchor installation, anchor torqueing shall be in strict accordance with the ICC-ESR report and manufacturer's data.

F. Drill holes perpendicular to substrate surface.

G. Drill holes with rotary impact hammer drills using carbide-tipped bits or core drills using diamond core bits as indicated in the ICC-ESR report.

H. Drill bits and core bits shall be of diameters indicated in the ICC-ESR report.

I. All holes shall be cleaned with compressed air to remove all drilling dust and other deleterious substances.

J. Remove water from holes to attain a surface dry condition unless specifically permitted otherwise by ICC-ESR report.

K. Base Material Strength: Unless otherwise specified, do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.

L. Embedded Items: Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Exercise care in coring or drilling to avoid damaging existing reinforcing or embedded items. Notify the Engineer if reinforcing steel or other embedded items are encountered during drilling. Take precautions as necessary to avoid damaging prestressing tendons, electrical and telecommunications conduit, and gas lines.

M. Perform anchor installation in strict accordance with manufacturer instructions and ICC-ES report.

N. Anchors shall be installed perpendicular to the substrate face within plus or minus 5 degrees unless specifically permitted otherwise by ICC-ESR report.

O. Install plate washers where specifically indicated or where connected elements have oversized holes.

P. Install a round washer under nuts. Round washers are in addition to plate washers where plate washers are required.

3.3 WEDGE ANCHORS

A. Protect threads from damage during anchor installation.

B. Set anchors to manufacturer's recommended torque, using a torque wrench. Following attainment of 10% of the specified torque, 100% of the specified torque shall be reached within 7 or fewer complete turns of the nut. If the specified torque is not achieved within the required number of turns, the anchor shall be removed and replaced unless otherwise directed by the Engineer.

3.4 CARTRIDGE INJECTION ADHESIVE ANCHORS

A. Clean all holes per manufacturer instructions using manufacturer's approved tools to remove loose material and drilling dust prior to installation of adhesive.

B. Inject adhesive into holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.

C. Follow manufacturer recommendations to ensure proper mixing of adhesive components.

D. Sufficient adhesive shall be injected in the hole to ensure that the annular gap is filled to the surface.

E. Remove excess adhesive from the surface.

F. Shim anchors with suitable device to center the anchor in the hole.

G. Do not disturb or load anchors before manufacturer specified cure time has elapsed.

H. Observe manufacturer recommendations with respect to installation temperatures.

I. Hilti HIT-HY200 system anchors shall be installed using the Hilti Safe Set Technology.

1. For conditions using HAS rods the Hilti hollow drill bit and Hilt vacuum system shall be employed.

3.5 FIELD QUALITY CONTROL

A. Testing and Inspection: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports in accordance with the schedule of special inspections.

B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.6 REPAIRS AND PROTECTION

A. Remove and replace misplaced or malfunctioning anchors. Fill empty anchor holes and patch failed anchor locations with high-strength non-shrink, nonmetallic grout. Anchors that fail to meet proof load or installation torque requirements shall be regarded as malfunctioning.

B. Galvanizing Repairs: Prepare and repair damaged galvanized coatings with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

C. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure that cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 050520

SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Structural steel.
2. Architecturally Exposed Structural Steel
3. Embed Plates
4. Bearing Plates
5. Nonshrink Grout.

B. Products furnished, but not installed under this Section:

1. Anchor rods and embed plates indicated to be built into masonry, installed under Division 04 Section "Unit Masonry".
2. Anchor rods and embed plates indicated to be cast into cast-in-place concrete, installed under Division 03 Section "Cast-in-place-Concrete"

C. Related Sections:

1. Division 01 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
2. Division 05 Section "Metal Stairs."
3. Division 05 Section "Post Installed Structural Anchors" for wedge, and adhesive anchors
4. Division 09 painting Sections and Division 09 Section "High-Performance Coatings" for special surface-preparation and priming requirements.

1.3 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303, "Code of Standard Practice for Steel Buildings and Bridges" and as modified herein.

B. Architecturally Exposed Structural Steel (AESS): Structural steel designated as architecturally exposed structural steel in the Contract Documents.

1.4 PERFORMANCE REQUIREMENTS

A. Connections: Provide details of connections required by the Contract Documents to be selected or completed by structural-steel fabricator, including comprehensive engineering design by a qualified professional engineer, to withstand loads indicated and comply with other information and restrictions indicated.

1. Select and complete connections using AISC 360 .
2. Use LRFD; data are given at factored-load level.
3. All bolted connections for bracing members shall be designed and fabricated as slip critical connections to allow for field reaming of holes to address fit up issues.
4. All bolted connections for axial loaded members shall be designed and fabricated as slip critical connection to allow for field reaming of holes to address fit up issues.

5. The minimum number of bolts for any connection shall be two.
6. All steel to steel connections shall extend at least two thirds of the depth of the supported member being connected.
7. All connections shall be designed to fit within the confines of concealed spaces unless specifically noted as acceptable to be exposed to view.
8. Connections shall allow for flush deck bearing at top flange of all beams beneath deck. If cover or flange plates are used a method for flush deck support around the cover/flange plate shall be provided at no cost to the owner.

1.5 SUBMITTALS

A. Contractor's Statement of Responsibility Per Division 01 Section "Collective Inspections and Structural Testing"

B. Fabricator's Certificate of Compliance Per Division 01 Section "Collective Inspections and Structural Testing"

C. Quality Control/Assurance Plan: Fabricator shall submit a job specific Quality Control/Quality Assurance plan for shop fabricated steel. The plan shall comply with the requirements of AISC 341-10 Chapter J, item J3. The plan shall specifically identify all QC and QA inspections the fabricator will be completing and the frequency of those inspections.

1. Structural Steel Fabricator

D. Weekly Inspection reports for Shop Fabricated Steel

E. Nonconformance reports for Shop Fabricated Steel

F. Product Data:

1. Primers

2. Paints
3. Electrodes

a. Indicate what welding process will be used with each electrode
b. Submit electrodes for both shop and field welding
c. Indicate compliance with AWS D1.8 Clause 6.3 for electrodes used in both SLRS Connections and Demand Critical Welds

4. Bolts, nuts, and washers including mechanical properties and chemical analysis.
5. Direct-tension indicators.
6. Tension-control, high-strength bolt-nut-washer assemblies.
7. Shear stud connectors.
8. Deformed bar anchors.
9. Nonshrink grout.
10. Post installed structural anchors: See specification section 050520

G. Shop Drawings: Show fabrication of structural-steel components.

1. All anchor rods shall be detailed with a minimum 3" projection above top of nut in the final installed condition unless noted otherwise.
2. Include min. 1/8" anchor rod setting templates. Detail quantity of templates such that there is one template for each bolt group. (Templates should not be reused).
3. Include details of cuts, connections, splices, camber, holes, and other pertinent data.

4. Splice members where indicated in the contract documents and as required to facilitate fabrication and erection. Coordinate splice locations within the limitations of referenced standards subject to approval of the Engineer of Record.
5. Include embedment drawings showing plan location and elevation of all embedded items.
6. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
7. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
8. Include scale drawings of all gusset plates.
9. Provide minimum 1/4" thick cap plates at the ends of all exposed HSS members, and at the top of all HSS columns.
10. Equally space filler beams or joists between columns and/or other dimensioned beams unless noted otherwise.
11. Where delegated design submittals are required the delegated design submittal must be included with associated shop drawings or the submittal will not be reviewed.
12. All bolts shall use standard or holes or short-slotted holes (perpendicular to the applied load).

H. Delegated-Design Submittal:

1. Steel to Steel Connections:

a. For structural steel connections indicated to comply with design loads provide structural design data signed and sealed by the qualified professional engineer responsible for their preparation.

1) Coordinate with Engineer of Record loading requirements at all steel to steel connections where not specifically indicated on the contract documents.

2) Coordinate with Engineer of Record for loading requirements at all splice locations

3) Each individual calculation shall be clearly labeled in coordination with erection drawings such that it identifies the member(s) that the connection applies to.

b. Professional Engineer's Statement: A written statement indicating that the for fabrication shop drawings incorporate all the connection requirements included in the calculations submitted for approval inclusive of any corrections required in response to shop drawing review comments. The statement shall be prepared by, and signed and sealed by the professional engineer that completed the calculations submittal.

c. The calculations must be included with the associated shop drawing submittal or the submittal will not be reviewed.

I. Slip Critical Bolt Installation Statement: A written statement indicating the means and equipment to be used to achieve the tightening requirements for clip critical bolt installation. Statement shall identify the specific pre-installation required by the special inspections and acknowledge that this testing must be coordinated and completed prior to commencement of erection.

J. As-built anchor rod and embed survey

K. Welding certificates

1. Submit welding certificates for all individuals expected to be performing field welding

L. Welding Procedure Specifications (WPS's) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for each field welded joint whether prequalified or qualified by testing, including the following:

1. Power source (constant current or constant voltage).
2. Electrode manufacturer and trade name, for demand critical welds.

M. Qualification Data:

1. Fabricator
2. Structural Steel Erector
3. Post Installed Structural Anchor Installer: See specification section 050520

N. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

O. Research/Evaluation Reports:

1. Post Installed Structural Anchors per specification section 050520

P. Product Test Reports: For the following:

Q. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

A. Connection Design Engineer

1. Responsibility: Preparation of design calculations for structural steel connections
2. Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated.

B. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category SBD (Conventional Steel Building Structures)

1. Fabricator Responsibility

a. The structural steel fabricator shall be responsible for enlisting the Steel Joist fabricator as a direct subcontractor.
b. The structural steel fabricator shall be responsible for enlisting the Steel Deck fabricator for steel deck bearing on structural steel or steel joists as a direct subcontractor.
c. The structural steel fabricator shall be responsible for enlisting the steel erector as a direct subcontractor.
d. The structural steel fabricator shall be responsible for enlisting the steel joist erector as a direct subcontractor.
e. The structural steel fabricator shall be responsible for enlisting the steel deck erector for steel bearing on structural steel or steel deck as a direct subcontractor.

C. Structural Steel and Architectural Structural Steel Installer Qualifications: The erector shall be experienced in installing structural steel equal in material, design and scope to the structural steel required for this project.

D. Post Installed Structural Anchor Installer: See specification section 050520 for requirements

E. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1. Welders and welding operators performing work on bottom-flange, demand-critical welds shall pass the supplemental welder qualification testing, as required by AWS D1.8. FCAW-S and FCAW-G shall be considered separate processes for welding personnel qualification.

F. Comply with applicable provisions of the following specifications and documents:

1. AISC 303.
2. AISC 341-10
3. AISC 360.
4. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

G. Preinstallation Conference: Conduct conference at Project site.

1. Review special inspection and testing and inspecting agency procedures for field quality control.
2. Review items requiring special inspection and testing that must be tested and inspected prior to installation of decking, concrete slabs, or other items that might limit access to the item to be tested or inspected
3. Review welding requirements
4. Review electrode storage requirements
5. Review pre-construction bolt installation verification
6. Review bolt installation calibration requirements

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

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

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
2. Clean and relubricate bolts and nuts that become dry or rusty before use.
3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

1.8 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. W-Shapes and Tees: ASTM A 992.

B. Channels, Angles-Shapes:

1. ASTM A 36 unless noted otherwise
2. ASTM A 572/A 572M, Grade 50 where indicated.

C. Plate and Bar:

1. ASTM A 36 unless noted otherwise
2. ASTM A 572/A 572M, Grade 50 where indicated.
3. In addition Heavy shapes shall have a minimum Charpy V-notch toughness of 20ft-lb at 70 degrees tested in alternate core locations as described in ASTM A6 Supplementary Requirement S30

D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.

1. Square or Rectangular HSS: Fy=50 KSI
2. Round HSS: Fy=50 KSI
3. Casings:

a. Structural steel casing consistent with tested assemblies
b. Maximum dimensions of casings shall be as noted on drawings, or as required to fit within the elements concealing the BRB's.

4. Debonding Agent: Manufacturer's standard agent suitable to maintain separation of steel core and grout encasement and consistent with tested assemblies
5. Fill Material: Manufacturer's standard grout suitable for use as a confining fill material and consistent with tested assemblies.

E. Welding Electrodes:

1. Comply with AWS D1.1 requirements.
2. In addition all weld filler metal for SFRS connections shall comply with AWS D1.8 Clause 6.3

3. In addition all weld filler metal for Demand Critical Welds shall comply AWS D1.8 Clause 6.3

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM A 325 or ASTM A 490 as indicated or as required, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.

1. Finish:

a. Plain for primed or painted steel
b. Hot-dip zinc coating, ASTM A 153/A 153M, Class C for hot dip galvanized steel.

2. Direct-Tension Indicators: ASTM F 959, Type 325 or Type 490 corresponding to bolt type, compressible-washer type.

a. Finish:

1) Plain for unprimed steel or steel receiving standard shop primer.
2) Mechanically deposited zinc coating, ASTM B 695, Class 50 for hot galvanized steel or steel to receive high performance top coating.

B. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852 or ASTM F 2280 as indicated or as required, Type 1, heavy hex or round head steel structural bolts with splined ends; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.

1. Finish:

1) Plain for unprimed steel or steel receiving standard shop primer.
2) Mechanically deposited zinc coating, ASTM B 695, Class 50 for hot galvanized steel or steel to receive high performance top coating.

C. Headed Stud Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1, Type B.

D. Threaded Rods: ASTM A 36 unless noted otherwise.

1. Nuts: ASTM A 563 heavy hex carbon steel.
2. Washers: ASTM A 36/A 36M carbon steel.
3. Finish:

a. Plain for unprimed steel or steel receiving standard shop primer.
b. Hot-dip zinc coating, ASTM A 153/A 153M, Class C for hot galvanized steel or steel to receive high performance top coating.

E. Post Installed Structural Anchors: See specification section 055020 for products

2.3 PRIMER

A. Standard Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.

1. Typical all primed steel exposed to view, unless noted otherwise.

B. Special Primer: Provide shop primer that complies with Division 09 painting Sections. Section "High-Performance Coatings" as applicable.

2.4 PAINT

A. Column Base Paint: MIL-C-18480B, “Coating Compound, Bituminous, Solvent, Coal-Tar Base”.

1. Typical at column bases below finished floor or below grade.

B. Galvanizing Repair Paint: ASTM A 780.

2.5 NONSHRINK GROUT

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

2.6 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC 360.

1. Camber structural-steel members where indicated.
2. Fabricate beams with rolling camber up.
3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
4. Mark and match-mark materials for field assembly.
5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.

C. Bolt Holes: Cut, drill, mechanically thermal cut, or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel framing members.

1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not enlarge holes by burning.
2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.7 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type:

a. Snug tightened unless noted otherwise
b. Slip critical, class “A” for all members of the SLRS.

B. Weld Connections:

1. Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.
3. Elements that are part of the SLRS:

a. Comply with AISC 341-10, AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

4. Demand Critical Welds:

a. Comply with AISC 341-10, AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

5. Architecturally Exposed Structural Steel: Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show-through on exposed steel surfaces.

a. Grind butt welds flush.
b. Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

2.8 CLEANING

A. Clean and prepare faying surfaces in class “B” slip critical connections according to SPSC-SP6 “Commercial Blast Cleaning.”

B. Clean and prepare steel surfaces in class “A” slip critical connections that are to remain unprimed according to SSPC-SP 2, "Hand Tool Cleaning" unless noted otherwise.

C. Clean and prepare steel surfaces that are to remain unprimed according to SSPC-SP 2, "Hand Tool Cleaning" unless noted otherwise.

D. Clean and prepare steel surfaces in class “A” slip critical connections that are to be primed according to SPSC-SP6, “Commercial Blast Cleaning.”

E. Clean and prepare steel surfaces that are to receive standard primer according to SSPC-SP 3, "Power Tool Cleaning."

F. Clean and prepare steel surfaces that are to receive special primer according to the associated painting specification. When not specifically noted the minimum cleaning shall be SSPC-SP 6, "Commercial Blast Cleaning."

2.9 STANDARD PRIMING

A. Shop prime steel surfaces except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
2. Surfaces to be field welded.
3. Surfaces to be high-strength bolted with slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
5. Galvanized surfaces.
6. Top flanges of beams to receive field welded headed studs

B. Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

C. Stripe paint corners, crevices, bolts, welds, and sharp edges.

D. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

2.10 SPECIAL PRIMING:

A. All steel located in exterior spaces shall be shop primed per Division 09 Section "High Performance Coatings","Exterior Painting"

2.11 GALVANIZING

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

1. Fill vent and drain holes that will be exposed in the finished Work unless they will function as weep holes, by plugging with zinc solder and filing off smooth.
2. Galvanize all exposed exterior steel and all steel located in exterior masonry walls unless noted otherwise. Coordinate with drawings and specifications.

a. Galvanized elements to be top coated shall not be quenched, and shall be swept blast to ensure proper adhesion of top coats.

2.12 SOURCE QUALITY CONTROL

A. Testing Agency: Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.

1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections

B. Testing Agency: Fabricator will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports as required.

C. All source quality control shall be completed by the fabricator's personnel unless noted otherwise and shall be in accordance with the following

1. The fabricator's quality control manual,
2. AISC Code of Standard Practice
3. AWS D1.1
4. AISC 341-10 Chapter J
   a. The fabricator shall complete both QA and QC requirements

5. Complete Joint Penetration (CJP) Welds: In addition to visual inspection, 100% of all shop completed full penetration welds shall be ultrasonically tested in accordance with ASTM E164 and all defects repaired as required by AWS D1.1.
6. Additional weld inspections as noted herein or in the contract documents.
7. Payment for shop testing shall be the responsibility of the fabricator.

D. Special inspections are not required at the source of fabrication based on the requirement for an AISC certified fabricator.

E. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

F. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

G. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1/D1.1M.

H. In addition to visual inspection, shop-welded shear connectors will be tested and inspected according to requirements in AWS D1.1/D1.1M for stud welding and as follows:

1. Bend tests will be performed if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
2. Tests will be conducted on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1/D1.1M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify, with steel Erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

1. Prepare a certified as-built survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

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

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

B. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.

1. Where ungrouted anchor rod sleeves are required caulk the annular surface between the sleeve and the anchor rod to prevent grout from entering the sleeves.
2. Set plates for structural members on wedges, shims, or setting nuts as required.
3. Weld plate washers to top of baseplate as indicated.
4. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
5. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

a. Use grout forms and grout surcharging as required to ensure that grout completely fills the space below bearing or base plate, and no voids remain.

6. Paint base plates, anchor bolts and sections of columns below grade and below finished floor with Coal Tar Mastic Paint.

C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

D. Maintain erection tolerances of architecturally exposed structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

E. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

F. Splice members only where indicated.

G. Remove erection bolts on welded, architecturally exposed structural steel; fill holes with plug welds; and grind smooth at exposed surfaces.

H. Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M.

I. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

1. For slip crtitical connections enlarge hole to next standard hole size and provide next standard bolt size.

J. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

1. Do not located based on local member geometry.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: As indicated on shop drawings.

B. Finger Tight Bolts: All joints noted as finger tight shall be hand tightened as required to install elements. Do not tighten by mechanical means

1. Provide jam nuts to prevent nut from backing off.
2. After initial tightening turn nut and jam nut in opposite direction to bind them against one another.

C. Weld Connections:

1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.
3. Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
4. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

5. Elements that are part of the SLRS:

a. Comply with AISC 341-05 Appendix W, AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

6. Architecturally Exposed Structural Steel: Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show-through on exposed steel surfaces.

a. Grind butt welds flush.
b. Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

D. Post Installed Structural Anchors: See specification section 050520 for products

3.5 FIELD PAINTING

A. Column bases: Paint column bases below grade and/or below finished floor with coal tar mastic paint.

B. Field painting of structural steel for finished appearance in exposed conditions or for high performance coating systems is specified in Division 09 painting sections.

3.6 FIELD QUALITY CONTROL

A. Contractor shall complete Field Quality control in accordance with AISC 341-10 Chapter J

B. Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports in accordance with the AISC 341-10 Chapter J and schedule of special inspections.

C. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.7 REPAIRS AND PROTECTION

A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780.

B. Touchup Painting: At all exterior and exposed interior conditions promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists, bearing plates, abutting structural steel, and accessories.

1. Clean and prepare surfaces by hand-tool cleaning, SSPC-SP 2, or power-tool cleaning, SSPC-SP 3.
2. Apply a primer of same type as shop primer used on adjacent surfaces. Coordinate with Part 2 priming requirements

END OF SECTION 051200

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Framing with dimension lumber.
2. Framing with timber.
3. Framing with engineered wood products.
4. Shear wall panels.
5. Rooftop equipment bases and support curbs.
6. Wood blocking and nailers.
7. Wood furring
8. Wood sleepers.
9. Utility shelving.
10. Plywood backing panels.

B. Related Requirements:

1. Section 061063 "Exterior Rough Carpentry."
2. Section 061600 "Sheathing" for sheathing, subflooring, and underlayment.
3. Section 313116 "Termite Control" for site application of borate treatment to wood framing.

1.2 DEFINITIONS

A. Boards or Strips: Lumber of less than 2 inches nominal (38 mm actual) size in least dimension.

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

C. Exposed Framing: Framing not concealed by other construction.

D. OSB: Oriented strand board.

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

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

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

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5664.
4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

B. Sustainable Design Submittals:

C. Fastener Patterns: Full-size templates for fasteners in exposed framing.

1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates:

1. For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

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

1. Wood-preservative-treated wood.
2. Engineered wood products.
3. Post-installed anchors.
4. Metal framing anchors.
5. Sill sealer gasket/termite barrier.

C. Qualification Statements: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.5 QUALITY ASSURANCE

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

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

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry wood products.
4. Dress lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber:

1. Boards: 19 percent.
2. Dimension Lumber: 15 percent unless otherwise indicated.
3. Timber. 19 percent.

C. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.

1. Allowable design stresses, as published by manufacturer, shall meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.2 PRESERVATIVE TREATMENT

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
2. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
3. After treatment, redry board sand/or dimension lumber to 19 percent maximum moisture content.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, and similar concealed members in contact with masonry or concrete.
3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Wood framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.
6. All exposed exterior wood

2.3 DIMENSION LUMBER FRAMING

A. Ceiling Joists: Construction or No. 2 grade.

1. Species:
   a. Southern pine; SPIB.
   b. Southern pine or mixed southern pine; SPIB.
   c. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

B. Joists, Rafters, and Other Framing by Grade: Select Structural or No. 1 grade.

1. Species:
   a. Southern pine; SPIB.
   b. Southern pine or mixed southern pine; SPIB.
   c. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

2.4 ENGINEERED WOOD PRODUCTS

A. <Double click to insert sustainable design text for composite wood products.>

B. Source Limitations: Obtain each type of engineered wood product from single source from a single manufacturer.

C. Laminated-Veneer Lumber: Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D5456 and manufactured with an exterior-type adhesive complying with ASTM D2559.

1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
2. Extreme Fiber Stress in Bending, Edgewise: 3100 psi (21.3 MPa) for 12-inch nominal- (286-mm actual-) depth members.
3. Modulus of Elasticity, Edgewise: 2,000,000 psi (13 700 MPa)
4. Horizontal Shear: 285 psi (1.97 MPa
5. Tension Parallel to Grain: 1950 psi (13.4 MPa).

D. Moisture Protection:

1. For western species (Douglas fir/hemlock), factory end and edge seal laminated veneer lumber with opaque moisture barrier.
2. For southern and eastern species (southern yellow pine, yellow poplar), factory seal laminated veneer lumber on face, edge, and ends.

2.5 MISCELLANEOUS LUMBER

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

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

B. Dimension Lumber Items: No. 2 the following species:
   1. Mixed southern pine or southern pine; SPIB.
   2. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
   3. Eastern softwoods; NeLMA.

C. Utility Shelving: Lumber with 15percent maximum moisture content of the following species and grades:
   1. Spruce-pine-fir (south) or spruce-pine-fir; or No. 1 Common grade; NeLMA, NLGA, WCLIB, or WWPA.

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

   1. Mixed southern pine or southern pine; No. 2 grade; SPIB.
   2. Spruce-pine-fir (south) or spruce-pine-fir; No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.

E. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

F. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

G. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.6 PLYWOOD BACKING PANELS

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

2.7 FASTENERS

A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture. Provide nails or screws, in sufficient length, to penetrate not less than 1-1/2 inches (38 mm) into wood substrate.

   1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fastener sof Type 304 stainless steel.
   2. For pressure-preservative-treated wood, use stainless steel fasteners.

B. Nails, Brads, and Staples: ASTM F1667.

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

D. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, ICC-ES AC58, ICC-ES AC193 or ICC-ES AC308 as appropriate for the substrate.

2.8 METAL FRAMING ANCHORS

A. Allowable design loads, as published by manufacturer, shall meet or exceed those of basis-of-design products Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.

B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653/A653M, G60 (Z180) coating designation.

1. Use for interior locations unless otherwise indicated.

C. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A653/A653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 (Z550) coating designation; and not less than 0.036 inch (0.9 mm) thick.

1. Use for wood-preservative-treated lumber and where indicated.

D. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304.

1. Use for exterior locations and where indicated.

E. Wall Bracing:

1. T-shaped bracing made for letting into studs in saw kerf, 1-1/8 inches (29 mm) wide by 9/16 inch (14 mm) deep by 0.034 inch (0.85 mm) thick with hemmed edges.
2. Angle bracing made for letting into studs in saw kerf, 15/16 by 15/16 by 0.040 inch (24 by 24 by 1 mm) thick with hemmed edges.

2.9 MISCELLANEOUS MATERIALS

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

B. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D3498 that is approved for use indicated by adhesive manufacturer.

C. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

C. Set work to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.

D. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels

E. Install shear wall panels to comply with manufacturer's written instructions.

F. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

G. Do not splice structural members between supports unless otherwise indicated.

H. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches (406 mm) o.c.

I. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches (2438 mm) o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches (2438 mm) o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal (38-mm actual) thickness.
3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. (9.3 sq. m) and to solidly fill space below partitions.
4. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet (6 m) o.c.

J. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

K. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.
2. Use copper naphthenate for items not continuously protected from liquid water.

L. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

M. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).
2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
3. ICC-ES evaluation report for fastener.

N. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

O. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.

1. Comply with indicated fastener patterns where applicable[Before fastening, mark fastener locations, using a template made of sheet metal, plastic, or cardboard.
2. Use finishing nails unless otherwise indicated. Countersink nail heads and fill holes with wood filler.

3. Use common nails unless otherwise indicated. Drive nails snug but do not countersink nail heads.

3.2 INSTALLATION OF WOOD BLOCKING AND NAILERS

A. Install where indicated and where required for[screeding or] attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches (38 mm) wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.3 INSTALLATION OF CEILING JOIST AND RAFTER FRAMING

A. Ceiling Joists: Install with crown edge up and complying with requirements specified above for floor joists. Face nail to ends of parallel rafters.

1. Where ceiling joists are at right angles to rafters, provide additional short joists parallel to rafters from wall plate to first joist; nail to ends of rafters and to top plate, and nail to first joist or anchor with framing anchors or metal straps. Provide 1-by-8-inch nominal- (19-by-184-mm actual-) size or 2-by-4-inch nominal- (38-by-89-mm actual-) size stringers spaced 48 inches (1200 mm) o.c. crosswise over main ceiling joists.

B. Rafters: Notch to fit exterior wall plates and toe nail or use metal framing anchors. Double rafters to form headers and trimmers at openings in roof framing, if any, and support with metal hangers. Where rafters abut at ridge, place directly opposite each other and nail to ridge member or use metal ridge hangers.

1. At valleys, provide double-valley rafters of size indicated or, if not indicated, of same thickness as regular rafters and 2 inches (50 mm) deeper. Bevel ends of jack rafters for full bearing against valley rafters.
2. At hips, provide hip rafter of size indicated or, if not indicated, of same thickness as regular rafters and 2 inches (50 mm) deeper. Bevel ends of jack rafters for full bearing against hip rafter.

C. Provide collar beams (ties) as indicated or, if not indicated, provide 1-by-6-inch nominal- (19-by-140-mm actual-) size boards between every third pair of rafters, but not more than 48 inches (1219 mm) o.c. Locate below ridge member, at third point of rafter span. Cut ends to fit roof slope and nail to rafters.

D. Provide special framing as indicated for eaves, overhangs, dormers, and similar conditions if any.

3.4 INSTALLATION OF TIMBER FRAMING

A. Install timber beams with crown edge up and provide not less than 4 inches (102 mm) of bearing on supports. Provide continuous members unless otherwise indicated; tie together over supports as indicated if not continuous.

B. Where beams or girders are framed into pockets of exterior concrete or masonry walls, provide 1/2-inch (13-mm) airspace at sides and ends of wood members.

C. Install wood posts using metal anchors indicated.

D. Treat ends of timber beams and posts exposed to weather by dipping in water-repellent preservative for 15 minutes.

3.5 PROTECTION

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

B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet enough that moisture content exceeds that specified, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

SECTION 061100 – STRUCTURAL WOOD FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Framing with dimension lumber.
2. Framing with engineered wood products.
3. Structural Wood blocking.

B. Related Requirements:

1. Division 06 Section "Structural Wood Sheathing."
2. Division 06 Section "Engineered Fabricated Wood Truss Framing".

1.3 PERFORMANCE REQUIREMENTS

A. The basis of design for proprietary products are as specified in this specification or the contract documents. Product substitutions must have capacities equal to or greater than values calculated for each specific condition calculated when calculated using the data in the ESR report associated with the product and in accordance with the appropriate design procedure and standards required by the building code. See requirements for substitution submittals.

1.4 DEFINITIONS

A. Exposed Framing: Framing not concealed by other construction.

B. Dimension Lumber:

1. Beams: Lumber of 2 inches nominal or greater but less than 5 inches in least dimension.
2. Columns: Lumber of 2 inches nominal or greater but less than 7 inches in least dimension.

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

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

1.5 SUBMITTALS

A. Contractor's Statement of Responsibility Per Division 01 Section "Collective Inspections and Structural Testing"

B. Product Data

1. Dimensional Lumber

   a. For each size and grade. Indicate species and grade.

2. Adhesive
3. Metal Framing Anchors and associated proprietary fasteners
4. Nails
5. Wood Screws
6. Lag Bolts
7. Bolts
8. Post installed structural anchors: See specification section 050520
9. Wood Preservative treated wood

   a. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
   b. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
   c. Include copies of warranties from chemical treatment manufacturer

C. Evaluation Reports: For the following, from ICC-ESR:

1. Wood-preservative-treated wood.
2. Engineered wood products.
3. Power-driven fasteners.
4. Powder-actuated fasteners.
5. Metal framing anchors.
6. Post installed structural anchors: See specification section 050520

D. Certificates of Inspection: Issued by lumber grading agency for exposed wood products not marked with grade stamp.

E. Substitutions:

1. Substitution requests may only be made using products with ICC-ESR reports for the proposed product covering the specific conditions present for the use of the product on this project.
2. Substitution request shall include signed and sealed calculations demonstrating that the product is capable of providing equivalent performance of the specified product for each specific location and condition when calculated using the data in the ESR report associated with the product and in accordance with the appropriate design procedure and standards required by the building code.
3. The design shall be completed without regard for strength contribution from sheathing materials.
4. Any increase in material labor cost resulting from the substitution shall be the responsibility of the contractor.

F. Qualification Data:

1. Post Installed Structural Anchor Installer per specification section 050520

2. Powder Actuated Fastener Installer: Submit installer qualification data as stated in Quality Assurance section. Qualifications shall be submitted in a letter format for each type of anchor to be installed, and shall include the following.

   a. The specific product to be used
   b. Complete description of installation procedure
   c. Manufacturer's training certificates

1.6 QUALITY ASSURANCE

A. Post Installed Structural Anchor Installer: See specification section 050520 for requirements

B. Actuated Fastener Installer: All installers shall be experienced in installing anchors equal to type and into the substrate material required for the project. All installers shall have a manufacturer's training certificate.

C. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

D. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

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

   1. Factory mark each piece of lumber with grade stamp of grading agency.
   2. For exposed lumber indicated to receive a stained or natural finish, omit grade stamp and provide certificates of grade compliance issued by grading agency.
   3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
   4. Provide dressed lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. After treatment redry to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

1. For exposed lumber indicated to receive a stained or natural finish, omit marking and provide certificates of treatment compliance issued by inspection agency.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood plates, sills, blocking, and similar members in contact with masonry or concrete.
2. Wood framing attached directly to the interior of below-grade exterior masonry or concrete walls.
3. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
4. Wood floor plates that are installed over concrete slabs-on-grade.
5. Wood exposed to weather

2.3 DIMENSION LUMBER FRAMING

A. Ceiling Joists:

1. Grade: #1 Prime
2. Species:

a. Mixed Souther Pine, SPIB
b. Southern pine; SPIB.
c. Spruce-pine-fir; NLGA.
d. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

B. Blocking

1. Grade: #1 Prime
2. Species:

a. Mixed Souther Pine, SPIB
b. Southern pine; SPIB.

2.4 ENGINEERED WOOD PRODUCTS

A. Engineered Wood Products, General: Products shall contain no urea formaldehyde and comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Source Limitations: Obtain each type of engineered wood product from single source from a single manufacturer.

C. Provide engineered wood products with current evaluation reports showing compliance with building code in effect for Project.

D. Allowable Design Stresses: Provide engineered wood products with allowable design stresses, as published by manufacturer that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency and documented in an evaluation report.

E. Laminated-Veneer Lumber: Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D 5456 and manufactured with an exterior-type adhesive complying with ASTM D 2559. Required properties as follows:

1. Modulus of Elasticity, Edgewise: 1,900,000 psi.
2. Shear Modulus of Elasticity, Edgewise: 118,750 psi
3. Allowable Extreme Fiber Flexural Stress, Edgewise: 2,600 psi for 12" depth members.
4. Allowable Horizontal Shear Stress, Edgewise: 285 psi
5. Compression Perpendicular to the Grain: 750 psi
6. Compression Parallel to the Grain: 2510 psi
7. Equivalent Specific Gravity: .50

F. Parallel-Strand Lumber: Structural composite lumber made from wood strand elements with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D 5456 and manufactured with an exterior-type adhesive complying with ASTM D 2559.

1. Column Material

a. Modulus of Elasticity, Edgewise: 1,800,000 psi.
b. Shear Modulus of Elasticity, Edgewise: 112,500 psi
c. Allowable Extreme Fiber Flexural Stress, Edgewise: 2,400 (plank orientation) psi for 12" depth members.
d. Allowable Horizontal Shear Stress, Edgewise: 190 (plank orientation) psi
e. Compression Perpendicular to the Grain: 425 (plank orientation) psi
f. Compression Parallel to the Grain: 2,500 psi
g. Equivalent Specific Gravity: 0.50

2. Beam Material

a. Modulus of Elasticity, Edgewise: 2,000,000 psi.
b. Shear Modulus of Elasticity, Edgewise: 125,000 psi
c. Allowable Extreme Fiber Flexural Stress, Edgewise: 2,900 psi for 12" depth members.
d. Allowable Horizontal Shear Stress, Edgewise: 290 psi
e. Compression Perpendicular to the Grain: 750 psi
f. Compression Parallel to the Grain: 2,900 psi
g. Equivalent Specific Gravity: 0.50

2.5 FASTENERS

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

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M or Type 304 stainless steel.

B. Nails: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

E. Lag Bolts: ASME B18.2.1

F. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 hex nuts and ASTM F844 flat washers.

G. Post installed structural anchors: See specification section 050520

2.6 METAL FRAMING ANCHORS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product.

B. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer that meet or exceed those **of basis-of-design products**. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency and documented in an evaluation report.

C. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

1. Use for interior locations unless otherwise indicated.

D. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.

1. Use for wood-preservative-treated lumber and where indicated.

E. Stainless-Steel Sheet: ASTM A 666, Type 316.

1. Use for exterior locations and where indicated.

2.7 MISCELLANEOUS MATERIALS

A. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.

B. Adhesives: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.

1. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit.

B. Set all members with crown up.

C. All plies of multi-ply members shall be glued together with adhesive. Unless indicated otherwise each ply shall be fastened to the previous ply with (2)-rows of 16D “sinker” nails at 9” O.C.

D. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

E. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

F. Install sill sealer gasket to form continuous seal between sill plates and foundation walls.

G. Do not splice structural members between supports unless otherwise indicated.

H. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

I. All blocking to be installed between framing members shall be cut to fit snug and in direct contact with surrounding framing members.

J. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal thickness.

K. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

L. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.
2. Use copper naphthenate for items not continuously protected from liquid water.

M. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated.

N. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

O. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.

1. Use common nails unless otherwise indicated. Drive nails snug but do not countersink nail heads.

P. For exposed deck boards used concealed fastener system installed in accordance with manufacturer's instructions.

3.2 JOIST FRAMING INSTALLATION

A. General: Unless noted otherwise install as follows:

1. Install floor joists with crown edge up
2. Space joists not to exceed 16" O.C.
3. Support ends of each member to bear full width of supporting member and anchor as follows:

   a. Where supported on wood members, by using metal framing anchors.
   b. Where framed into wood supporting members, by using metal joist hangers.

4. Frame openings with headers and trimmers supported by metal joist hangers; double headers and trimmers where span of header exceeds 36 inches.
5. Do not notch in middle third of joists; limit notches to one-sixth depth of joist, one-third at ends. Do not bore holes larger than 1/3 depth of joist; do not locate closer than 2 inches from top or bottom.
6. Provide solid blocking of 2-inch nominal thickness by depth of joist at ends of joists unless nailed to header or band.
7. Lap members framing from opposite sides of beams, girders, or partitions not less than 4 inches or securely tie opposing members together. Provide solid blocking of 2-inch nominal thickness by depth of joist over supports.
8. Provide bridging between joists of type indicated below, at the midspan of joist and at intervals not exceeding 96 inches o.c., and as required for sheathing installation requirements.

   a. Solid 2x wood blocking of depth matching framing for use when blocking is required for sheathing installation requirements.
   b. Diagonal wood bridging formed from bevel-cut, 1-by-3-inch nominal size lumber, double-crossed and nailed at both ends to joists.
   c. Steel bridging installed to comply with bridging manufacturer's written instructions.

B. Ceiling Joist: Unless noted otherwise install as follows:

1. Where ceiling joists are at right angles to rafters, provide additional short joists parallel to rafters from wall plate to first joist; nail to ends of rafters and to top plate fasten to first joist with framing anchors.
2. Unless noted otherwise installed ceiling joists directly adjacent to rafters and face nail ceiling joist to rafter

3.3 FASTENERS

A. Lag screws: Shall be installed as follows:

1. A predrilled clearance hole with diameter equal to 100% of the lag screw shank diameter shall be drilled to a depth equal to the unthreaded portion of the shank.
2. A predrilled lead hole with diameter equal to 75% of the lag screw shank diameter shall be drilled to a depth of the lag screw embedment.
3. The lag screw shall be inserted into the hole with a turning action and not a driving action.
4. Where not specifically indicated otherwise the minimum embedment into the main member shall be four times the lag screw shank diameter.
5. Holes in steel elements of the connection shall have a hole diameter of 1/16" diameter greater than the fastener diameter for fasteners 3/8" or greater in diameter, and 1/32" diameter greater than the fastener diameter for fasteners less than 3/8" in diameter.

B. Wood screws: Shall be installed as follows:

1. A predrilled lead hole with diameter equal to 70% of the screw root diameter shall be drilled to a depth of the wood screw embedment.
2. The wood screw shall be inserted into the hole with a turning action and not a driving action.
3. Where not specifically indicated otherwise the minimum embedment into the main member shall be six times the wood screw diameter.
4. Holes in steel elements of the connection shall have a hole diameter of 1/32" diameter greater than the fastener diameter.

C. Bolts: Shall be installed as follows:

1. Holes in wood members shall be drilled with a diameter to match the bolt diameter.
2. Holes in steel elements of the connection shall have a hole diameter of 1/16" diameter greater than the fastener diameter for fasteners 3/8" or greater in diameter, and 1/32" diameter greater than the fastener diameter for fasteners less than 3/8" in diameter.
3. A flat washer shall be provided under the head or the nut where the head or nut is bearing on the wood surface.
4. A flat washer shall be provided under the head or the nut when the head or the nut bears on a steel element and will be the turned element when tightening.

3.4 METAL FRAMING ANCHORS

A. Install metal framing anchors to comply with manufacturer's written instructions.

B. Install fasteners through each anchor hole unless noted otherwise.

C. Install fasteners of max number and size indicated in manufacturer's data unless noted otherwise.

3.5 FIELD QUALITY CONTROL

A. Testing and Inspection: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports in accordance with the schedule of special inspections.

B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.6 PROTECTION

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

B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes sufficiently wet that moisture content exceeds that specified, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061100

SECTION 061620 – STRUCTURAL WOOD SHEATHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Roof sheathing.

B. Related Requirements:

1. Division 06 Section “Structural Wood Framing”

1.3 SUBMITTALS

A. Product Data:

1. Sheathing:

a. For each type required. Indicate compliance with requirements

2. Adhesive
3. Nails

4. Plywood Edge Clips
5. Wood Screws

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

1. Preservative-treated plywood.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

2.2 WOOD PANEL PRODUCTS

A. Plywood: DOC PS 2 unless otherwise indicated.

B. Oriented Strand Board: DOC PS 2.

C. Factory mark panels to indicate compliance with applicable standard.

2.3 PRESERVATIVE-TREATED PLYWOOD

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.

C. Application: Treat items indicated on Drawings and plywood in contact with masonry or concrete.

2.4 ROOF SHEATHING

A. Plywood Roof Sheathing:

1. Exposure: Exposure I

2. Grade: [Structural I

3. Span Rating: Not less than **32/16**
4. Nominal Thickness:

a. Match existing thickness, but not less than 5/8 inch

5. Edge Configuration: Square edged, or tongue and grooved at contractor's option

2.5 FASTENERS

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

1. For typical roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
2. For preservative treated or fire-retardant treated sheathing or supporting framing provide fasteners of Type 304 stainless steel.

B. Nails: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

E. Panel Edge Clips: Manufacturer's standard "H" shape configured clip fabricated from minimum 20 ga hot dip galvanized sheet steel. Clip shall be sized to match specified sheathing.

2.6 MISCELLANEOUS MATERIALS

A. Adhesives for Field Gluing Panels to Framing: Formulation complying with ASTM D 3498 that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.

B. Plywood Edge Clips: Manufacturer's standard "H" shape configured clip fabricated from minimum 20 ga hot dip galvanized sheet steel. Clip shall be sized to match specified sheathing.

PART 3 - EXECUTION

3.1 INSTALLATION GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

B. Arrange joints so that pieces do not span between fewer than three support members where framing spacing is less than or equal to 16" o.c., and two supporting member where framing spacing is greater than 16" o.c.

C. Arrange joints such that minimum panel width perpendicular to span is 24" unless panel edges are fully blocked or supported.

D. Install all panels with the strength axis perpendicular to the supporting members. Unless the panel is specifically marked otherwise the strength direction shall be the long direction of the full sheet.

E. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

F. Coordinate sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

G. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

3.2 FASTENING

A. Comply with NES NER-272 for power-driven fasteners.

B. Use common wire nails where nail fastening is indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.

C. Sheathing fasteners shall be centered in the supporting member or blocking where panel is continuous.

D. Sheathing fasteners at panel ends and edges sheathing fasteners shall be located 3/8 inch from the panel edge.

E. Fastening Pattern: Fastening pattern shall be in accordance with drawings and as follows”

1. Fasten sheathing at all blocking lines
2. Fasten sheathing at all supporting members
3. Fasten sheathing at all parallel edges terminating on framing or blocking lines
4. Fasten all sheathing edges where a fully blocked diaphragm is indicated on drawings.

F. Fastening Methods: Fasten panels as indicated below:

1. Roof Sheathing:

a. Nail to wood framing.
b. Space panels 1/8 inch apart at edges and ends.
c. Unless tongue and groove plywood is used provide one panel edge clip at midspan between support where panel span exceeds 24”, and two equally spaced edge clips where supports are spaced 48” o.c. or greater.

3.3 FIELD QUALITY CONTROL

A. Testing and Inspection: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports in accordance with the schedule of special inspections.

B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.4 PROTECTION

A. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

END OF SECTION 061620

SECTION 061753 – ENGINEERED FABRICATED WOOD TRUSS FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Wood roof trusses.
2. Wood truss bracing.
3. Metal truss accessories.
4. Supplemental Hip, Ridge and Valley Framing.

B. Related Requirements:

1. Division 06 Section "Structural Wood Sheathing" for roof sheathing
2. Division 06 Section “Structural Wood Framing”

1.3 DEFINITIONS

A. Metal-Plate-Connected Wood Trusses: Planar structural units consisting of metal-plate-connected members fabricated from dimension lumber and cut and assembled before delivery to Project site.

B. TPI: Truss Plate Institute, Inc.

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

1. SPIB: The Southern Pine Inspection Bureau.

1.4 PERFORMANCE REQUIREMENTS

A. Design Loads: Provide metal-plate connected wood trusses capable of withstanding the design loads within the limits and under the conditions indicated. Comply with requirements of TPI 1 unless more stringent requirements are specifically specified.

1. All load combinations in accordance with the referenced building code.
2. Roof Trusses:
   a. Truss Top Chord Dead Load: 10 psf
   b. Truss Top Chord Live Load: 20 psf
   c. Truss Bottom Chord Dead Load: 10 psf 30psf at mechanical spaces
   d. Wind Loads:

      1) Compute base wind pressures using the structural design criteria given.

2) Compute internal pressures using the enclosure classification given in the structural design criteria.
3) All truss member loads shall be based on components and cladding pressures. Pressures may be calculated based on effective wind area as defined by ASCE 7. The calculated pressure shall be applied to the actual tributary width without reduction.
4) Trusses shall be designed for uplift with zero psf bottom chord dead loading, and reduced top chord dead loading in accordance with building code load combinations.
5) All truss anchorage loads shall be based on components and cladding pressures. Pressures shall be calculated with the effective wind area equal to the actual area tributary to the anchorage without reduction.
6) End wall truss verticals shall be designed to resist wall components and cladding pressures.
7) Shear Truss Loads: As indicated.
8) Blocking Panel Loads: As indicated

e. Seismic Loads:

1) Compute Seismic Load Factors to calculate vertical seismic forces using structural design criteria given.
2) Shear Truss Loads: As indicated.
3) Blocking Panel Loads: As indicated

B. Deflection Limits: Design framing system to withstand design loads without deflections greater than the following:

1. Roof Trusses:

a. Live Load Vertical deflection of 1/360 of span not to exceed ¾ inch.
b. Total Load Vertical deflection of 1/240 of span not to exceed 1 inch.
c. End wall Vertical horizontal deflection:

1) 1/600 when acting as backup for masonry.
2) 1/360 when acting as backup for material other than masonry.

d. Total horizontal deflection of ¾ inch with assumed pin roller condition

C. Design framing system to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F.

1.5 SUBMITTALS

A. Contractor's Statement of Responsibility Per Division 01 Section "Collective Inspections and Structural Testing"

B. Fabricator's Certificate of Compliance Per Division 01 Section "Collective Inspections and Structural Testing"

C. Product Data:

1. Fasteners
2. Electrodes
3. Galvanizing Repair Paint
4. Truss to Truss Hangers and Clips
5. Truss to Structure Clips and Hangers
6. Post installed structural anchors: See specification section 050520
7. Wood-preservative-treated lumber

a. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to truss fabricator.
b. Include copies of warranties from chemical treatment manufacturer for each type of treatment.

D. Shop Drawings:

1. Submit detailed layout indicating placement of trusses, supplemental hip, ridge and valley framing and blocking panels, signed and sealed by the professional engineer responsible for the truss design.

   a. Clearly indicate clear spacing between trusses where specifically noted in contract documents.
   b. Clearly indicate bevel cuts on roof truss top chords and supplementary framing where roof plane is not coplanar with top surface of top chord.
   c. Girder trusses shall be located as dimensioned on plans, or at the associated designed and detailed pier, column or post support.

2. Submit individual truss and blocking panel drawings, signed and sealed by the professional engineer responsible for the truss design. Include the following:

   a. Detailed description of design criteria of the truss
   b. Engineering analysis indicated member stresses and truss deflections.
   c. Indicated and dimension clear openings passing thru trusses as noted in contract documents.
   d. Member sizes and thickness
   e. Truss joint connections
   f. Truss support reactions
   g. Local truss member reinforcement and associated connection requirements.

3. Submit permanent truss bracing drawings including layout of bracing and associated connection details. , signed and sealed by the professional engineer responsible for the truss design.
4. Submit details, signed and signed and sealed by the professional engineer responsible for the truss design for the following:

   a. Supplemental hip, ridge and valley framing with beveled surfaces and associated connections of adequate strength and geometry for proper structural support and flush bearing of sheathing edges. Coordinate with sheathing specifications.
   b. Truss to truss connections. Indicate specific product to be used.
   c. Blocking panel to truss and Blocking panel to structure anchorage.
   d. Truss to structure anchorage based on the structural elements included in the contract documents. Indicate specific product to be used.
   e. Field applied local member reinforcement.
   f. Details for permanent bracing connections.
   g. Indicate limitations for connection to trusses made by other trades. Coordinate with General Contractor and all subs for preferred hanging methods for piping, ductwork, and other similar elements.

E. Delegated-Design Submittal:

1. Submit comprehensive design analysis results for each truss, blocking panel, supplemental framing member and all other components designed under this specification. Analysis results shall be signed and sealed by the qualified professional engineer responsible for their preparation. As a minimum results shall include the following:

   a. Design criteria
   b. Standard and Special Loading. Clearly identify top chord and bottom chord loadings separately

c. Member Stresses
d. Dead, Live, and Total Load deflections
e. Resulting member sizes, thicknesses and strengths
f. Anchorage forces and design of anchorage to structure. Supporting structure assumptions for anchorage design shall be based strictly on information included in the contract documents.

F. Welding certificates.

1. Submit welding certificates for all individuals expected to be performing field welding.

G. Welding Procedure Specifications (WPS's) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1/D1.1M, "Structural Welding Code -Steel" and AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel," for each welded joint whether prequalified or qualified by testing, including the following:

1. Power source (constant current or constant voltage).
2. Electrode manufacturer and trade name, for demand critical welds.

H. Material Certificates: For dimension lumber specified to comply with minimum specific gravity. Indicate species and grade selected for each use and specific gravity.

I. Evaluation Reports:

1. For the following, from ICC-ES

a. Wood-preservative-treated lumber.

2. Submit ICC-ESR reports for the following:

a. Metal-plate connectors.
b. Metal framing anchors.
c. Truss to truss hangers and clips
d. Truss to structure hangers and clips

J. Qualification Data:

1. Metal Connector Plate Manufacturer

2. Wood Truss Fabricator.

a. Indicate TPI QAP participation and compliance with TPI-1 Quality Assurance requirements.

3. Powder Actuated Fastener Installer
4. Post Installed Structural Anchor installer.

5. Powder Actuated Fastener Installer: Submit installer qualification data as stated in Quality Assurance section. Qualifications shall be submitted in a letter format for each type of anchor to be installed, and shall include the following.

a. The specific product to be used.
b. Complete description of installation procedure
c. Manufacturer’s training certificates

1.6 QUALITY ASSURANCE

A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI, is an active participant in TPI Quality Assurance Program (QAP), and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.

1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.

B. Wood Truss Fabricator Qualifications: Shop that participates in a recognized quality-assurance program that complies with quality-control procedures in TPI 1 and that involves third-party inspection by an independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction is certified for chain of custody by an FSC-accredited certification body.

C. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer.

D. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated.

E. Installer Qualifications: The installer shall be experienced in installing wood trusses equal in material, design and scope to the trusses required for this project.

F. Powder Actuated Fastener Installer: All installers shall be experienced in installing anchors equal to type and into the substrate material required for the project. All installers shall have a manufacturer’s training certificate.

G. Post Installed Structural Anchor Installer: See specification section 050520 for requirements.

H. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."

I. Source Limitations for Connector Plates: Obtain metal connector plates from a single manufacturer.

J. Comply with applicable provision of the following standards and documents:

1. TPI 1, "National Design Standard for Metal Plate Connected Wood Truss Construction."
2. TPI DSB, "Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses."
3. TPI HIB, "Commentary and Recommendations for Handling, Installing & Bracing Metal Plate Connected Wood Trusses."
4. AF&PA, National Design Specifications for Wood Construction" and its Supplement.

K. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

L. Fire-Test Response Characteristics: Where indicated, provide wood truss framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

M. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1. Review special inspection and testing and inspecting agency procedures for field quality control.
2. Review requirements for supplementary hip, valley and ridge framing

3. Review requirements for bevel cuts on top chords where top surface of top chord is not coplanar with roof plane.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Handle and store trusses to comply with recommendations in TPI BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."

B. Store trusses flat, off of ground, and adequately supported to prevent lateral bending.

C. Protect trusses from weather by covering with waterproof sheeting, securely anchored.

D. Provide for air circulation around stacks and under coverings.

E. Exercise extreme care to avoid damage during loading, unloading, storing and erection.

F. Inspect trusses showing discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

G. Keep trusses free of dirt and foreign matter.

PART 2 - PRODUCTS

2.1 DIMENSION LUMBER

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

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. Provide dressed lumber, S4S.
4. Provide dry lumber with 19 percent maximum moisture content at time of dressing.

B. Grade and Species: Provide visually graded dimension lumber for truss chord and web members, of not less than the following grade and the following species:

1. Grade for Chord Members: No. 2, Southern Yellow Pine; SPIB, or better as required by design.
2. Grade for Web Members: No 2, Southern Yellow Pine; or better as required by design.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground].

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
2. For exposed trusses indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

1. For exposed trusses indicated to receive a stained or natural finish, omit marking and provide certificates of treatment compliance issued by inspection agency.

D. Application:

1. Treat trusses where indicated on Drawings.
2. Provide treated elements at all exterior exposed truss members.

2.3 COMPONENTS

A. Roof Truss Chords:

a. Unless noted otherwise bevel top chords to match plane of roof where top surface of top chord is not coplanar with the roof plane
b. Minimum 2 inch nominal width for both top and bottom chords.
c. Minimum 4 inch nominal depth for both top and bottom chords, but not less than the depth of any member framing into chord.
d. Coordinate top chord depth with overhang details.
e. Chords shall be oriented with the wide face vertical and narrow face horizontal.

B. Permanent Bracing: Provide wood bracing of size, grade, layout, orientation and fastening indicated on the truss shop drawings.

2.4 METAL CONNECTOR PLATES

A. Plates shall have an ICC-ESR report.

B. Source Limitations: Obtain metal connector plates from single manufacturer.

C. General: Fabricate connector plates to comply with TPI 1.

D. Hot-Dip Galvanized-Steel Sheet: ASTM A 653; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 coating designation; and not less than 0.036 inch thick.

1. Use for interior locations unless otherwise indicated.

E. Hot-Dip Heavy-Galvanized-Steel Sheet: ASTM A 653; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.

1. Use for wood-preservative-treated lumber and where indicated.

F. Stainless-Steel Sheet: ASTM A 666, Type 316, and not less than 0.035 inch thick.

1. Use for exterior locations**, wood-preservative-treated lumber,** and where indicated.

2.5 FASTENERS

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

1. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.
2. Where trusses are exposed to weather, in ground contact, made from pressure-preservative treated wood, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Post installed structural anchors: See specification section 050520.

E. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure the required loads as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency, and documented in an ICC ESR report applicable for the specific substrate being anchored into.

F. Wood Screws: ASME B18.6.1.

G. Lag Bolts: ASME B18.2.1.

H. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

2.6 METAL FRAMING ANCHORS AND HANGERS

A. Anchors and hangers shall have an ICC-ESR report.

B. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer that meet or exceed those of basis-of-design products for the specific configuration in which the anchor is being designed. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency and documented in an ICC ESR report for the referenced building code.

C. Provide anchors of brand, material and specific model indicated on approved shop drawings.

D. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653, G60 coating designation.

1. Use for interior locations unless otherwise indicated.

E. Hot-Dip Heavy-Galvanized-Steel Sheet: ASTM A 653; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.

1. Use for wood-preservative-treated lumber and where indicated.

F. Stainless-Steel Sheet: ASTM A 666, Type 316.

1. Use for exterior locations**, wood-preservative-treated lumber,** and where indicated.

G. Welding Electrodes: Comply with AWS standards.

2.7 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: ASTM A 780.

B. Shims: Paired tapered hardwood shims

2.8 FABRICATION

A. Trusses shall be shop fabricated. Field fabricated trusses are not permitted.

B. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints.

C. Unless noted otherwise bevel top chords to match plane of roof where top surface of top chord is not coplanar with the roof plane.

D. Fabricate trusses to greatest extent possible in the shop using templates and jigs. Deliver to the site for field splicing as required.

E. Fabricate metal connector plates to sizes, configurations, thicknesses, and anchorage details required to withstand design loads for types of joint designs indicated.

F. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.

1. Fabricate wood trusses within manufacturing tolerances in TPI 1.

G. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

2.9 SOURCE QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform special inspections.

1. Provide special inspector with access to fabricator's documentation of detailed fabrication and quality-control procedures that provide a basis for inspection control of the workmanship and the fabricator's ability to conform to approved construction documents and referenced standards.
2. Provide special inspector with access to places where wood trusses are being fabricated to perform inspections.

B. Correct deficiencies in Work that special inspections indicate does not comply with the Contract Documents.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install wood trusses only after supporting construction is in place and is braced and secured.

B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.

C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.

D. Install and brace trusses according to TPI recommendations and as indicated.

E. Install trusses plumb, square, and true to line and securely fasten to supporting construction.

F. Space trusses as indicated in shop drawings but not greater than indicated in contract documents; adjust and align trusses in location before permanently fastening.

G. Anchor trusses securely at bearing points as indicated in shop drawings. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.

H. Securely connect each truss ply required for forming built-up girder trusses as indicated in shop drawings.

1. Anchor trusses to girder trusses as indicated.

I. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.

1. Install bracing to comply with size, grade, layout, orientation, and fastening requirements indicated on shop drawings.

J. Install wood trusses within installation tolerances in TPI 1.

K. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.

L. Replace wood trusses that are damaged or do not meet requirements.

1. Damaged trusses may be repaired according to truss repair details signed and sealed by the qualified professional engineer responsible for truss design, when approved by Architect.

3.2 REPAIRS AND PROTECTION

A. Protect wood trusses from weather. If, despite protection, wood trusses become wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Repair damaged galvanized coatings on exposed surfaces with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

END OF SECTION 061753

SECTION 072100 - THERMAL INSULATION

PART 1 - - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Batt (blanket) insulation, to be installed in Restroom attic.

1.3 SUBMITTALS

A. General: Submit in accordance with Section 013300.

1. Submit for components of each wall assembly containing components specified in this section simultaneously. See Schedule of Wall Assemblies at end of Section 018300.

B. Product Data: Submit product data for each product.

C. Samples: Submit two samples, (12 by 12 inches) in size of each type of insulation.

D. Informational Submittals: Submit manufacturer's instructions packaged separately from other submittals.

1.4 QUALITY ASSURANCE

A. Single Source Responsibility: Furnish each insulation type from one manufacturer for entire Project, unless otherwise acceptable to Architect.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 016000.

1. Identify products with appropriate markings of applicable testing and inspecting organization.
2. Storage and Protection: Store materials raised off floor or ground and under cover to keep dry. Protect from weather, direct sun light, contamination, sources of ignition, and damage from construction operations.

B. Mold Prevention: Comply with Sections 015000, 016000 and 017400.

1. Protect insulation products from exposure to moisture.

1.5 PROJECT CONDITIONS

A. Mold Prevention: Comply with Sections 015000, 016000 and 017400. Provide temporary heating and ventilation as required to keep insulation products dry during construction operations.

1.6 SEQUENCING

A. Sequence work under provisions of Section 011000.

1. Do not begin work until adjacent substrate work is complete and work of other trades which will be concealed by work of this section have been approved.
2. Coordinate with cast-in-place concrete for below slab insulation.

B. Mold Prevention: Comply with Sections 015000, 016000 and 017400.
   1. Schedule and sequence work to protect mold growth products from exposure to moisture.

PART 2 - - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Glass Fiber Insulation Manufacturers:

   1. CertainTeed Corp., Valley Forge, PA 19482.
   2. Johns Manville, Denver CO 80217.
   3. Owens-Corning, Toledo, OH 43659.
   4. Knauf Fiber Glass, Shelbyville, IN 46176.
   5. Any Suggested Substitution will be reviewed in accordance with Section 012500.

2.2 INSULATION MATERIALS

A. Insulation Materials: Use of chlorofluorocarbons (CFCs) not allowed.

   1. Maximize use of recycled material with minimum of 25 percent recycled glass cullet plus 20 percent post-consumer.
   2. Acceptable Formaldehyde Levels: Formaldehyde free.

B. Batt Insulation - Unfaced: Glass fiber composition, friction fit type, unfaced.

   1. Thermal Resistance (R-Values): As indicated .
   2. Classification: ASTM C665, Type I.
   3. Density: (1 PCF) minimum.
   4. Thermal Resistance: ASTM C518, (R Value of 3.2 per inch) of thickness at (75º F) mean temperature.
   5. Fire Rating: ASTM E84, Flame spread 25 or less and smoke development 50 or less.

2.3 ACCESSORIES

A. Insulation Fasteners: Impale clip type with retaining disc or plate, galvanized steel, adhered or mechanically fastened to surface to receive insulation, length to suit insulation thickness, capable of securely fastening insulation in place.

B. Tape: Self-adhering pressure sensitive, compatible with insulation, foil type recommended by manufacturer of insulation.

   1. Adhesives & Sealants: Only use adhesives and sealants in the interior of the building that meet or do not exceed the VOC limits of the CURRENT requirements of South Coast Air Quality Management District (SCAQMD) Rule No. 1168 on the interior of the building.

      a. Current requirement refers to the date on which the materials are installed in the building.
      b. SCAQMD Rule #1168 is referenced in section 018113 that was current as of the date of this specification. Refer to http://www.aqmd.gov/rules for the actual current version of the rule that will be applicable at the date of installation during construction.
      c. Interior refers to all building construction that is inside of the exterior weatherproofing material.

PART 3 - - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with work in accordance with Section 014000.

   1. Verify that work of other trades which will be covered by insulation is complete, approved, and tested.

B. Mold Prevention: Comply with Sections 015000, 016000 and 017400. Do not install wet insulation, insulation adjacent to wet materials, or insulation in wet conditions.

3.2 BATT (BLANKET) INSULATION

A. General: Comply with Section 016000.

B. Batt (Blanket) Installation: Install insulation after plumbing, mechanical, and electrical services have been installed.

1. Provide mechanical fasteners, wire mesh, or other accessories to ensure insulation remains in specified position.
2. Fit insulation tight within spaces and tight to exterior side of plumbing, mechanical, and electric services within plane of insulation leaving no gaps or voids.
3. Butt insulation tightly.
4. Cut and fit tightly around items penetrating insulation.
5. Stagger butt joints.
6. Use batts free of damage.
7. Install insulation within metal framing systems full height and width. Do not allow voids or openings to occur. Insulation is required for full width between studs, including cavity of each stud.
8. Cut and trim insulation neatly, to fit spaces.
9. Cut insulation oversize to ensure tight butt joints when installed. Cut insulation to fit around protrusions and irregularly shaped projections.

END OF SECTION

SECTION 073011 – ROOFING UNDERLAYMENT

PART 1 — GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies a self-adhering sheet membrane used as underlayment for sloped roofs.
   1. High temperature application, 260F resistance, Grace Ice & Water Shield® HT.

B. Related Sections: Refer to the following specification sections for coordination:
   1. Section 061000 - Rough Carpentry.
   2. Section 076100 - Sheet Metal Roofing.

C. Referenced Standards: Comply with the requirements of the following standards published by ASTM International to the extent referenced in this section.
   1. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension.
   2. ASTM D461 - Standard Test Methods for Felt.
   3. ASTM D 903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds.
   4. ASTM D1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
   5. ASTM D3767 - Standard Practice for Rubber—Measurement of Dimensions.
   6. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
   7. ASTM G90 – EMMAqua test.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with requirements of authorities having jurisdiction and applicable codes at the location of the project.

B. Manufacturer: Minimum 10 years experience producing roofing underlayment.

C. Installer: Minimum 2 years experience with installation of similar underlayment.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver materials and products in unopened factory labeled packages. Protect from damage.

B. Cover materials and store in dry condition between temperatures of 40 and 90 degrees F (5 and 32 degrees

C). Use within one year of date of manufacture. Do not store at elevated temperatures as that will reduce the shelf life of the product.

PART 2 — PRODUCTS

2.1 MANUFACTURER

A. Manufacturer: GCP Applied Technologies, Inc., 62 Whittemore Avenue, Cambridge, MA 02140, Toll Free 866-333-3726, www.gcpat.com.

2.2 MATERIALS

A. Self-Adhering Sheet Membrane Roof Underlayment: Provide Grace Ice and Water Shield HT by GCP Applied Technologies, Inc with the following characteristics:

1. Material: Cold applied, self adhering membrane composed of an innovative and proprietary rubberized asphalt adhesive and interwound with a disposable release sheet. An embossed, slip resistant surface is provided on the high performance film with UV barrier properties.
2. Membrane Thickness: 40 mils (1.02 mm) per ASTM D3767 Method A.
3. Membrane Tensile Strength: MD 33 lbf/in, CD 31 lbf/inch per ASTM D412 Die C Modified.
4. Membrane Elongation: 250% per ASTM D412 Die C Modified.
5. Low Temperature Flexibility: Unaffected at -20 degrees F (-29 degrees C) per ASTM D1970.
6. Adhesion to Plywood: 5.0 lb/in. width (876 N/m) per ASTM D903.
7. Maximum Permeance: 0.05 perms (2.9 ng/sgms Pa) per ASTM E96.
8. Maximum Material Weight Installed: 0.22 pounds/sqft (1.1 kg/sqm) per ASTM D461.
9. Service Temperature: 260 degrees F (115.6 degrees C) per ASTM D1204
10. Compatibility: Suitable for use under all types of sloped roofing with the exception high altitude c climates where zinc, copper or Cor-Ten roof coverings are used.
11. Adhesive: Rubberized asphalt adhesive containing post-consumer recycled content, contains no calcium carbonate, sand or fly ash.
12. Exposure: Can be left exposed for a maximum of 120 days from date of installation per ASTM G90 – EMMAqua test.
13. Primer: Water-based Perm-A-Barrier WB Primer by GCP Applied Technologies, Inc.
14. Code and Standards Compliance: Grace Ice and Water Shield HT meets the following requirements:
    a. ASTM D1970.
    b. ICC-ES ESR-3121, per AC 48 Acceptance Criteria for Roof Underlayments used in Severe Climate Areas.
    c. Underwriters Laboratories Inc. R13399 - Class A fire classification under fiber-glass shingles and Class C under organic felt shingles (per ASTM E108/UL 790).
    d. Underwriters Laboratories Inc. Classified Sheathing Material Fire Resistance Classification with Roof Designs: P225, P227, P230, P237, P259, P508, P510, P512, P514, P701, P711, P717, P722, P723, P732, P734, P736, P742, P803, P814, P818, P824
    e. Miami-Dade County Code Report NOA #15-0728.11
    f. Florida State Approval Report No. FL289-R3
    g. CCMC Approval No. 13671-L

PART 3 — EXECUTION

3.1 EXAMINATION

A. Prior to start of installation, inspect existing conditions to ensure surfaces are suitable for installation of roofing underlayment. Verify flashing has been installed. Starting work indicates installers acceptance of existing conditions.

3.2 INSTALLATION

A. Installation: Install roofing underlayment on sloped surfaces at locations indicated on the Drawings, but not less than at hips, ridges, eaves, valleys, sidewalls and chimneys, and surfaces over interior space within 36 inches (914 mm) from the inside face of the exterior wall. Strictly comply with manufacturer's installation instructions including but not limited to the following:

1. Schedule installation such that underlayment is covered by roofing within the published exposure limit

of the underlayment.

2. Do not install underlayment on wet or frozen substrates.
3. Install when surface temperature of substrate is a minimum of 40 degrees F (5 degrees C) and rising.
4. Remove dust, dirt, loose materials and protrusions from deck surface.
5. Install membrane on clean, dry, continuous structural deck. Fill voids and damaged or unsupported areas prior to installation.
6. Prime concrete and masonry surfaces using specified primer at a rate of 500-600 square feet per gallon (12-15 sqm/L). Priming is not required for other suitable clean and dry surfaces.
7. Install membrane such that all laps shed water. Work from the low point to the high point of the roof at all times. Apply the membrane in valleys before the membrane is applied to the eaves. Following placement along the eaves, continue application of the membrane up the roof. Membrane may be installed either vertically or horizontally after the first horizontal course.
8. Side laps minimum 3-1/2 inches (89 mm) and end laps minimum 6 inches (152 mm) following lap lines marked on underlayment.
9. Patch penetrations and damage using manufacturer's recommended methods.

3.3 CLEANING AND PROTECTION

A. Protection: Protect from damage during construction operations and installation of roofing materials. Promptly repair any damaged or deteriorated surfaces.

B. Repair minor damage to eliminate all evidence of repair. Remove and replace work which cannot be satisfactorily repaired in the opinion of the Architect.

C. Provide temporary protection to ensure work being without damage or deterioration at time of final acceptance. Remove protective film and reclean as necessary immediately before final acceptance.

END OF SECTION

SECTION 074113 - STANDING SEAM METAL ROOF PANELS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

A. Pre-finished, prefabricated, structural standing seam roof system and accessories.
   1. Stand ' N Seam

1.3 RELATED SECTIONS

A. Section 05 10 00 - Structural Metal Framing.

B. Section 06 10 00 - Rough Carpentry.

1.4 REFERENCES

A. ASTM A 653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

B. ASTM A 755 - Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.

C. ASTM A 792 - Standard Specification for Steel Sheet, 55 percent Aluminum-Zinc Alloy-Coated by the Hot- Dip Process.

D. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

E. ASTM E 98 - Reference Radiographs for Inspection of Aluminum and Magnesium Castings.

F. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

G. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

H. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.

I. ASTM E 1514 - Standard Specification for Structural Standing Seam Steel Roof Panel Systems.

J. ASTM E1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.

K. ASTM E 1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.

L. ASTM E 1680 - Standard Test Method for Rate of Air Leakage through Exterior Metal Roof Panel Systems.

M. ASTM E 2140 - Standard Test Method for Water Penetration of Metal Panel Roof Systems by Static Water Pressure Head.

N. UL 580 - Tests for Uplift Resistance of Roof Assemblies.

O. UL Building Materials Directory.

P. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies.

Q. UL 790 - Standard for Standard Test Methods for Fire Tests of Roof Coverings.

R. UL 2218 - Standard for Impact Resistance of Prepared Roof Covering Materials.

S. SMACNA - Architectural Sheet Metal Manual.

T. AISI - Cold Formed Steel Design Manual.

U. Aluminum Association - Aluminum Design Manual/

V. AAMA 621 - Voluntary Specifications For High Performance Organic Coatings On Coil Coated Architectural Hot Dipped Galvanized (Hdg) And Zinc-Aluminium Coated Steel Substrates.

W. AAMA 2605 - Voluntary Specifications For High Performance Organic Coatings On Coil Coated Architectural Hot Dipped Galvanized (Hdg) And Zinc-Aluminium Coated Steel Substrates.

X. MCA - Preformed Metal Wall Guidelines.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Design Data, Test Reports: Provide manufacturer test reports indicating product compliance with requirements.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Installation methods.

C. Shop Drawings: Submit detailed drawings and panel analysis showing: Profile, gauge of both exterior and interior sheet, location, layout and dimensions of panels, location and type of fasteners, shape and method of attachment of all trim, locations and type of sealants, and installation sequence.
   1. Coordination Drawings: Provide elevation drawings and building sections which show panels in relationship to required locations for structural support. Include panel details and details showing attachment to structural support.
   2. Other details as may be required for a weathertight installation.

D. Selection Samples: For each material and finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each material and finish product specified, two samples, minimum size 12 inches (300 mm) long, representing actual product, color, and patterns.

F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

G. Field Quality Control Reports: Submit manufacture's field representative's quality control and inspection reports regularly during installation.

H. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic cleaning and maintenance of all components.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum of ten years experience in the production of metal roof panels. Demonstrate experience with examples of projects of similar type and exposure.

B. Installer Qualifications: Installer with a minimum of five years experience with projects of similar size and scope with supervisors trained and approved by manufacturer.

C. 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.
4. Accepted mock-ups shall be comparison standard for remaining Work

1.7 PRE-INSTALLATION MEETINGS

A. Pre-installation meeting: Conduct a pre-installation meeting at the job site attended by Owner, Architect, Manufacturer's Technical Representative, Panel Installer, and related trades. Coordinate structural support requirements in relation to roof panel panel system, installation of any separate air/water barriers, treatment of fenestration, roof penetrations and other requirements specific to the project.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.

C. Store panel materials on dry, level, firm, and clean surface. Stack no more than two bundles high. Elevate one end of bundle to allow moisture run-off, cover and ventilate to allow air to circulate and moisture to escape.

1.9 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.

1.10 WARRANTY

A. Warranty: Provide manufacturer's standard limited warranties for products and finishes
1. Material Warranty: Standard form in which manufacturer agrees to repair or replace items that fail in materials or workmanship within specified warranty period. Items covered by the warranty include structural performance and finish performance.
a. Warranty Period: Two years from date of Substantial Completion.
2. Paint Finish: Standard form in which paint manufacturer agrees to repair or replace metal panels that evidence deterioration of fluoropolymer finish.
a. Warranty Period: Fluoropolymer finish, thirty years from date Substantial Completion.
b. Warranty Period: Metallic/Mica Fluoropolymer finish, Custom finish, twenty years from date Substantial Completion.
3. Installer's Warranty: Installer's warranty covering the Work of this Section, including all components of roof panels for two years from date of Substantial Completion.
4. Weather-tight Warranty: Twenty years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Fabral, which is located at: 30 Technology Pkwy. Suite 400; Peachtree Corners, GA 30092-1317; Tel: 770-449-7066; Fax: 717-735-2879;

B. Requests for substitutions will be considered in accordance with provisions of Section 016000 - Product Requirements.

2.2 STAND `N SEAM

A. Roof Panels: STAND `N SEAM structural standing seam roof system.
1. Roof Panel Description: Provide to the configurations indicated on the Drawings.
a. Panel: Factory formed.
b. Panel Width: 16 inch (406 mm).
c. Seam Height: 2-1/2 inch (63 mm).
d. Maximum Panel Length: Factory Formed 47 feet.
e. Minimum Panel Length: 6 feet.

2. Design Loads: Verify panels will withstand design loads indicated without detrimental effects or deflection. Include thermal differential effects between exterior and interior panel facings and resistance to fastener pullout.
    a. Calculate wind uplift using ASCE-10
    b. Calculate clip spacing
    c. Verify stress and deflection of panel meet project design load
    d. Verify project design load conditions with ASTM E 1592
    e. Verify project design load conditions with UL 580
3. Materials:
    a. AZ50 Galvalume Steel: Aluminum-zinc alloy-coated steel sheet (Galvalume) complying with ASTM A 792/A 792M, Class AZ50/AZ55 coating designation; structural quality. Pre-painted by the coil-coating process to comply with ASTM A 755/A 755M
        1) Gauge:
            a) 24 gauge.
        2) Exterior Finish: As selected from manufacturer's premium finishes.
        3) Color: As selected from manufacturer's full range.
    b. Aluminum Sheet: Coil-coated sheet, ASTM B 209, alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.
        1) Thickness:
            a) 0.030 inch
        2) Surface:
            a) Smooth, flat
        3) Color: As selected from manufacturer's full range.
    c. Sealant: Factory applied for factory formed panels.
4. Performance Requirements:
    a. Minimum Roof Slope: 1/2:12
    b. Hail Resistance: UL 2218, Class 4
    c. Fire Resistance: UL 790, Class A
    d. Thermal Cycling Test: 100,000 cycles
    e. Wind Uplift:
        1) UL580: Class 90, #275, 275A, 275B, 319
        2) ASTM E 330/ASTM E 1592: Results Vary Depending on Gauge and Panel Thickness.
    f. Air Infiltration
        1) ASTM E 283: 0.006 cfm/ft2 @ 20 psf
        2) ASTM E 1680: No air penetration @ 20 psf
    g. Water Penetration
        1) ASTM E 331: No Water @ 20 psf
        2) ASTM E 1646: No Water @ 20 psf
        3) ASTM E 2140: No leakage of standing water
    h. Miami Dade NOA (steel & aluminum)

B. Roof Panel Accessories:
1. General: Provide components required for a complete, weather-tight panel system including trim, copings, fasciae, mullions, sills, corner units, panel clips, flashings, sealants, gaskets, fillers, panel closures, and similar items. Match material and finish of metal panels unless otherwise indicated.
2. Miscellaneous Metal Sub-framing and Furring: Provide manufacturer's standard sections as required for support and alignment of metal panel system.
3. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
4. Panel Fasteners: Self-tapping screws recommended by the manufacturer designed to withstand design loads.
5. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are non-staining, and do not damage panel finish.
6. Sealant Tape: Buytl
    a. Joint Sealant: One Part Poly
    b. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.3 FINISH

A. Steel Panels and Accessories:
   1. Exposed Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   2. Exposed Mica Fluoropolymer: AAMA 621. Two-coat fluoropolymer finish with suspended mica flakes containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   3. Exposed Three-Coat Metallic Fluoropolymer: AAMA 621. Three-coat fluoropolymer finish with suspended metallic flakes containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   4. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

2.4 FABRICATION

A. General: Provide factory-formed metal roof panel system complying with ASTM E 1514.

B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

C. Form panels in continuous lengths, endlaps are not permitted.

D. Field forming of panels shall be done by factory employees operating the machines.

E. Fabricate metal panel joints with factory-installed butyl sealant that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.

F. Sheet Metal Flashing and Trim: Fabricate flashing and trim shall comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
   1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
   2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
   3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
   4. Sealed Joints: Form non-expansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
   5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
   6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
   7. Provide to size recommended by SMACNA's "Architectural Sheet Metal Manual" or metal panel manufacturer for application, but not less than thickness of metal being secured.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
   1. Examine primary and secondary roof framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer.
   2. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal roof panel manufacturer.

B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.

C. Do not begin installation until substrates have been properly prepared.

D. If substrate 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. Install system sub-framing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. General: Install metal panels according to manufacturer's written instructions and in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components securely in place, with provisions for thermal and structural movement.
   1. Shim or otherwise plumb substrates receiving metal panels.
   2. Flash and seal metal panels at perimeter of all openings in conformance with manufacturer's recommendations.
   3. Install flashing and trim as metal panel work proceeds.
   4. Panels to be in one continuous length, long length roofs must be field formed by Manufacturer.
   5. Provide weather-tight escutcheons for pipe and conduit-penetrating panels.

B. Fasteners:
   1. Steel Panels: Use stainless-steel fasteners for surfaces exposed to the exterior; use galvanized- steel fasteners for surfaces exposed to the interior.
   2. Aluminum Panels: Use aluminum or stainless-steel fasteners for surfaces exposed to the exterior; use aluminum or galvanized-steel fasteners for surfaces exposed to the interior.

C. Anchor Clips: Anchor metal roof panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturer's written instructions.

D. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

E. Standing-Seam Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.
   1. Install clips to supports with self-tapping fasteners.
   2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
   3. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so metal roof panels, and factory-applied sealant are completely engaged.

F. Accessory Installation: Install accessories with positive anchorage to building and weather tight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
   1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof and weather-resistant performance.
   2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.4 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align metal panel units within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect metal roof panel installation, including accessories. Report results in writing.

B. Remove and replace applications of metal roof panels where tests and inspections indicate that they do not comply with specified requirements.

C. Prepare inspection reports.

D. Installer must have installation shop drawings on site at all times.

3.6 CLEANING AND PROTECTION

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

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

C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures

END OF SECTION

SECTION 074400 – FIBER CEMENT SIDING AND TRIMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

A. Cementitious express/reveal jointed panel with accessories. (James Hardie HZ5 or HZ10 Hardie Reveal Panels.)

1.3 RELATED SECTIONS

A. Section 05 40 00 - Cold-Formed Metal Framing.

B. Section 06 10 00 - Rough Carpentry.

1.4 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).

1.5 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - 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.

1.6 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.

1.7 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.

1.8 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.

1.9 WARRANTY

A. Manufacturer's Warranty: Provide Hardie HZ5 or HZ10 Reveal Panel 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 Building Products, Inc.

B. Requests for approval of equal substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 CLADDING

A. Cement Cladding Panels: Hardie Reveal Panel as manufactured by James Hardie Building Products, Inc. 7/16 inches thick, 3 feet 11.5 inches (1206 mm) wide by 7 feet 11.5 inches (2426 mm) long. Product shall be engineered for climate conditions.
1. Manufacturer's Climate Zone Product: HZ5 for freezing wet climates with a green tint primer.
2. Manufacturer's Climate Zone Product: HZ10 for hot humid and wet climates with a yellow tint primer.
3. Refer to hardiezone.com to identify the specific zone of your project.

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 HardieWrap and HardieWrap 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. HardieWrap Weather Barrier ICC-ES Evaluation Report ESR-2258

2.4 FURRING (STRAPPING)

A. Rainscreen Cavity: Install Hardie Reveal Panels on a drained and vented rainscreen cavity, with a minimum 3/4 inch (19mm) air cavity. Selection of cavity vent materials shall be incorporated into the design to prevent insect and pest entry.

2.5 ACCESSORIES

A. Trims: Reveal Trims manufactured by Custom Aluminum of Elgin, IL 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.

2.6 FASTENERS

A. Fasteners: For attaching Hardie Reveal Panel direct to sheathing to a rain screen 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.

2.7 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 in intact and all penetrations are sealed.

3.3 INSTALLATION

A. Wood Framing: Nominal 2 inch by 4 inch (51 m 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 sub-fascia 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.

END OF SECTION

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes: Sheet metal materials, fabrication, finishes and accessories.

B. Related Requirements: Comply with following:

1. Metal Finishes: Section 050510.

C. Related Sections:

1. Section 061000 - Rough Carpentry

D. General: Submit in accordance with Section 013300 for Submittal Procedures.

1.3 REFERENCES

A. Reference Standards: In addition to requirements shown or specified, comply with applicable provisions of following for design, materials, fabrication, and installation of component parts:

1. SMACNA Manual: Architectural Sheet Metal Manual, Sheet Metal and Air Conditioning Contractors National Association, Inc.
2. NRCA Manual: Roofing and Waterproofing Manual, National Roofing Contractors Association.

1.4 SUBMITTALS

A. General: Submit in accordance with Section 013300 for Submittal Procedures.

B. Product Data: Submit following:

1. Product data for reglets.
2. Product data indicating performance and physical characteristics of sheet metal products, including thickness.
3. Include sample of warranty customized for this project.
4. Color charts for finish indicating manufacturer's colors available for selection.

C. Shop Drawings: Indicate typical layout including dimensions, configuration, locations, interface with adjacent systems, clearances, tolerances, frequency of attachment, and fabrication details.

1. Submit detail drawings of transitions, intersections, and connections.

D. Informational Submittals: Submit following packaged separately from other submittals:

1. Certifications specified in Quality Assurance article.
2. Qualification Data: Fabricator's qualification data.

1.4 QUALITY ASSURANCE

A. Fabricator’s Qualifications: Company specializing in sheet metal flashing work with three years documented experience in similar size and type of installations.

B. Certifications: Fabricator's certification that products furnished for Project meet or exceed specified requirements.

1.5 FIELD SAMPLES

A. General: Comply with Section 014000 for Quality Requirements.

B. Sample Installation: Construct sample metal fascia and coping 10 feet long as directed.

1. Show splice between adjoining sections of metal fascia and coping and construction techniques.
2. Accepted Field Sample: May remain part of completed Work.

1.6 DELIVERY, STORAGE AND HANDLING

A. Comply with Section 016000 for Product Requirements.

1. Stack pre-formed material to prevent twisting, bending, and abrasions, and provide ventilation.
2. Prevent contact with materials which may cause discoloration or staining.

1.7 WARRANTY

A. Special Warranties: Prepare and submit in accordance with Section 017800 for Closeout Procedures.

1. Warrant installed system to be free of leaks and free from defects in materials and workmanship for two years.
2. Factory Finish: 20 year Warranty Stating Finish will be:

a. Free of fading or color change in excess of 5 Delta E units, ASTM D2244;
b. Will not chalk in excess of numeral rating of 8 for colors and 6 for whites, ASTM D4214;

PART 2 - - PRODUCTS

2.1 MATERIALS

A. Stainless Steel: ASTM A167, type 304, hot rolled, annealed, blasted clean.

1. Thickness: 22 gage.

2.2 ACCESSORIES

A. Cleats: Continuous, unless otherwise shown. Of same material as sheet metal used at coping and counterflashing.

B. Fasteners:

1. Stainless steel for stainless steel or aluminum sheet.
2. Nails: Use annular ring shank type, No. 12 gage or larger to suit application, of sufficient length to penetrate backing material at least 7/8 inch.
3. Screws and Bolts: Sufficient size and length to sustain imposed stresses.

D. Solder Materials:

1. Flux: Type as recommended by sheet material manufacturer; not detrimental to base material.
2. Solder: ASTM B32, 50 percent tin/50 percent lead for galvanized steel Asphalt Mastic: SSPC-Paint 12, solvent-type asphalt mastic, containing no asbestos fibers, compounded for 15 mil dry film thickness per coat for preventing galvanic action.

E. Self-adhering tape: At typical unexposed seams in sheet metal where soldering not provided, use self-adhering tape of butyl rubber or rubberized asphalt composition with HDPE facer. Minimum overall thickness: 60 mils.

F. Sealant Backing Tape: Precompressed, expanding foam tape, urethane impregnated, used to span irregularities and as gasket between substrates and surface mounted reglets, termination bars, cleats, and other continuously, mechanically fastened applications.

1. Acceptable Products and Manufacturers:

a. Polytite B, Polytite Manufacturing Corp., Cambridge, MA.

G. Joint Sealant: Silicone - General Purpose sealant in accordance with Section 079200.

1. Color: As selected by Architect from full range of manufacturer's standard colors.

H. Wood Nailers: Solid, preservative pressure treated softwood as specified in Section 061000.

2.3 SHEET METAL FLASHING AND TRIM FABRICATION

A. General: Fabricate in accordance with Drawings and NRCA and SMACNA Manuals.

1. Shop fabricate components to maximum extent possible to minimize site fabrication.
2. Fabricate to allow for adjustments in field for proper anchoring and joining.
3. Form sections true to shape, accurate in size, square, free from distortion and defects.
4. Cleats: Fabricate cleats and starter strips interlockable with coping and counterflashing in accordance with SMACNA or NRCA recommendations.

a. At cleats used as termination bars at membrane flashing and at metal base flashing for roofing and waterproofing systems, fold top flange over to create hem not less than 1 inch wide. Extend bottom flange minimum 1/2 inch, at angle of 30 to 45 degrees from vertical to establish positive, snap-on attachment of coping and of counterflashing.

5. Fabricate corners from one piece with minimum 18 inch long legs; solder for rigidity; seal with sealant.
6. Enddams: Form enddams watertight. Heat solder. Seal with sealant.
7. Solder: Solder and seal metal joints except those indicated or required to be expansive type joints.

a. After soldering, remove flux. Wipe and wash solder joints clean.

B. Seams: Provide following seam types unless noted or detailed otherwise. Provide continuous application of silicone sealant within seams to maintain seams watertight. Provide sufficient means within seams to accommodate movement of items joined together. Minimum movement capability: 1/8 inch per 10 feet.

1. Flat Seam: Drive cleat.
2. Corner Seam: Double corner.
3. Standing Seam: Double lock standing.

C. Sheet Metal Thickness/Mass: Except as otherwise specified above, provide following:

1. Metal Flashing: In accordance with SMACNA Chapter 4.
2. Closures: Same material, thickness, and finish as adjacent metal.

D. Metal Flashing: NRCA MB 4, MB-5, or MB-7.

1. Hem exposed flashings on underside 1/2 inch; miter and seam corners.
2. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.
3. Fabricate flashings to allow toe to extend minimum 2 inches over wall surfaces.
4. Counterflashing: Designed and fabricated to be removable and fit and work with reglet provided. Lap and seal joints watertight in accordance with reglet manufacturer's recommendations to allow for expansion and contraction.

E. Metal Coping: NRCA MB-8.

1. Top: Slope minimum of 1:10 to roof side.

F. Metal Fascia: NRCA MB-I.

1. Joint system: In accordance with SMACNA Figure 2-5A.

2.4 FINISHES AT STEEL AND ALUMINUM

A. Fluoropolymer (PVDF) Coating: In accordance with Section 050510.

B. Stainless Steel Finish: In accordance with Section 050510.

PART 3 - - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with work in accordance with Section 017000 for Execution.

1. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, cant strips and reglets in place, and nailing strips located.
2. Verify membrane termination and base flashings are in place, sealed, and secure.

3.2 PREPARATION

A. General: Field measure site conditions prior to fabricating work.

1. Install edge strips and cleats in accordance with NRCA and SMACNA before starting installation of sheet metal items.
2. Install surface mounted reglets true to lines and levels. Seal top of reglets with sealant.

3.3 SHEET METAL FLASHING AND TRIM INSTALLATION

A. General: Install metal work in accordance with NRCA and SMACNA Manuals.

1. Wood Nailers: Install securely to substrate in accordance with Section 061000.
2. Install units plumb, level, square, and free from warp or twist while maintaining dimensional tolerances and alignment with surrounding construction.
3. Apply asphalt mastic on metal surfaces of units in contact with cementitious materials and dissimilar metals.
4. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
5. Miter, lap seam and close corner joints with solder. Seal seams and joints watertight.
6. Expansion Joints: Install at frequency recommended by SMACNA. Do not fasten seams such that movement is restricted.
7. Coordinate with installation of roofing system and roof accessories.

B. Metal Base Flashing: Locate over membrane base flashing and secure with continuous cleat to form compression seal. Fasten cleat at maximum4 inches on center. Extend bottom flange of metal base flashing over roofing assembly. Fill top well of cleat serving as metal base flashing termination bar with joint sealant.

1. At thresholds, storefronts, and curtain wall conditions, set top flange of metal base flashing in full bed of continuous sealant prior to mechanically fastening flange to concrete.

C. Continuous cleat: Fasten at maximum8 inches on center at typical applications, including when used as termination bar at membrane flashing. Form compression seal when used as termination bar. Fill top well of cleat serving as membrane termination bar with asphalt mastic. Fill top well of cleat not serving as termination bar with joint sealant.

3.4 CLEANING

A. General: Comply with Section 017400 for Cleaning. Upon completion of each area of soldering, carefully remove flux and other residue from surfaces. Neutralize acid flux by washing with washing soda solution, and then flushing clear water rinse. Use special care to neutralize and clean crevices.

END OF SECTION

SECTION 07713 - GUTTERS AND DOWNSPOUTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

A. Gutters and Downspouts.

B. Related Accessories.

1.3 RELATED SECTIONS

A. Section 07611 - Sheet Metal Roofing.

B. Section 07620 - Sheet Metal Flashing and Trim.

C. Section 07900 - Joint Sealers

1.4 REFERENCES

A. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet andPlate.

B. SMACNA - Architectural Sheet Metal Manual.

1.5 DESIGN / PERFORMANCE REQUIREMENTS

A. Conform to applicable code for size and method of rain water discharge.

B. American Architectural Manufacturers Association (AAMA) Specification 1405.1 "Specification for Aluminum Raincarrying Systems".

C. FHA Minimum Property Standard 4900.1 for One- and Two-Family Dwellings.

D. FHA Minimum Property Standard 4910.1 for Multi-Family Dwellings.

1.6 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's catalog data, detail sheets, and specifications.

C. Shop Drawings: Prepared specifically for this project; showing dimensions of metal gutters and accessories, fastening details and connections and interface with otherproducts.

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, minimumsize 6 inches (150 mm) square, representing actual product, color, and patterns.

F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

G. Manufacturers warranties.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications:

B. Installer Qualifications: Certified and approved installer of the sheet metal roofingmanufacturer.

C. Perform Work in accordance with [SMACNA Manual] [CDA Handbook].

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store products to prevent twisting, bending, and abrasion, and to provide ventilation. Slope stored materials to drain.

C. During storage prevent contact with materials capable of causing discoloration, staining, or other damage.

1.9 PROJECT CONDITIONS

A. Coordinate installation with installation of adjacent roofing, siding and relatedmaterials.

1.10 WARRANTY

A. Provide the Manufacturer's Limited 20-Year, pro-rated and non-transferable Warranty covering labor materials.

1.11 COORDINATION

A. Coordinate Work with other operations and installation of floor finish materials to avoid damage to installed underlayment and membrane materials.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Englert, Inc., which is located at: 1200 Amboy Ave. ; Perth Amboy, NJ 08861; Toll Free Tel: 800-364-5378; Tel: 732-826-8614;

B. Substitutions: Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 COMPONENTS

A. Gutters: Aluminum sheet, ASTM B 209, Alloy 3105-H24. Minimum tensile strength26,000 psi, minimum yield strength 25,000 psi or equivalent. Continuous and seamless sheet aluminum, roll formed.
   1. Thickness:
      a. 0.032 inch (0.81 mm).
   2. Size:
      a. 6 inches by 6 inches152mm by 152mm)

B. Downspouts: Aluminum sheet, ASTM B 209, Alloy 3105-H24. Minimum tensile strength 26,000 psi,

minimum yield strength 25,000 psi or equivalent.

1. Thickness:
   a. 0.019 inch (0.48 mm).

2. Size:
   a. 6 inches by 6 inches (76 mm by 102 mm).

C. Endcaps: Aluminum sheet, ASTM B 209, Alloy 3105-H24, thickness 0.027 inch(0.69 mm).

D. Inside and Outside Mitres: Aluminum sheet, ASTM B 209, Alloy 3105-H24, thickness 0.027 inch (0.69 mm).

E. Gutter Hangers and Anchors: Aluminum sheet, ASTM B 209, Alloy 3105-H24, thickness 0.063 inch (1.60 mm). Provide types required to suit project requirements.

F. Downspout Anchors: Aluminum. Provide types required to suit project requirements.

G. Elbows: Aluminum sheet, ASTM B 209, Alloy 3105-H24. Minimum tensile strength26,000 psi, minimum yield strength 25,000 psi or equivalent.

1. Thickness:
   a. 0.019 inch (0.48 mm).
2. Size: To match downspouts.

H. Gutter Guard:

1. Size:
   a. Aluminum mesh, 5 inch (127 mm) by 3 foot (914 mm).
   b. Aluminum mesh, white, 5 inch (127 mm) by 3 foot (914 mm).
   c. Aluminum mesh, 6 inch (152 mm) by 3 foot (914 mm).

I. Gutter Screen:

1. Size:
   a. Aluminum screen, brown, 5 inch (127 mm) by 3 foot (914 mm).
   b. Aluminum screen, white, 5 inch (127 mm) by 3 foot (914 mm).

J. Aluminum Finish: Castle Clad, two-coat system applied in a continuous baked-on process in a single operation, comprising of an acid-based primer and baked-on high performance linear polyester topcoat on exposed surfaces. Concealed surfacesfinished with a polyester gold backer or wash coat.

1. Color: to be selected from manufacture's standards.

K. Joint Sealant: Provide as specified in Section 079200.

L. Fasteners: Same material and finish as gutters and downspouts.

2.3 FABRICATION

A. Continuously form seamless gutters to the profiles and sizes specified.

B. Form downspouts of profiles and sizes specified.

C. Hem exposed edges of metal.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Verify governing dimensions at building.

C. Verify surfaces are ready to receive gutters and downspouts.

D. If substrate 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. Clean and repair if necessary any adjoining work on which this work is in any way dependent for its proper installation.

C. Prepare surfaces using the methods recommended by the manufacturer forachieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install gutters using appropriate hangers to allow normal expansion and contraction.

C. Install gutter hangers using two 1-1/4 inch (32 mm) screw shank nails and fastenedinto solid lumber.

D. All gutters shall be in continuous length for each elevation (run). No end laps are allowed.

E. Exercise care in placing aluminum in contact with other dissimilar metals ormaterials that are not compatible with aluminum.

F. Providing adequate insulation/separation where ever necessary, such as by painting or otherwise protecting when they are in contact with aluminum or when drainage from them passes over aluminum surfaces.

G. Install sealants where indicated to clean dry surfaces only without skips or voids.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 079200 - JOINT SEALANTS

PART 1 - - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes: Applied joint sealant materials, preformed joint sealants, accessories and general application procedures.

B. Related Sections:

1. Section 013543 - Environmental Procedures: Indoor air quality procedures.

1.3 REFERENCES

A. Reference Standards: See Section 014200. In addition to requirements shown or specified, comply with applicable provisions of following for design, materials, fabrication, and installation of component parts:

1. Chapter I - Joints and Chapter II - Sealants of SWRI “Sealants: The Professionals’ Guide;” Sealant, Waterproofing and Restoration Institute.

1.4 DEFINITIONS

A. Use definitions in ASTM C717.

B. Exterior Surfaces: Total assembly, including concealed back-up. Exterior faces of walls, roofs, and other exposed building components include back-up systems and surfaces.

C. Non-Bleeding: Not capable of exuding liquid chemical components of sealant.

D. Non-Staining: Not capable of discoloring joint substrate.

E. One-Stage Sealing: Weatherproof sealing of joints at exterior face of wall section; sealant acts as both water and air seal.

F. Primary Seal: Deflector seal in two-stage sealing.

G. Sealant System: Sealant, sealant backing, and primer intended for use in particular condition.

H. Secondary Seal: Air-water seal in two-stage sealing.

I. Two-Stage Sealing: Weatherproof sealing of joints in which deflector (rain) seal and air-water seal are treated as two separate functions. Deflector seal is used to prevent water from entering joint. Air-water seal is located at interior protected joint location preventing air and water from passing through joint.

1.4 SYSTEM DESCRIPTION

A. Performance Requirements: See Section 014200.

B. Conform with requirements of ASTM C920, Source Quality Control specified in PART 2 of this Section, and Field Quality Control specified in PART 3 of this Section.

C. Additional basis for failure includes staining or discoloration of sealant or of adjacent surfaces such as:

1. Masonry, concrete, and related materials,

2. Metals and finishes,
3. Coatings
4. Cleaning products

1.5 SUBMITTALS

A. General: Submit in accordance with Division 1 Section for Submittal Procedures.

B. Product Data: For each product.

1. Include data to indicate chemical characteristics, performance criteria, limitations, substrate preparation, installation requirements, and curing requirements.
2. Include information for accessories and other required components.
3. Include color charts indicating manufacturer's full color range available of each sealant type for Architect's initial selection.
4. Include sample of warranty customized for this project.

C. General: Submit in accordance with Section for 013300.

1. Samples: Four ¼ inch diameter by 2 inch long samples illustrating sealant colors for each product exposed to view.
2. Submit a schedule outlining different conditions, adjacencies, and selected products for architect's review and color selection.

D. Informational Submittals: Submit following packaged separately from other submittals:

1. Test Reports: Written results of testing specified as part of Source and Field Quality Control articles.
2. Certifications specified in Quality Assurance article.
3. Qualification Data: Manufacturer's and installer's qualification data.
4. Manufacturer's Instructions. Include requirements for surface preparation, priming, joint size ratios, adhesion and compatibility testing, and perimeter conditions requiring special attention.
5. Manufacturer's field reports.

E. Closeout Submittals: Submit specified warranty in accordance with Section 017800.

1.6 QUALITY ASSURANCE

A. Single Source Responsibility: Provide products for each sealant system from one manufacturer for entire Project, unless otherwise acceptable to Architect.

1. Provide products from single manufacturer to ensure material compatibility where different sealant materials come in direct contact with each other.
2. Provide each sealant system as complete unit, including accessory items necessary for proper function.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum five years documented experience.

C. Applicator Qualifications: Acceptable to manufacturer, specializing in applying sealants, with documented experience on at least five projects of similar nature in past five years.

D. Certifications: Submit following:

1. Manufacturer's Certification that Products:
2. Furnished for Project meet or exceed specified requirements.
3. Components for each joint assembly are compatible with each other and with joint substrates under conditions of service and application.
4. Are suitable for indicated use.
5. Manufacturer's certification that sealants, primers, and cleaners, comply with local regulations controlling use of volatile organic compounds.
6. Contractor's and installer's certification that products are installed in accordance with Contract Documents, based on inspection and testing specified in Field Quality Control.

1.7 FIELD SAMPLES

A. General: Comply with Section 014000.

B. Sample Installation:

1. Construct sealant joint mock-up 5 feet long for elastomeric joint sealants specified in this Section.
2. Position at locations directed.
3. Perform "Field Hand-Pull Adhesion Test" under Field Quality Control.
4. Accepted Field Sample: May remain part of completed Work.

1.8 MOCK-UPS

A. General: Comply with Section for 014000.

B. Visual Mock-Up:

1. Seal joints in mock-ups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section.
2. Visual mock-up may be used for pre-construction field test mock-up of assemblies specified in other Sections.
3. Demonstrate:

   a. Selections made from submittal samples.
   b. Sealant color and aesthetic effects.
   c. Material and installation qualities.
   d. Placement of two-stage seals, including sequence and curing procedures.

4. Perform "Field Hand-Pull Adhesion Test" under Field Quality Control.

1.9 PRE-INSTALLATION CONFERENCE

A. Conduct pre-installation conference in accordance with Section 013119.

1. Convene pre-installation conference two weeks prior to commencing work of this Section.

B. Conference Purpose and Agenda:

1. Visit Project site to analyze site conditions, and inspect surfaces and joints to be sealed in order that recommendations may be made should adverse conditions exist.
2. Discuss following items:
3. Substrate conditions.
4. Compatibility of sealants with substrates.
5. Adhesion and compatibility test results.
6. Preparatory work.
7. Weather conditions under which work will be done.
8. Anticipated frequency and extent of joint movement.
9. Joint design.
10. Sealant installation procedures.

1.10 DELIVERY, STORAGE AND HANDLING

A. Comply with Division 1 Section for Product Requirements.

B. Deliver materials to Site in Unopened Containers and Bundles with Labels Indicating:

1. Manufacturer's name.
2. Product name and designation.
3. Color.
4. Expiration period for use.
5. Working life.
6. Curing time.

7. Mixing instructions for multi-component materials.

C. Storage and Protection: Store products within manufacturer's required temperature and humidity ranges.

1. Prior to use, condition products within manufacturer's required temperature range, humidity range, and time period.

1.11 PROJECT CONDITIONS

A. Environmental Requirements:

B. Apply sealant when following are within manufacturer's limits during and for 24 hours after sealant installation:

1. Ambient and surface temperatures.
2. Relative humidity.

C. Do not apply sealants to wet or frozen surfaces or below 40 degrees F.

D. Comply with manufacturer's requirements regarding application of sealants in vicinity of curing sealants of different material.

1.12 SEQUENCING AND SCHEDULING

A. Sequence work in accordance with Division 1 requirements.

B. Coordinate work with Sections referencing this Section.

C. Coordinate installation of sealants with substrates to which they are applied.

D. Mold Prevention: Comply with Division Sections Product Requirements and Cleaning.

E. Schedule and sequence work to protect mold growth products from exposure to moisture.

1.13 WARRANTY

A. Special Warranty: Prepare and submit in accordance with Section 017800.

B. Warrant installed products to be free from defects in material, labor, or installation techniques for twenty years.

C. Include Coverage for Installed Sealants and Accessories Which:

1. Fail to achieve air tight seal.
2. Fail to achieve watertight seal.
3. Exhibit loss of adhesion.
4. Exhibit loss of cohesion.
5. Exhibit loss of color or color change.
6. Stain adjacent surfaces.
7. Do not cure.

1.14 EXTRA STOCK MATERIALS

A. Comply with Section 017800.

B. Furnish extra sealant in quantity equal to 2 percent of total material furnished but not less than six cartridges of each type and color.

PART 2 - - PRODUCTS

2.1 JOINT SEALANT MANUFACTURERS

A. Acceptable Silicone Joint Sealant Manufacturers:

1. Dow Corning Corporation, Midland, MI 48686.
2. General Electric Silicone Products Division, Waterford, NY 12188.
3. Tremco Incorporated, Beachwood, OH 44122.
4. Accepted Substitute in accordance with Section 012500.

B. Interior Locations: Joint sealants containing mercury, butyl rubber, neoprene, SBR, or nitrile not allowed.

C. Joint sealants formulated with aromatic solvents (organic solvent with benzene ring in its molecular structure), fibrous talc or asbestos, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium, or their components not allowed.

D. Color: As selected by Architect from complete range available from manufacturer.

E. Primer: When required by sealant manufacturer, type as recommended.

1. Acceptable Products, Weather Seal (Glass to Metal):
2. 795 Silicone Structural Glazing and Weatherproofing Sealant, Dow Corning Corp., Midland, MI.
3. Silpruf, General Electric Co., Waterford, NY.
4. Spectrem 2, Tremco

2.2 PREFORMED JOINT SEALANTS

A. Preformed Silicone-Sealant System: Manufacturer's standard system consisting of precured low-modulus silicone extrusion, in sizes to fit joint widths indicated, combined with a neutral-curing silicone sealant for bonding extrusions to substrates.

B. Color: As selected from manufacturer’s standards.

C. Acceptable Products:

1. 123 Silicone Seal, Dow Corning Corporation.
2. UltraSpan US1100, GE Silicones.
3. Sil-Span, Pecora Corporation.
4. Spectrem Ez Seal, Tremco.

2.3 ACCESSORIES

A. Joint Cleaner: Chemical cleaners required by sealant manufacturer for substrates encountered, compatible with sealant backing bond breaker materials.

B. Free of Substances Capable of Staining, Corroding, or Harming:

1. Joint substrates.
2. Adjacent nonporous surfaces.
3. Sealant.
4. Sealant backing.

C. Formulated to promote optimum adhesion of sealants to joint substrates.

D. Primer: Dyed coating material required by sealant manufacturer for enhancing sealant adhesion to joint substrates.

E. Non-staining to joint substrate beyond substrate surface.

F. Required for use, except as directed by manufacturer. Do not prime surfaces when directed by manufacturer or when determined by results of:

1. "Manufacturer’s Sealant-Substrate Compatibility and Adhesion Test" under Source Quality Control.
2. "Field Hand-Pull Adhesion Test" under Field Quality Control.

G. Backer Rod: Non-staining, bond-breaking material.

H. Backer rods manufactured with CFC blowing agents not allowed.

I. Compatible with sealant, joint substrates, primers, and other sealant backing bond breakers.

J. Sealant manufacturer approved.

K. Sized and shaped to provide optimum performance and backing to sealant.

L. Compatible and non-adhering to sealant, ASTM C1330.

1. Type O, Open Cell Polyurethane: Not allowed, unless specifically required by sealant manufacturer.
2. Type C, Closed Cell Polyethylene: Non-absorbent to liquid water.

a. Use in wall, floor, and ceiling joints unless otherwise required by sealant manufacturer.

3. Type B, Reticulated polymeric: Contractor's option: Bicellular material, open cell core with closed cell surface skin; for use at vertical joints only.

a. Sof®-Rod, Nomaco Inc., Zebulon, NC.

A. Unless otherwise required by sealant manufacturer, oversize rod to be larger than joint width by following minimum amounts:

1. Open Cell Polyethylene (if required): 50 percent.
2. Closed Cell Polyethylene: 33 percent.
3. Reticulated Polymeric: 25 percent.

B. Elastomeric Tubing Joint Filler: Neoprene, butyl, EPDM, or silicone tubing, ASTM D1056.

C. Shore A hardness of 70.

D. Compatible with sealant, joint substrates, primers, and other sealant backing bond breakers.

E. Use in pavement joints, unless otherwise required by sealant manufacturer.

F. Use sealant backing bond breaker tape to separate sealant from rod.

G. Unless otherwise required by sealant manufacturer, oversize rod to be larger than joint width by 25 percent.

H. Sealant Backing Bond Breaker Tape: Pressure sensitive polyethylene tape or tetrafluorethylene self-adhesive tape required by sealant manufacturer to suit application.

I. Minimum Thickness of 11 mils.

J. Sealant Tape: Precompressed, expanding foam tape, urethane impregnated, used to span irregularities and as gasket between substrates and surface mounted reglets, termination bars, cleats, and other continuously, mechanically fastened applications.

K. Acceptable Products and Manufacturers:

1. Polytite B, Polytite Manufacturing Corp., Cambridge, MA.

X. Masking Tape: Non-staining, non-absorbent material compatible with sealants and surfaces adjacent to joints.

Y. Tooling Liquids: Non-staining material approved by manufacturer to reduce adhesion of sealant to joint finishing tools.

Z. Adhesives & Sealants: Only use adhesives and sealants in the interior of the building that meet or do not exceed the VOC limits of the CURRENT requirements of South Coast Air Quality Management District (SCAQMD) Rule No. 1168 on the interior of the building

AA. Current requirement refers to the date on which the materials are installed in the building.

BB. Interior refers to all building construction that is inside of the exterior weatherproofing material.

2.4 MIXES

A. General: Comply with manufacturer's instructions.

B. Mix thoroughly with mechanical mixer without mixing air into sealants.

C. Continue mixing until sealant is uniform in color and free from streaks of unmixed materials.

2.5 SOURCE QUALITY CONTROL

A. Tests, General: Comply with Section 014000.

B. Test sealants with substrates and adjacent materials.

C. Coordinate testing of compatibility, adhesion, and staining of sealants and adjacent materials such as materials in contact with sealant and sealant backing materials.

D. Obtain sufficient number of samples of actual proposed products in contact with sealants.

E. Submit number and sizes of test pieces as required by testing standards for each type of material, including joint substrates, shims, sealant backing, and miscellaneous materials.

F. Schedule sufficient time for testing and analysis of results based on specified test methods. Prevent delay in progress of Work due to testing.

G. Investigate sealant material failing compatibility, adhesion, and staining tests and obtain manufacturer's written instructions for corrective measures, including use of specially formulated primers. Inability to correct failures results in rejection of sealant.

H. Include in Test Report, Manufacturer's:

1. Interpretation of test results regarding sealant performance.
2. Primers and substrate preparation required to achieve adhesion.

I. Test Methods, Adhesion: ASTM C794 – Adhesion-in-Peel. Determine whether priming of surfaces, other specific joint preparation techniques, or other sealant types or products are required to obtain rapid, optimum adhesion of sealants to joint substrates without damaging substrates.

J. Staining and Color Change: ASTM C510.

K. Structural Glazing: ASTM C1087.

L. Staining of Porous Surfaces: ASTM C1248

M. Durability: ASTM C1519 - Standard Practice for Evaluating Durability of Building Construction Sealants by Laboratory Accelerated Weathering Procedures

PART 3 - - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with work in accordance with Section 017000.

B. Ensure that concrete and masonry have cured minimum of 28 days.

C. Verify that sealant backing is compatible with sealant.

D. Verify that Substrate Surface:

1. Is within manufacturer's moisture content range.
2. Complies with manufacturer's cleanliness and surface preparation requirements.

E. Joint Width: Verify joints are greater than minimum widths required by manufacturer.

F. If joints are narrower than minimum required widths, widen narrow joints to indicated width.

G. Do not place sealant in joints narrower than manufacturer's required minimum.

3.2 PREPARATION

A. General: Prepare, clean, and prime joints in accordance with manufacturer's instructions.

B. Remove loose materials and matter which might impair adhesion of primer and sealant to substrate.

C. Remove form release agents, laitance, and chemical retarders, which might impair adhesion of primer and sealant to concrete and masonry surfaces.

D. Comply with ASTM C1193.

E. Protect elements adjoining and surrounding work of this Section from damage and disfiguration.

F. Priming:

G. Prime Joint Substrates Unless Priming Is Not Required by:

1. "Manufacturer's Sealant-Substrate Compatibility and Adhesion Test" under Source Quality Control.
2. "Field Hand-Pull Adhesion Test" under Field Quality Control.

H. Apply primer to substrate areas where joint sealant is to adhere.

I. Comply with manufacturer's sequencing requirements for joint priming and sealant backing bond breaker rod installation to assure required primer application coverage and rate without placement of primer on backer rod surface to be in contact with sealant and avoid three-sided sealant adhesion.

J. Do not allow spillage and migration of primer onto surfaces not to receive primer.

K. Install sealant to primed substrates after primer has cured.

L. Masking Tape:

M. Use Masking Tape to Prevent Contact of Primer and Sealant with Adjoining Surfaces that Would Be Permanently Stained or Damaged by:

1. Contact with primer and sealant.
2. Cleaning methods used to remove primer and sealant smears.

N. Place continuously along joint edges.

O. Apply masking tape so it does not shift in position after placement.

3.3 JOINT SEALANT APPLICATION

A. General: Comply with Division 1 Section for Execution Requirements.

B. Comply with Results and Recommendations from:

1. "Manufacturer's Compatibility and Adhesion Test" under Source Quality Control.
2. "Field Hand-Pull Adhesion Test" under Field Quality Control article.

C. Provide compatible sealant system between:

1. Dissimilar assemblies;
2. Dissimilar materials; and
3. Adjacent types of construction.

D. Seal locations necessary to create and secure continuous enclosure even though Drawings may not indicate all locations; do not seal weep holes.

E. Seal to prevent migration of water, vapor, and air through joints.

F. Comply with manufacturer's required application temperature and relative humidity ranges. Consult manufacturer when sealant cannot be applied within these ranges.

G. Sealant Backing Bond Breaker: Measure joint dimensions and size materials to achieve manufacturer-required width-to-depth ratios.

H. Install to achieve sealant depth and sealant contact depth no greater than distance required by manufacturer for sealant material, joint width, and joint movement range.

I. Install using blunt instrument to avoid puncturing.

J. Do Not:

1. Twist, puncture, and tear material.
2. Leave gaps between ends of material pieces.
3. Stretch or compress material along its length.
4. Stretch or compress tape material along its width.

K. Install to provide optimum joint profile and in manner to provide not less than 1/4 inch sealant depth when tooled.

L. Install tape where insufficient joint depth makes use of rod not possible. Match tape width to joint width to prevent three-side adhesion. Do not wrap tape onto sides of joint.

M. Replace backing bond breaker materials which have become wet with dry materials prior to sealant application.

N. Joint Sealant: Install sealants at same time as installation of backing bond breaker materials.

O. Do Not Exceed Manufacturer's Required:

1. Material shelf life.
2. Material working life.
3. Installation time after mixing.

P. Comply with manufacturer's requirements for applying different sealant materials in direct contact with each other.

Q. Use gun nozzle size to suit joint size and sealant material.

R. Install sealant with pressure-operated devices to form uniform continuous bead.

S. Use sufficient pressure to fill voids and joints full.

T. Install to adhere to both sides of joint.

U. Install to not adhere to back of joint; provide sealant backing.

V. Install sealant free of air pockets and embedded matter.

W. Recess sealant 1/8 inch from surface of pavements and horizontal surfaces.

X. Sealant Tooling: Comply with manufacturer's tooling method requirements.

Y. Tool sealant within manufacturer's tooling time limits.

Z. Tooling Liquids:

1. Comply with manufacturer's requirements regarding use.
2. Do not use when not permitted by manufacturer.
3. Do not allow tooling liquids to come in contact with surfaces receiving sealant.

AA. Produce smooth exposed surface.

BB. Tool Sealant to be Free of:

1. Air pockets and voids.
2. Embedded impurities.
3. Surface ridges, sags, and indentations.

CC. Achieve full sealant contact and adhesion with substrate.

DD. Form concave tooled joint shape indicated in Section A of Figure 5 of ASTM C1193, unless otherwise indicated.

EE. Remove excess sealant from surfaces adjacent to joint.

FF. Allow acrylic latex sealant to achieve firm skin before paint is applied.

GG. Masking Tape: Remove immediately after tooling sealant and before sealant skin forms.

HH. Remove without disturbing sealant.

II. Preformed Foam Sealants: Position sealant in joint.

JJ. Apply adhesive and top coat for pavement type sealant in accordance with manufacturer's requirements.

KK. Immediately after removing wrapping to expose adhesive side, press adhesive surface onto side of joint.

LL. Do not stretch or compress material.

MM. At ends, turns, and intersections, comply with manufacturer's requirements to produce continuity of seal.

3.4 FIELD QUALITY CONTROL

A. General: Comply with Section 014000.

B. Field Hand-Pull Adhesion Test:

C. At Mock-Up:

1. Before sealant installation is commenced, test materials for indications of staining and poor adhesion to substrate.
2. Perform after sealants have fully cured.
3. Perform under observation of Architect and manufacturer's technical representative.

D. Subsequent to Commencement of Sealant Installation:

1. Perform under observation of manufacturer's technical representative.
2. Perform minimum of four times prior to completion of sealant installation.
3. Schedule tests at evenly-spaced intervals during sealant installation at discretion of sealant manufacturer.

E. Procedure: Make knife cut through sealant from side to side of joint.

1. At joint's sides, make two cuts approximately 2 inches long meeting cut made across joint width.
2. Place mark on cut portion of sealant inch from cut across joint width.
3. Use fingers to grasp 2 inch piece of sealant firmly between mark and cut across joint width.
4. Pull cut portion outward at angle of 90 degrees from sealant face.
5. Use ruler to measure distance that sealant is pulled.
6. Pull uncut sealant out of joint to distance recommended by manufacturer for testing adhesive capability, but not less than distance equal to maximum movement capability in extension.
7. Hold extended sealant for minimum of 10 seconds.
8. If adhesion is proper, sealant should tear cohesively in itself or be difficult to adhesively remove from joint substrate.

F. Summarize test results in test report. Indicate:

1. Sealants tested.
2. Joint substrates.
3. Cohesive failures.
4. Adhesive failures.
5. Pull distance used.
6. Actions to correct failures and non-complying conditions.

G. In absence of non-complying conditions, sealants which do not indicate adhesive failure from testing will be considered satisfactory.

H. Replace sealant removed from test locations by applying sealant in accordance with manufacturer's requirements for applying sealant to previously sealed joints.

3.5 CLEANING AND PROTECTION

A. General: Comply with Section 017400. Clean excess sealants and sealant smears from adjacent surfaces as application progresses; comply with sealant manufacturer's requirements and manufacturer of surface in which joints occur.

B. Repair or replace defaced or disfigured finishes caused by work of this Section and replace where installation techniques result in unsatisfactory joining of materials and unsightly conditions.

C. Protect in accordance with Section 017000.

D. Protect sealants from contamination until cured.

E. Protect sealant joints in horizontal surfaces from foot and vehicular traffic until cured.

END OF SECTION

SECTION 080670 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware for:

a. Swinging doors.

2. Field verification, preparation and modification of doors and frames to receive door hardware.
3. The intent of the hardware specification is to specify the hardware for exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.

B. Exclusions: Unless specifically listed in hardware sets, hardware is not specified in this section for:

1. Toilet accessories

C. Related Sections:

1. Division 01 Section Alternates• for alternates affecting this section.
2. Division 07 Section Joint Sealants• for sealant requirements applicable to threshold installation specified in this section.
3. Division 09 sections for touchup, finishing or refinishing of existing openings modified by this section.

1.3 REFERENCES

A. UL - Underwriters Laboratories

1. UL 1784 - Air Leakage Tests of Door Assemblies

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Key Systems and Nomenclature

C. ANSI - American National Standards Institute

1. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties

1.4 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 requirements.
2. Highlight, encircle, or otherwise specifically identify on submittals deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.
3. Prior to forwarding submittal, comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, EXAMINATION• article, herein.

B. Action Submittals:

1. Product Data: Technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.

2. Samples for Verification: If requested by Architect, submit production sample or sample installations of each type of exposed hardware unit in finish indicated, and tagged with full description for coordination with schedule.

   a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.

3. Door Hardware Schedule: Submit schedule with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, include:

   a. Door Index; include door number, heading number, and Architects hardware set number.
   b. Opening Lock Function Spreadsheet: List locking device and function for each opening.
   c. Quantity, type, style, function, size, and finish of each hardware item.
   d. Name and manufacturer of each item.
   e. Fastenings and other pertinent information.
   f. Location of each hardware set cross-referenced to indications on Drawings.
   g. Explanation of all abbreviations, symbols, and codes contained in schedule.
   h. Mounting locations for hardware.
   i. Door and frame sizes and materials.
   j. Name and phone number for local manufacturer's representative for each product.

4. Key Schedule:

   a. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
   b. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
   c. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion.

      1) Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.

   d. Prepare key schedule by or under supervision of supplier, detailing Owner’s final keying instructions for locks.

6. Templates: After final approval of hardware schedule, provide templates for doors, frames and other work specified to be factory or shop prepared for door hardware installation.

C. Informational Submittals:

1. Qualification Data: For Supplier, Installer and Architectural Hardware Consultant.
2. Certificates of Compliance:

   a. UL listings for fire-rated hardware and installation instructions if requested by Architect or Authority Having Jurisdiction.
   b. Installer Training Meeting Certification: Letter of compliance, signed by Contractor, attesting to completion of installer training meeting specified in QUALITY ASSURANCE• article, herein.
   c. Electrified Hardware Coordination Conference Certification: Letter of compliance, signed by Contractor, attesting to completion of electrified hardware coordination conference, specified in QUALITY ASSURANCE• article, herein.

3. Warranty: Special warranty specified in this Section.

D. Closeout Submittals:

1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:

a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
b. Catalog pages for each product.
c. Factory order acknowledgement numbers (for warranty and service)
d. Name, address, and phone number of local representative for each manufacturer.
e. Parts list for each product.
f. Final approved hardware schedule, edited to reflect conditions as-installed.
g. Final keying schedule
h. Copies of floor plans with keying nomenclature
i. Copy of warranties including appropriate reference numbers for manufacturers to identify project.

1.5 QUALITY ASSURANCE

A. Supplier Qualifications and Responsibilities: Recognized architectural hardware supplier with record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that provides certified Architectural Hardware Consultant (AHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.

1. Warehousing Facilities: In Project's vicinity.
2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
4. Coordination Responsibility: Assist in coordinating installation of electronic security hardware with Architect and electrical engineers and provide installation and technical data to Architect and other related subcontractors.

a. Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.

B. Architectural Hardware Consultant Qualifications: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:

1. For door hardware, DHI-certified, Architectural Hardware Consultant (AHC).
2. Can provide installation and technical data to Architect and other related subcontractors.
3. Can inspect and verify components are in working order upon completion of installation.
4. Capable of producing wiring diagrams.
5. Capable of coordinating installation of electrified hardware with Architect and electrical engineers.

C. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

D. Accessibility Requirements: For door hardware on doors in an accessible route, comply with governing accessibility regulations cited in REFERENCES• article, herein.

E. Keying Conference

1. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:

a. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
b. Preliminary key system schematic diagram.
c. Requirements for key control system.
d. Requirements for access control.
e. Address for delivery of keys.

F. Pre-installation Conference

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Inspect and discuss preparatory work performed by other trades.

3. Inspect and discuss electrical roughing-in for electrified door hardware.
4. Review sequence of operation for each type of electrified door hardware.
5. Review required testing, inspecting, and certifying procedures.

G. Coordination Conferences:

1. Installation Coordination Conference: Prior to hardware installation, schedule and hold meeting to review questions or concerns related to proper installation and adjustment of door hardware.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site.

B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

1. Deliver each article of hardware in manufacturer's original packaging.

C. Project Conditions:

1. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
2. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.

D. Protection and Damage:

1. Promptly replace products damaged during shipping.
2. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work.
3. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.

E. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

F. Deliver keys and permanent cores to Owner by registered mail or overnight package service.

1.7 COORDINATION

A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.

B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.

1.8 WARRANTY

A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Beginning from date of Substantial Completion, for durations indicated.

a. Closers:

1) Mechanical: 30 years

b. Locksets:

1) Mechanical: 3 years.

c. Key Blanks: Lifetime

2. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.

1.9 MAINTENANCE

A. Maintenance Tools: Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The Owner requires use of certain products for their unique characteristics and project suitability to insure continuity of existing and future performance and maintenance standards. After investigating available product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: No Substitute.•

1. Where No Substitute• is noted, submittals and substitution requests for other products will not be considered.

B. Approval of manufacturers and/or products other than those listed as Scheduled Manufacturer• or Acceptable Manufacturers• in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.

C. Approval of products from manufacturers indicated in Acceptable Manufacturers• is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.

D. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.2 MATERIALS

A. Fasteners

1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units exposed when door is closed except when no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless thru-bolts are required to fasten hardware securely. Review door specification and advise Architect if thru-bolts are required.
4. Install hardware with fasteners provided by hardware manufacturer.

2.3 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Ives 5BB series.
2. Acceptable Manufacturers and Products: Hager BB series, McKinney TA/T4A series, Stanley FBB Series.

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. 1-3/4 inch thick doors, up to and including 36 inches wide:

   a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches high

3. Provide three hinges per door leaf for doors 90 inches or less in height, and one additional hinge for each 30 inches of additional door height.
4. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:

   a. Steel Hinges: Steel pins
   b. Out-Swinging Exterior Doors: Non-removable pins

2.4 MORTISE LOCKS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Schlage L9000 series.
2. Acceptable Manufacturers and Products: No Substitution.

B. Requirements:

1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1.
2. Provide locks manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance.
3. Provide lock case that is multi-function and field reversible for handing without opening case. Cylinders: Refer to KEYING article, herein.
4. Provide locks with standard 2-3/4 inches backset with full 3/4 inch throw stainless steel mechanical anti-friction latchbolt. Provide deadbolt with full 1 inch throw, constructed of stainless steel.
5. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.

   a. Lever Design: Schlage 17A.
   b. Tactile Warning (Knurling): Where required by authority having jurisdiction. Provide on levers on exterior (secure side) of doors serving rooms considered to be hazardous.

2.5 CYLINDERS

A. Manufacturers:

1. Scheduled Manufacturer: Schlage

B. Requirements:

1. Provide interchangeable cylinders/cores to match Owner's existing key system, compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset, manufacturer's series as indicated. Refer to KEYING article, herein.

2. Provide the following keyway: Match existing keyway.

C. Construction Keying:

1. Replaceable Construction Cores.

   a. Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.

      1) 3 construction control keys

   b. Owner or Owner's Representative will replace temporary construction cores with permanent cores.

2.6 KEYING

A. Provide a factory registered keying system, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

B. Provide cylinders/cores keyed into Owner's existing factory registered keying system.

C. Comply with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

D. Requirements:

1. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.

    a. Master Keying system as directed by the Owner.

2. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
3. Provide keys with the following features:

    a. Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
    b. Patent Protection: Keys and blanks protected by one or more utility patent(s).

4. Identification:

    a. Mark permanent cylinders/cores and keys with applicable blind code per DHI publication Keying Systems and Nomenclature• for identification. Do not provide blind code marks with actual key cuts.
    b. Identification stamping provisions must be approved by the Architect and Owner.
    c. Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with DO NOT DUPLICATE• along with the PATENTED• or patent number to enforce the patent protection.
    d. Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
    e. Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.

5. Quantity: Furnish in the following quantities.

    a. Change (Day) Keys: 3 per cylinder/core.
    b. Permanent Control Keys: 3.
    c. Master Keys: 6.

2.7 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: LCN 4010/4110/4020 series.
2. Acceptable Manufacturers and Products: LCN and Substitution.

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. Certify surface mounted mechanical closers to meet fifteen million (15,000,000) full load cycles. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
3. Cylinder Body: 1-1/2 inch diameter with 11/16 inch diameter double heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers. When closers are parallel arm mounted, provide closers which mount within 6-inch top rail without use of mounting plate so that closer is not visible through vision panel from pull side.
8. Pressure Relief Valve (PRV) Technology: Not permitted.
9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI/BHMA Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.8 DOOR TRIM

A. Manufacturers:

1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: Burns, Rockwood.

B. Requirements:

1. Provide push plates 4 inches wide by 16 inches high by 0.050 inch thick and beveled 4 edges. Where width of door stile prevents use of 4 inches wide plate, adjust width to fit.
2. Provide push bars of solid bar stock, diameter and length as scheduled. Provide push bars of sufficient length to span from center to center of each stile. Where required, mount back to back with pull.
3. Provide offset pulls of solid bar stock, diameter and length as scheduled. Where required, mount back to back with push bar.
4. Provide flush pulls as scheduled. Where required, provide back-to-back mounted model.
5. Provide pulls of solid bar stock, diameter and length as scheduled. Where required, mount back to back with push bar.
6. Provide pull plates 4 inches wide by 16 inches high by 0.050 inch thick, beveled 4 edges, and prepped for pull. Where width of door stile prevents use of 4 inches wide plate, adjust width to fit.

2.9 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: Burns, Rockwood.

B. Requirements:

1. Provide kick plates minimum of 0.050 inch thick, beveled four edges as scheduled. Furnish with sheet metal screws, finished to match plates.
2. Sizes of plates:

   a. Kick Plates: 10 inches high by 2 inches less width of door on single doors.

2.10 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: Burns, Rockwood.

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide convex type where mortise type locks are used and concave type where cylindrical type locks are used.
2. Where a wall stop cannot be used, provide universal floor stops for low or high rise options.
3. Where wall or floor stop cannot be used, provide medium duty surface mounted overhead stop.

2.11 THRESHOLDS, SEALS, DOOR SWEEPS, AND GASKETING

A. Manufacturers:

1. Scheduled Manufacturer: Zero International.
2. Acceptable Manufacturers: National Guard, Reese.

B. Requirements:

1. Provide thresholds, weather-stripping (including door sweeps, and seals) and gasketing systems (including smoke, sound, and light) as specified and per architectural details. Match finish of other items.
2. Size of thresholds:

a. Saddle Thresholds: 1/2 inch high by jamb width by door width
b. Bumper Seal Thresholds: 1/2 inch high by 5 inches wide by door width

3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.

2.12 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: Burns, Rockwood.

B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

2.13 FINISHES

A. Finish: BHMA 626/652 (US26D); except:

1. Hinges at Exterior Doors: BHMA 630 (US32D)
2. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
3. Protection Plates: BHMA 630 (US32D)
4. Door Closers: Powder Coat to Match
5. Wall Stops: BHMA 630 (US32D)
6. Latch Protectors: BHMA 630 (US32D)
7. Weatherstripping: Clear Anodized Aluminum
8. Thresholds: Mill Finish Aluminum

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Field verify doors and frames receiving hardware. Verify that new hardware is compatible with door and frame preparation and conditions.

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

3.2 PREPARATION

A. Where on-site modification of doors and frames is required:

1. When modifications are exposed to view, use concealed fasteners, when possible.
2. Prepare hardware locations and reinstall in accordance with installation requirements for new door hardware and with:

a. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.

3.3 INSTALLATION

A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.

B. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.

C. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.

D. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.

E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

F. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.

G. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

H. Lock Cylinders: Install construction cores to secure building and areas during construction period.

1. Replace construction cores with permanent cores as indicated in keying section.

I. Door Closers: Mount closers on inside of exterior doors.

J. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."

K. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.

L. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

N. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.4 FIELD QUALITY CONTROL

A. Engage qualified manufacturer trained representative to perform inspections and to prepare inspection reports.

1. Representative will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

3.6 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.7 DOOR HARDWARE SCHEDULE

A. Hardware items are referenced in the following hardware. Refer to the above-specifications for special features, options, cylinders/keying, and other requirements.

B. Hardware Sets: to be provided by General Contractor selected Architectural Hardware Consultant.

END OF SECTION

SECTION 081100 - METAL DOORS AND FRAMES

PART 1 - - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Hollow metal doors and frames.

B. Related Requirements: Comply with following:

1. Metal Finishes: Section 050510 for stainless steel finishes.

C. Related Sections:

1. Section 080671 - Door Hardware.

D. General: Submit in accordance with Section 013300 for Submittal Procedures.

1.3 REFERENCES

A. Reference Standards: In addition to requirements shown or specified, comply with applicable provisions of following for design, materials, fabrication, and installation of component parts:

1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames (SDI - 100).

1.4 SYSTEM DESCRIPTION

A. General: Meet or exceed ANSI/SDI 250.8 and more stringent requirements specified in this Section.

1. Hardware Preparation: ANSI A250.6, except for hardware locations.

a. Hardware Locations: Comply with Section 08710.
b. Mortise, reinforce, drill, and tap frames and doors at factory to receive mortised and concealed hardware in accordance with templates and approved hardware schedules.
c. Reinforce frames and doors for surface mounted hardware; drilling and tapping will be in field at time of hardware application.
d. Comply with ANSI A250.6 for thickness of hardware reinforcing.

1.5 SUBMITTALS

A. General: Submit in accordance with Section 013300 for Submittal Procedures.

B. Shop Drawings: Schedule indicating opening identification number, door and frame types, sheet metal thickness, dimensions, swing, label, hardware requirements, and undercuts when applicable. Use same identification numbers for openings as shown by Contract Drawings.

1. Include elevations and details indicating door and frame types, profiles, conditions at openings, methods of anchoring, hardware locations, reinforcements for hardware, and provisions for vision panels and louvers when applicable.
2. Clearly identify work that cannot be permanently factory assembled before shipment. Indicate locations of field splice joints and include associated details to ensure proper assembly at project site.

C. Informational Submittals: Submit following packaged separately from other submittals:

1. Certifications as specified in Quality Assurance article.

1.6 QUALITY ASSURANCE

A. Certifications:

1. Manufacturer's and fabricator's certification that products furnished for Project meet or exceed specified SDI requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 016000 for Product Requirements.

1. Store in protected dry area under cover.
2. Place units on wood skids and store in manner that will prevent corrosion and damage.
3. Avoid use of non-vented plastic or canvas coverings which could trap moisture.
4. Store assemblies upright, do not stack flat. Provide space between stacked assemblies to promote air circulation.

PART 2 - - PRODUCTS

2.1 MATERIALS

A. Galvanized / Galvannealed Steel:

1. Sheet: ASTM A653,G60 coating designation, zinc coated by hot-dip process, commercial quality, stretcher-leveled, mill phosphatized. WCGS not permitted.
2. Anchors and Accessories: ASTM A591, minimum Class B coating, zinc coated by electro-deposition, commercial quality, mill phosphatized.

B. Anchor Bolts, Fasteners, and Screws: Manufacturer's standard type, except cadmium or zinc plated finish. Stainless steel acceptable.

C. Primer: Manufacturer's standard rust inhibitive primer, air-dried or baked, compatible with finish painting specified in Section 099100 for interior doors and exterior doors.

2.2 FABRICATION

A. General: Except where specified or noted otherwise, fabricate frames, door faces and edges using cold-rolled steel. Concealed stiffeners, reinforcing, and other components may be cold-rolled or hot-rolled steel at fabricator's option.

1. Fabricate frames, doors and related components using galvanized/galvannealed steel where scheduled or indicated, where assemblies have exposure to exterior atmosphere, including loading docks, and other similar areas.
2. Fabricate designated frames and doors using stainless steel where scheduled or indicated.
3. Fabricate sheet metal work neat in appearance and free from defects, warps, or buckles.
4. Accurately form metal to required sizes and profiles.
5. Grind and dress exposed welds smooth and flush with adjacent surfaces.
6. Remove tool marks and surface imperfections by dressing, filling, and sanding smooth. Do not use metallic filler to conceal manufacturing defects.

B. Edge Clearances:

1. Between Bottom Edge of Door and Finish Floor at Non-Label Assemblies: In accordance with ANSI/SDI 250.8 except where larger undercuts are scheduled. Finish floor is defined as top surface of substrate. Where carpet or other applied surface materials are placed over floor substrate and greater than 1/2 inch thickness, provide 1/4 inch clearance.
2. Between Bottom Edge of Door and Threshold: 1/4 inch maximum.

2.3 FABRICATION - HOLLOW METAL FRAMES

A. Acceptable Manufacturers and Products:

1. Curries Company , Mason City, IA: M Series.
2. Ceco Doors; Milan TN: SU Series.
3. Steelcraft.

B. Hollow Metal Frames:

1. Provide frames based on door grade and model in accordance with ANSI/SDI A250.8 as follows:
2. Exterior Assemblies: Level 3 Extra Heavy-Duty, 14 gage or 0.067 inch steel thickness as scheduled.
3. Welded Construction: Required; knocked-down not allowed.
4. Corners of mitered design; stops coped and butted, or mitered.
5. Accurately cope joints of mullions, rails, and other similar tubular members; reinforce joints with concealed clips or sleeves.
6. Closed or tubular members may be fabricated of two pieces if interlocked at base of stops; visible seams or joints are not acceptable.

C. Guard Box: Closed box design, 26 gage or 0.018 inch minimum, welded to frame. Provide at mortise hardware cutouts for assemblies installed within masonry walls or where assemblies have frames grouted with mortar or similar materials at time of installation.

D. Spreader: Manufacturer's standard temporary channel or angles tack welded at bottom of jamb members.

E. Floor Anchor: Provide at each jamb and mullions which extend to floor.

1. In areas where concrete topping or other similar construction occurs, provide adjustable design to permit securing to depressed subfloor construction. In lieu of adjustable design, frames may extend to subfloor.

F. Jamb Anchors:

1. Masonry Walls: 3/16 inch diameter crimped galvanized wire or corrugated steel T-strap design. Locate near bottom of frame, near top of frame, and 32 inch centers maximum intermittently, minimum three per jamb.

2. Metal Stud Wall Systems: Steel clips welded to frame, type or design compatible with stud system. Locate at top of frame, 12 inch from top, and 24 inch centers maximum intermittently, minimum four per jamb.
3. Previously Placed Concrete or Masonry: Tension plate and spacer design, welded to frame at approximately 24 inch centers, minimum three per jamb. Frames drilled and countersunk for 1/4 inch flathead anchor bolts, set below frame surface.
4. Fire Rated Frames: Comply with fire testing agency label and listing requirements.

G. Silencers: Drill or punch frames for silencers. Coordinate hole size with silencers specified in Section 087100.

1. Single Interior Doors: Three at strike jamb.
2. Pair of Interior Doors: Two at header.
3. Weather-stripped Doors: None required.

H. Terminated Stops: Terminate stops for interior frames 6 inches above floor where scheduled or indicated.

1. Cut stop at 45 degree angle and close with metal filler plate welded in place.
2. Terminated stops not allowed on fire rated, light seal, sound seal, or lead lined assemblies.

2.4 FABRICATION - HOLLOW METAL DOORS

A. Acceptable Manufacturers and Products:

1. Curries Company, Mason City, IA: 707 Series (Interior) and 747 Series (Exterior).
2. Ceco Doors, Milan, TN: Legion and Medallion.

3. Steelcraft: L Series and B Series.

B. Flush Hollow Metal Doors: 1-3/4 inch thick.

1. Exterior: SDI Level 3, Model 2, 0.053 inch thick/16 gage steel face sheets.
2. Core:

a. Interior: Steel stiffeners, 22 gage or 0.030 inch minimum with glass fiber core.
b. Face Construction:

1) Interior: Face sheets broken to form and meet in joint on stile edges
2) Exterior: Same as Interior except weld and grind smooth joints on stile edges.

4. Vertical edges continuously reinforced from top to bottom with steel channels or flat bars placed immediately inside of face sheets.
5. Reinforce top and bottom edge full width of door with steel channel not less than 16 gage or 0.053 inch.
6. Fabricate exterior doors with top and bottom edge closed flush with flush closure. Provide openings in bottom closure of exterior doors to permit escape of entrapped moisture.
7. Provide insulating material in void spaces for sound deadening in assemblies utilizing internal core of steel stiffeners.
8. Fill face welds and surface depressions with metallic paste filler or body putty, grind smooth and flush to unblemished finish appearance.
9. Bevel lock or latch edge 1/8 inch in 2 inches at single doors and at meeting stiles at pairs of doors.

2.5 ACCESSORIES

A. Bituminous Paint: Equivalent to Coal Tar Epoxy C200, Sherwin-Williams Co., Cleveland, OH.

2.6 FINISHES

A. Galvanized Steel Assemblies: Clean surfaces free of mil scale, rust, oil, grease, dirt, and other foreign materials.

1. Phosphatize or chemically treat surfaces before application of prime coat finish.
2. Touch-up areas where abrasions and welding have destroyed zinc coating with zinc-rich paint before application of prime coat finish.
3. Prime coat: Manufacturer's standard rust inhibitive primer to produce smooth and uniform coat.

PART 3 - - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with Work in accordance with Section 017000 for Execution.

3.2 INSTALLATION

A. Hollow Metal Frame Assemblies: Install in accordance with ANSI/SDI – 250.8, SDI – 105, and HMMA 840.

1. Hollow Metal Frames: Set plumb, level, in true alignment, securely fastened to floor with floor anchors and expansion shields and bolts, and fastened to adjoining walls with specified jamb anchors. Remove temporary spreaders and braces.
2. Frames at Masonry Partitions: See Section 042200 for setting jamb anchors in mortar joints and grouting of frames with mortar. Coat inside of frames with bituminous paint.
3. All exterior hollow metal frames to be fully grouted.

B. Face of Countersunk Flathead Frame Anchors: Fill with metallic paste filler; grind smooth and flush with frame surface. Metallic paste filler not required at countersunk frame anchors for stainless steel assemblies; provide exposed flathead stainless steel anchor bolts.

C. Hollow Metal Doors: Install accurately in frames maintaining specified clearances. Install hardware in accordance with manufacturer's written instructions and associated templates. Refer to Section 087100 for hardware installation requirements.

D. Remove protective paper from stainless steel assemblies. Clean surfaces free of residue and polish to uniform luster.

3.3 ADJUSTING

A. After installation of hardware, test and adjust doors for smooth operation.

END OF SECTION

SECTION 089100

LOUVERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Metal wall louvers and screens exposed to view in finish work, including:
a. Fixed, extruded-aluminum exterior metal wall louvers.

B. Related Requirements:
1. Section 07910 - Joint Sealers.

1.3 REFERENCES

A. Air Movement and Control Association International Inc. (AMCA):
1. AMCA Standard 500 Test Method for Louvers, Dampers, and Shutters.
2. AMCA Publication 261 Directory of Licensed Products, current edition.

B. American Society for Testing and Materials (ASTM):
1. ASTM A526 Standard Specification for Steel Sheet, Zinc-coated (galvanized) steel.
2. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
3. ASTM B221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

1.3 COORDINATION

A. Extent: Extent of exterior louvers is indicated on Drawings. Coordinate requirements, quantities, and sizes with mechanical drawings. Provide louvers indicated on mechanical Drawings as part of Work within this Section.

1.4 SUBMITTALS

A. Comply with Division 01 requirements.

B. Product Data: Manufacturer's specifications and technical data including the following.
1. Detailed specification of construction and fabrication.
2. Manufacturer's installation instructions.
3. Submit Product Data on the following items:
a. Each louver type.
b. Each type of louver installation.

C. Shop Drawings: Indicate dimensions, description of materials and finishes, general construction, specific modifications, component connections, anchorage methods, relationship to adjoining work, hardware, and installation procedures.
1. Relationship to adjoining work.
2. Submit Shop Drawings on the following items:
a. Each louver type.
b. Each louver opening.

3. Signed by Professional Structural Engineer registered in the State in which the Project is located.
   a. Certifying compliance with structural requirements.
   b. Do not submit design calculations.

D. Samples: Submit samples for color selection of louver finishes.

E. Quality Control:
   1. Certified test reports indicating compliance with specified performance requirements.

F. Manufacturer's Instructions: Manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

A. Product/Material Qualifications: Provide AMCA certified rating and seal indicating compliance with specified air flow requirements.

B. Certifications: Perform structural design work of this Section under the direct supervision of a Professional Structural Engineer registered in the State in which the Project is located.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site ready use. Fabricate in as large sections and assemblies as practical.

B. Exercise proper care in handling of Work so as not to injure finished surfaces. Protect Work from damage after it is in place.

C. Store materials under cover in a dry and clean location off the ground. Remove materials that are damaged or otherwise not suitable for installation from Project site and replace with acceptable materials at no additional cost to Owner.

1.6 WARRANTY

A. Provide manufacturer's written warranty.

B. Warrant materials and fabrication against defects after completion and final acceptance of Work.
   1. Repair defects, or replace with new materials, faulty materials or fabrication developed during warranty period at no expense to Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products from the following manufacturer:

Architectural Louvers
226 W. Mitchell Avenue
Cincinnati, OH 45232
PH: 888.568.8371

FX: 888.568.8370
ArchLouvers.com

2.2 MATERIALS

A. Aluminum Sheet: ASTM B209 Alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer to provide required finish.

B. Aluminum Extrusions: ASTM B221, Alloy 6063-T5.

C. Galvanized, Bonderized Coating: ASTM A526 galvanized to G90 zinc coating.

D. Fastening: Provide stainless steel screws and fasteners for aluminum louvers and zinc-coated or stainless steel screws and fasteners for steel louvers. Provide other accessories as required for complete and proper installation.

2.3 WIND DRIVEN RAIN SERIES BLADE

D. MODEL E4JS
1. Louver Depth: 4 inch
2. Frame Thickness: 0.081 inch extruded aluminum type 6063-T5
3. Blade Angle: Standard.
4. Blade Thickness: 0.060 inch extruded aluminum type 6063-T5
5. Blade Spacing: 5 inch
6. Performance Requirements: As follows determined by testing 48 inch by 48 inch units per AMCA 500.
   a. Free Area: 5 0 . 4 percent
   b. Static Pressure Loss: Not more than .30 inch water gage at an airflow rate of 735 FPM free area intake velocity.
   c. Water Penetration: Not more than 0.01 ounces per square foot of free area at an airflow rate of 735 FPM free area velocity.
   d. Wind Load Rating: 30 psf

2.4 LOUVER ACCESSORIES

A. Exterior Sill: Provide sill flashing of same material and finish as louvers where indicated on drawings.

2.5 FABRICATION

A. Fabrication Requirements:
1. Performance: Fabricate as required for optimum performance with respect to water penetration, strength, durability, and appearance.
2. Size: Fabricate louvers in walls to meet dimensions indicated on drawings.
3. Field Measurement: Verify size, location, and placement of louvers before fabrication.
4. Shop Assembly: Fabricate to minimize field adjustments, splicing, mechanical joints, and field assembly of units.
5. Accessories: Include supports, anchorage, and accessories required for complete assembly.
6. Vertical mullions: Provide vertical mullions of type and spacing indicated but not farther apart than recommended by manufacturer.
7. Horizontal mullions: Provide horizontal mullions at horizontal joints between louver units except where continuous vertical assemblies are indicated.
8. Connections: Join frame and blade members to one another welding, except where field bolted connections between frame members are made necessary by size of louvers.
9. Spacing: Maintain equal blade spacing to produce uniform appearance.

2.14 FINISHES

A. Comply with NAAMM Metal Finishes Manual for recommendations relative to application and designations of finishes.

B. Shop Finishing: Factory finish louvers and accessories as following:
1. Fluorocarbon 3 Coat Coating System (with clear top coat) : Comply with AAMA 605.2.

C. Color:
1 . Selected by Architect from manufacturer's standard color selection chart.

D. Finish Protection: Provide finish protection as recommended by louver manufacturer.

E. Selected color will be submitted for approval using same materials to be used for fabrication.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions under which Work is to be performed and identify conditions detrimental to proper or timely completion.
1. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordinate size and location of cutouts in blank-off panels with mechanical ductwork installer.

B. Protection: Protect aluminum in contact with masonry, concrete, steel, and other dissimilar materials from galvanic and corrosive action with neoprene gaskets or a coat of bituminous paint, applied before installation of aluminum product.

3.3 INSTALLATION

A. Install louvers per manufacturer's typical details and instructions along with advice of their qualified representative.

B. Provide necessary fastenings and anchors as required to complete installation. Install units plumb, level, and in proper alignment with adjacent Work.

C. Form tight joints and fit exposed connections accurately.

3.4 ADJUSTING AND CLEANING

A. Adjustment: Adjust operable parts for smooth and accurate operation.

B. Remove temporary coverings and protection of adjacent work areas.

C. Repair or replace damaged products.

D. Clean installed products per manufacturer's instructions before completion.

3.5 PROTECTION

A. After installation, carefully protect work against disfiguration or damage from mechanical abuse or harmful materials.

END OF SECTION

SECTION 099100 – PAINTING

PART 1 - - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Finish Painting of Exterior and Interior Items and Surfaces, Including:

1. Exposed interior surfaces.
2. Factory-primed surfaces.
3. Scheduled and otherwise identified exterior surfaces.

B. Exterior and Interior Items and Surfaces Not Requiring Painting, Unless Noted Otherwise:

1. Surfaces coated by other specification sections.
2. Items with factory applied finishes other than factory-applied primer only applications.
3. Aluminum, stainless steel, plated architectural metals and prefinished metals specified in Section 050510.
4. Brick and decorative concrete unit masonry.
5. Moving parts of operating units.
6. Code required labels or equipment identification plates.
7. Surfaces concealed or inaccessible in finished construction unless specifically required.
8. Other surfaces specifically scheduled or indicated to remain unfinished or unpainted.

C. Materials and Products Not To Be Painted:

1. Items with integral or factory-applied final finish unless indicated otherwise.
2. Moving parts of operating equipment such as valve and damper operators, linkages, sensing devices, motor and fan shafts.
3. UL, FM or other code-required labels, name plates, identification or performance rating labels.
4. Mechanical and electrical items within unfinished spaces unless noted otherwise.

D. Field finish coating of shop or factory primed and prefinished items. Refer to individual Sections for priming requirements. Use intermediate and finish coat products of same manufacturer as primer.

E. Preparation work and coatings specified in this Section are in addition to shop and factory applied finishes and surface treatment specified in other Sections.

F. Refer to Divisions 21, 22, 23 and 26 for painting requirements for items in dedicated mechanical and electrical spaces.

G. Paint items unless specifically shown or specified not to be painted.

H. Refer to Color Schedule on Contract Drawings.

I. Related Sections:

1. Section 013543 – Environmental Project Procedures: Indoor air quality procedures.
2. Division 22 Section: Plumbing Systems Identification.
3. Division 23 Section: HVAC Identification.
4. Division 26 Section: - Electrical: Electrical Identification.

1.2 DEFINITIONS

A. Conform to Painting and Decorating Contractors of America (PDCA) Glossary for interpretation of terms used in this Section except as modified below.

1. EXPOSED SURFACES: Surfaces of products, assemblies, and components visible from any angle after final installation. Includes internal surfaces visible when operable doors, panels or drawers are open, and surfaces visible behind registers, grilles, or louvers.
2. CONCEALED SURFACES: Surfaces permanently hidden from view in finished construction and which are only visible after removal or disassembly of part or all of product or assembly.
3. INACCESSIBLE SPACES: Spaces not intended for human use.
4. Spaces listed below are defined as CONCEALED or INACCESSIBLE:
   a. Inside of partitions.
   b. Mechanical and electrical items enclosed within casework or equipment.
   c. Foundation spaces.
   d. Trenches and manholes.
   e. Mechanical shafts or chases.
5. SHEEN: Degree of luster as measured with specular gloss meter, ASTM D523:

a.	Flat:	85 degree meter	Below 15
b.	Eggshell:	60 degree meter	5 to 20
c.	Satin:	60 degree meter	15 to 35
d.	Semi-gloss:	60 degree meter	30 to 65
e.	Gloss:	60 degree meter	65 to 80
f.	High Gloss:	60 degree meter	Over 80

6. ARCHITECTURAL PAINT: Paints, field applied to stationary structures and their appurtenances, pavements, or curbs.
7. INDUSTRIAL MAINTENANCE PRIMERS and TOPCOATS: High performance paints formulated for and applied to substrates in industrial, commercial, or institutional situations for purpose resisting heavy abrasion, immersion, prolonged exposure to temperatures in excess of 250º F, prolonged moisture condensation, chemical corrosion, solvent cleaning, or exterior exposure of metal structures.
8. METALLIC PIGMENTED PAINTS: Paints containing at least 0.4 pounds of metallic pigment per gallon of paint as applied.
9. SYSTEM DFT: Dry film thickness of entire paint system unless otherwise noted.

B. VOC: Low volatile organic compounds.

1.3 SYSTEM DESCRIPTION

A. Perform testing according to following methods:

1. Solids Content by Volume: ASTM D2832.
2. Surface Burning Characteristics: ASTM E84.

B. Application Requirements: Apply scheduled paints to exposed surfaces of items and spaces unless specifically indicated otherwise.

C. Interface with Adjacent Systems: Review other Sections specifying prime coats to ensure compatibility of total paint system for various substrates.

1. Upon request from other trades, furnish information on characteristics of finish materials proposed for use to ensure compatibility of various paints.
2. Test compatibility of existing coatings, including shop applied primers and previously applied coatings, by applying specified special paint to small, inconspicuous area.
3. If specified paint lifts or blisters existing coating, apply barrier or tie coat as recommended by paint manufacturer.
4. If no compatible barrier or tie coat exists, remove existing coating completely and apply paint system as specified for new work.

1.4 SUBMITTALS

A. General: Submit in accordance with Section 013300 for Submittal Procedures.

B. Product Data: Submit product data, including label analysis for each product.

1. Specifically include percent solids-by-volume, VOC content (pound/gallon), and lead content (percent of weight of dried film).

    a. 2.Color Charts: Submit manufacturer's standard color chips and charts for use in preparation of Color Schedule.
    b. 3.Schedule: List each material proposed for use, and cross-reference to specific paint system and substrate application.
    c. Identify each material by manufacturer's catalog number, product name, and generic classification.
    d. Include typewritten list identifying paint systems and colors applied to each room, space, or item.

        1) 4. Include sample of warranty customized for this Project.

C. Samples: Color and Sheen: Prepare two (2) samples of each opaque finish paint specified in each color and sheen scheduled for appearance verification.

1. Apply to 12 by 12 by 1/4 inch hardboard. Apply sufficient paint thickness to provide proper hiding and appearance.
2. Label each sample to indicate material, color, and sheen.

D. Samples: Painting Systems:

1. Prepare two (2) samples of each opaque paint system scheduled on actual substrate materials proposed for use. Apply in most common top coat color scheduled.
2. Step back each coat and process at least one inch to show bare substrate and each coat and process in system build-up.
3. Minimum sample size of 4 by 8 inches.
4. Label each sample to indicate materials, color, sheen, DFT of each coat applied, and total system DFT.

E. Informational Submittals: Submit following packaged separately from other submittals:

1. Certifications specified in Quality Assurance article.
2. Qualification Data: Applicator's qualification data.
3. Manufacturer's instructions.

F. Closeout Submittals: Submit specified warranty in accordance with 017700 Section for Closeout Procedures.

1.5 QUALITY ASSURANCE

A. Single Source Responsibility: Provide products of single manufacturer for use in each paint system. Do not mix products of different manufacturers without approval of Architect and manufacturers involved.

B. Applicator Qualifications: Company specializing in commercial painting and finishing with three years documented experience.

1. Approved applicator, participating in extended warranty application program.

C. Regulatory Requirements:

1. Lead Content: Comply with CPSC 16 CFR 1303 and other applicable federal, state, and local regulations.
2. Volatile Organic Compound Content: ASTM D3960.
3. Comply with applicable regulations limiting volatile organic compound (VOC) content of paints to be applied. Conduct and report measurement of volatile organic compounds in paints in accordance with ASTM D3960 or Architect approved method.

D. Certifications:

1. Certification from manufacturer that materials furnished for use on this Project comply with applicable federal, state, and local requirements regarding lead and VOC content.
2. Certification from manufacturer that materials furnished for use on this Project meet or exceed specified requirements.
3. Certification from manufacturer that applicator selected for project is approved for providing warranty for paint work indicated.

1.6 FIELD SAMPLES

A. General: Comply with Section for 014000 Quality Requirements.

B. Sample Installation: Duplicate finishes of approved paint system samples on wall surfaces and other interior and exterior components selected by Architect.

1. Provide full-coat finish on at least 100 square feet of surface until required color, sheen, and texture are obtained. Simulate finished lighting conditions for review of in-place work.
2. Request review by Architect of first finished room, space, or item for each paint system for color, texture, quality, and workmanship before proceeding with rest of Work.
3. Accepted Field Sample: May remain part of completed Work.

1.7 PRE-INSTALLATION CONFERENCE

A. Conduct pre-installation conference in accordance with Section 013119 for Project Meetings.

B. Conference attendance by Owner, Architect, Contractor, Installer, and manufacturer's representative authorized to certify Installer as an approved applicator and participant in extended warranty program specified.

C. Minimum Agenda:

1. Discuss sequence and scheduling, installation procedures and interface with other trades.
2. Review requirements and conditions which could possibly interfere with successful performance of work.
3. Review Project Specifications and Drawings.
4. Review basis and coordination to determine acceptability of surfaces to receive paints and coatings.
5. Review environmental and ventilation requirements.

D. Where required by warranty requirements, include scheduling requirements for manufacturer representative to confirm acceptability of surfaces. Include surface preparation to receive paints and coating, acceptable application methods and techniques for painting and coating, and acceptable completion of work to permit issuance of warranty.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 016000.

1. Deliver products to site in manufacturer's sealed and labeled containers; inspect to verify compliance with specified requirements.
2. Label containers to indicate manufacturer's name, product name and type of paint, brand code or stock number, date of manufacture, coverage, surface preparation, drying time, cleanup, color designation and instructions for mixing and reducing.
3. Store paint materials in tightly covered containers in well-ventilated area at ambient temperatures of 45º F minimum and 90º F maximum, unless required otherwise by manufacturer. Maintain containers in clean condition, free of foreign materials and residue with labels in legible condition.
4. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.9 PROJECT CONDITIONS

A. Environmental Conditions: Comply with more restrictive of following or manufacturer's requirements under which systems can be applied.

1. Provide continuous ventilation during application of paints to exhaust hazardous fumes.
2. Provide heating necessary to maintain surface and ambient temperatures within specified limits.
3. Maintain temperature and humidity conditions for minimum 24 hours before, during, and 48 hours after application of finishes, unless longer times are required by manufacturer.
4. Do not permit wide variations in ambient temperatures which might result in condensation on freshly coated surfaces.
5. Provide illumination of not less than 80 foot candles measured mid-height at substrate surface during application of paints.
6. Apply water reducible paints only when ambient and surface temperatures are between 50º F and 90º F.
7. Apply solvent reducible paints only when ambient and surface temperatures are between 45º F and 90º F.
8. Do not apply paints under any of following conditions:

a. When surfaces are damp or wet.
b. During snow, rain, fog, or mist.
c. When relative humidity is less than 20 percent or exceeds 85 percent.
d. When temperature is less than 5º F above dew point.
e. When dust may be generated before paints have dried.
f. In direct sunlight.
g. When wind velocity is above 20 mph.

9. Application of paints may continue during inclement weather provided work areas and surfaces to be coated are enclosed and specified environmental conditions are maintained.

1.10 WARRANTY

A. Special Warranty: Prepare and submit in accordance with Section 017800 for Closeout Submittals.

1. Warrant installation to be free from defects in material and workmanship for five years.
2. Repair or replace defects occurring during warranty period.
3. Defects include, but are not limited to, pinholes, crazing or cracking, loss of adhesion to substrate, deficient thickness, bleed-through, improper materials, defective materials, and defective workmanship.

1.11 MAINTENANCE

A. Extra Materials: Furnish in accordance with Section 017800 for Closeout Submittals.

1. Provide one unopened gallon container of each type of opaque top paint in each color and sheen used on Project.
2. Store where directed with labels intact.

PART 2 - - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. Benjamin Moore, Montvale, NJ.
2. National Paint Alliance
3. Glidden Professional, Strongsville, OH 44136.
4. PPG Industries, Pittsburgh, PA.
5. Pratt & Lambert, Buffalo, NY.
6. Sherwin-Williams, Cleveland, OH.
7. Accepted Substitute in accordance with Section 012500.

B. Listing of products by manufacturer's trade name is not intended to exclude equivalent products by other manufacturers identified above. For products not specifically named, submit substitution request in accordance with Section 012500.

2.2 PAINT MATERIALS - GENERAL

A. Paints: Ready-mixed, factory tinted, best professional grade produced by manufacturer.

1. Fully grind pigments to maintain soft paste consistency in vehicle.
2. Capable of being dispersed into uniform, homogeneous mixture.
3. Possess good flowing and brushing properties.
4. Capable of drying or curing free of streaks or sags, and yielding specified finish.
5. Paints formulated with formaldehyde, halogenated solvents, mercury or mercury compounds, or tinted with pigments of lead, cadmium, chromium VI and their oxides not allowed.

a. Water Based Paints formulated with aromatic hydrocarbons (organic solvent with benzene ring in its molecular structure) not allowed.
b. Solvent Based Paints formulated with more than 10 percent aromatic hydrocarbons by weight not allowed.

6. Comply with local regulatory requirements for VOC content of field applied paints.

B. Paint and Primer Maximum Product Emissions Limits: Top coat and primer interior paints must meet or not exceed the VOC (Volatile Organic Compounds) limits of the current requirements of Green Seal Standards GS-11 - Paints in the building. GS-11 VOC limits for interior paints are as follows. Interior refers to all building construction that is inside of the exterior weatherproofing material:

1. Interior, Non-flats: 150 grams per liter of product minus water

2. Interior, Flats: 50 grams per liter of product minus water.

2.3 FINISH PAINTING SYSTEMS

A. Unless otherwise specified in the Interior Finish Material Legend, provide following:

B. General: System DFT specified identifies the minimum of the acceptable range. Concrete and Masonry Surfaces:

1. Paint System No. PT-C4 (Flat Latex Finish):
   a. Surface: Interior concrete walls.
   b. Sheen: Flat.
   c. Prime Coat: Latex Primer at 1.0 mils.
   d. Under Coat: Interior Latex Flat Paint at 1.4 mils.
   e. Top Coat: Interior Latex Flat Paint at 1.4 mils.
   f. System DFT: 3.9 mils.

2. Paint System No. PT-C10 (Latex Finish w/ Cementitious Block Filler):
   a. Surface: Interior concrete masonry units.
   b. Sheen: Eggshell.
   c. Prime Coat: Block Filler at 150 square feet per 50 pound bag for leveled fill.
   d. Under Coat: Interior Latex Enamel at 1.5 mils.
   e. Top Coat: Interior Latex Enamel at 1 .5 mils.
   f. System DFT: 3.0 mils (excluding primer).

C. Metal Surfaces:

1. Exterior Metal Surfaces: See Section 099600.
2. Paint System No. PT-M2 (Latex Finish):

   a. Surface: Interior and Exterior non-ferrous metals and zinc-coated (galvanized) steel.
   b. Sheen: Eggshell.
   c. Prime Coat: Galvanized Primer at 2.0 mils.
   d. Under Coat: Acrylic DTM at 3.0 mils.
   e. Top Coat: Acrylic DTM at 3.0 mils.
   f. System DFT: 8.0 mils.

3. Paint System No. PT-M4 (Latex Finish):

   a. Surface: Interior non-ferrous metals and zinc-coated (galvanized) steel.
   b. Sheen: Eggshell.
   c. Prime Coat: Galvanized Primer at 2.0 mils.
   d. Under Coat: Interior Latex Enamel at 1.5 mils.
   e. Top Coat: Interior Latex Enamel at 1.5 mils.
   f. System DFT: 5.0 mils

2.4 FILLERS AND SEALERS

A. Interior Block Filler:

1. Benjamin Moore: Moorcraft Block Filler No. 285.
2. Glidden Professional: Concrete Coatings: Block Filler No. GP 3010.
3. PPG: Speedhide Acrylic Latex Masonry Block Filler, 6-7.
4. Pratt & Lambert: Pro Hide Latex Block Filler.
5. Sherwin-Williams: Interior/Exterior Block Filler No. B25W25.

2.5 PRIMERS

A. Interior Alkyd Enamel Undercoater:

1. Benjamin Moore: Alkyd Underbody No. 217.
2. Glidden Professional: Woodwork Penetrating Primer Sealer No. GP 1120.
3. PPG: Speedhide Quick Drying Enamel Undercoater, 6-6.
4. Pratt & Lambert: Vitralite Enamel Undercoater.
5. Sherwin-Williams: Wall and Wood Primer B49WZ2.

B. Galvanized Primer:

1. International Paint: Devoe Coatings: Devguard Multi-Purpose Metal Primer No. 4160.
2. PPG: Galvanized Steel Primer No. 6-209.
3. Sherwin-Williams: Galvite HS B50WZ30.

C. Low VOC Latex Primer:

1. Benjamin Moore and Company:
2. Glidden Professional: No VOC Interior Primer No. GP 9116.
3. PPG Industries, Inc.
4. Sherwin-Williams: ProGreen 200 Primer B28W600.

2.6 WATER REDUCIBLE PAINTS

A. Industrial Acrylic:

1. International Paint: Devoe Coatings:

   a. Semi-Gloss: Devflex Acrylic Semi-Gloss Enamel No. 4216HP.
   b. Eggshell: Devflex Acrylic Eggshell Enamel No. 4212 HP.

2. PPG: Water Base Inhibitive Primer No. 6-712.
3. Sherwin-Williams: DTM Acrylic B66W1 .

B. Low-VOC Interior Latex/Acrylic Based Paint:

1. Benjamin Moore and Company, Pristine.

2. Glidden Professional:

   a. Eggshell: Lifemaster No VOC Eggshell No. GP 9300.
   b. Semi-Gloss: Lifemaster No VOC Semi-Gloss No. GP 9200.

3. Sherwin-Williams: Harmony

   a. Egg Shell: B9
   b. Semi-Gloss: B10.

C. Water Based Epoxy:

1. Benjamin Moore: Moorcraft Acrylic Epoxy Enamel.
2. International Paint: Devoe Coatings:

a. Semi-Gloss: Tru-Glaze Waterborne Semi-Gloss Epoxy No. 4406.
b. Gloss: Tru-Glaze Waterborne Gloss Epoxy No. 4408.

3. PPG: Pitt-Glaze Water Based Acrylic Epoxy Enamel.
4. Sherwin-Williams: Water Based Catalyzed Epoxy B70-200.

2.7 ACCESSORY MATERIALS

A. Muriatic Acid, Mildewcide, TSP (Tri-Sodium Phosphate), Acidic-Detergent, Zinc Sulfate, Sodium Metasilicate, And Solvent: Commercially available, non-damaging to surface being cleaned; as specified in PDCA Specification Manual; acceptable to paint manufacturer.

B. Metal Conditioner: Proprietary phosphoric acid based, etching type solution; acceptable to paint manufacturer.

C. Rust Inhibitor: Water containing 0.32 percent of sodium nitrite and 1.28 percent by weight of secondary ammonium phosphate (dibasic); or water containing 0.2 percent by weight of chromic acid or sodium chromate or sodium dichromate or potassium dichromate.

D. Do not use products of different manufacturers in combination.

2.9 MIXING

A. Use factory prepared colors matching approved samples. Site Tinting: Not allowed.

1. Thoroughly mix and stir paints before use to ensure homogeneous dispersion of ingredients. Prior to application, blend multiple containers of same material and color by pouring from one container to another several times to ensure uniform consistency, color, and smoothness.
2. Mix only in clean mixing pails of material recommended by manufacturer to avoid contamination.
3. Remove film which may form on surface of material in containers and strain material before using. Stir frequently during use to maintain pigments in suspension. Do not stir film into material.
4. Apply paints of consistency recommended by manufacturer. Thin only within recommended limits using thinners approved by paint manufacturer.

2.10 COLORS AND FINISHES

A. Colors: Refer to Material and Finish Legend on Contract Drawings.

B. Sheen:

1. Ceilings: Semi-gloss in patient areas; Flat elsewhere unless noted otherwise.
2. Walls: Semi-gloss in patient areas and wet areas to include but not limited to housekeeping closets, toilet/shower rooms, soiled utility rooms; Satin/Eggshell elsewhere unless noted otherwise.
3. Metal Doors and Frames: Semi-gloss, unless noted otherwise.
4. Metals with accent colors - Semi-gloss, unless noted otherwise.
5. Painted Wood: Semi-gloss, unless noted otherwise.

PART 3 - - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with work in accordance with Section 017000 for Execution.

B. Measure moisture content of substrates using recently calibrated electronic moisture meter. Do not apply paints if moisture content of surfaces exceeds lesser of percentages listed below or those required by paint manufacturer. If excess moisture content exists and cannot be reduced, obtain written approval of paint manufacturer before application of paints.

1. Masonry, Concrete, CMU, and Portland Cement Plaster: 17 percent for solvent reduced paints. Test concrete floors in accordance with ASTM D4263.

C. Prior to applying alkali and acid sensitive paints, test surface pH with universal pH paper placed against wetted surface. Substrate pH shall not exceed pH of clean wash water.

D. Beginning of execution constitutes acceptance of existing conditions.

3.2 PREPARATION - GENERAL

A. Protect completed construction from damage. Furnish drop cloths, shields, and protective methods to prevent spray, splatter, or droppings from disfiguring other surfaces.

B. Remove surface hardware, mechanical diffusers, escutcheons, registers, electrical plates, light fixture trim, fittings, fastenings and similar items prior to preparing surfaces for finishing. Provide surface-applied protective masking for non-removable items. Carefully store removed items for reinstallation.

1. Remove mildew by scrubbing with mildewcide. Rinse thoroughly with clean water.
2. Before beginning application of paints, ensure surfaces are clean, dry, and free of dirt, dust, rust or rust scale, oil, grease, mold, mildew, algae, efflorescence, release agents, or any other foreign material which could adversely affect paint adhesion or finished appearance.

3.3 SURFACE PREPARATION FOR NEW WORK

A. General: Correct minor defects.

1. Remove temporary labels, wrappings, and protective coverings from surfaces to be coated.
2. Seal stains, marks, and other imperfections which may bleed through surface finishes.

B. Concrete: Prior to application of paints, allow surfaces to cure minimum 60 days.

1. Remove dirt, scale, powder, laitance, and bond breakers by light sandblasting to minimum 1.5 mil profile.
2. Remove oil and grease with solution of TSP; rinse well.
3. Remove stains caused by weathering or corroding metals with solution of sodium metasilicate applied after thoroughly wetting surface with potable water; allow to dry.
4. Fill cracks and voids with compatible filler.

C. Masonry: Prior to application of paints, allow surfaces to cure minimum 28 days.

1. Remove dirt, scale, loose mortar, efflorescence, and powder by wire brushing or by other approved methods.
2. Remove oil and grease with solution of TSP, rinse, and allow to dry.
3. Remove stains caused by weathering or corroding metals with solution of sodium metasilicate applied after thoroughly wetting surface with potable water; allow to dry.
4. Wash and neutralize surfaces as recommended by paint manufacturer, rinse, and allow to dry.

D. Frames: At interface between wall and frame surfaces, apply Sealant, tool and prepare to receive paint in accordance with sealant and paint manufacturers requirements. See Section 079200.

E. Sills: At interface between sills and adjacent wall and window frame surfaces, apply Sealant, tool and prepare to receive paint in accordance with sealant and paint manufacturers requirements. See Section 079200.

G. Steel – Factory or Shop Prime Coated: Remove loose primer and rust to feather-edge at adjacent sound primer by cleaning in accordance with SSPC SP2 - Hand Tool Cleaning and SP3 - Power Tool Cleaning.

1. Apply metal conditioner to abrasions, welds, bolts, and nuts in accordance with manufacturer's recommendations. Allow to set as recommended by manufacturer. Rinse with clean water with rust inhibitor mixed with water or applied immediately following rinse. Allow to dry.
2. Prime entire surface immediately.
3. Apply specified primer to bare steel and previously primed steel surfaces including steel joists and joist girders

H. Steel - Galvanized: Remove white rust by cleaning in accordance with SSPC SP2 - Hand Tool Cleaning and SP3 - Power Tool Cleaning. Exercise care not to remove galvanizing.

1. Pretreat surfaces to receive solvent reducible coatings immediately.

3.4 APPLICATION

A. General Requirements: Coat all surfaces specified, scheduled, illustrated, and otherwise exposed unless specifically noted otherwise.

1. Apply paints of type, color, and sheen as scheduled.
2. Apply products in accordance with Division 1 Section for Execution. Use application materials, equipment, and techniques as recommended by paint manufacturer and best suited for substrate and type of material being applied.
3. Do not apply finishes to surfaces that are improperly prepared.
4. Number of coats specified are minimum number acceptable.
5. Apply paint systems to total dry film thickness scheduled. Apply material at not less than manufacturer's recommended spreading rate. Do not exceed maximum single coat thickness recommended by paint manufacturer. Do not double-back with spray equipment building up film thickness of two coats in one pass.
6. Ensure that edges, corners, crevices, welds, and exposed fasteners receive dry film thickness equivalent of flat surfaces.
7. Finish edges of paints adjoining other materials or colors sharp and clean, without overlapping.

B. Prime Coats: Apply initial coat to surfaces as soon as practical after preparation and before subsequent surface deterioration.

1. Backprime exterior woodwork with specified primer.
2. Backprime interior woodwork scheduled to receive transparent finish with gloss varnish reduced 25 percent with mineral spirits.
3. Apply primer to wood and metal sash before field glazing.
4. Prime factory or shop primed metal surfaces prior to application of finish coatings.

C. Intermediate and Top Coats: Allow previously applied coat to dry before next coat is applied.

1. Sand and dust lightly between coats as recommended by paint manufacturer.
2. Apply each coat to achieve uniform finish, color, appearance, and coverage free of brush and roller marks, runs, misses, visible laps or shadows, hazing, bubbles, pin holes, or other defects.
3. If stains, undercoats, or other conditions show through final topcoat, correct defects and apply additional topcoats until paint film is of uniform finish, color, and appearance.

D. Finish Matching: Finish closets same as adjoining rooms, unless otherwise specified.

1. Finish tops, bottoms, and edges of doors same as door faces. Apply sanding sealer to cut-outs. When faces are different colors, finish edges of doors to match space from which they are visible when door is in partly open position.
2. Finish other surfaces not specifically mentioned to match adjoining surfaces.

E. Mechanical and Electrical Items: Refer to Divisions 21, 22, 23, and Division 26 for schedule of color coding and identification banding of equipment, ductwork, piping, and conduit. Color code equipment, piping, conduit and exposed ductwork in accordance with requirements indicated.

1. Prior to finishing mechanical and electrical items, remove louvers, grilles, covers, and access panels and finish separately. Replace when dry.
2. Paint interior surfaces of ducts, and heating cabinets that are visible or reflective behind grilles and registers with one coat of flat black paint.
3. Finish dampers visible behind grilles and registers to match surface finish.
4. Paint both sides and edges of plywood equipment backboards before installing equipment.
5. Do not apply paints over name plates, tags, or other equipment identification.

F. Reinstall trim, fittings, and other items removed for finishing.

3.5 FIELD QUALITY CONTROL

A. General: Comply with requirements of Section 014000 for Quality Requirements.

1. Periodically test film thickness of each coat with wet film gage to ensure paints are being applied to proper thickness.
2. Request review of each applied coat by Architect before application of successive coats. Only reviewed coats will be considered in determining number of coats applied.
3. Immediately prior to Substantial Completion, perform detailed inspection of painted surfaces and repair or refinish abraded, stained, or otherwise disfigured surfaces.

B. Manufacturer Field Observations:

1. Manufacturer: Periodically visit site to review surface preparation and coating application procedures to ensure proper application.
2. When commencing surface preparation and application of coatings at each type of surface, obtain manufacturer's review of process. Manufacturer shall submit certification that work was observed and shall note whether proper procedures were followed in accordance with manufacturer's printed instructions. Failure to obtain certification that work was acceptably performed in accordance with manufacturer's requirements will subject the completed work to forensic testing, paid for by the Contractor.

C. Testing: Owner reserves right to employ independent testing agency to verify acceptability of substrates and conformance of paint materials to specified requirements; and to test paint quality and dry film thickness.

1. If test results show that material does not comply with specified requirements, remove non-complying paints, recoat with acceptable material, and pay costs of additional testing to ensure compliance.

3.6 CLEANING AND PROTECTION

A. Cleaning: Comply with Section 017400 for Cleaning. Promptly remove spilled, splashed, or spattered paints. Clean spots, oil, and other soiling from finished surfaces using cleaning agents and methods which will not damage materials.

1. If completed construction is damaged beyond normal cleaning or repair by painting operations, replace damaged items at no additional cost to Owner.
2. Maintain premises and storage areas free of unnecessary accumulation of tools, equipment, surplus materials, and debris.
3. Collect waste, cloths, and material which may constitute fire hazards and place in closed metal containers; remove from site daily along with empty containers.

B. Protection: Protect finished work in accordance with Section 017000.

1. Protect work of other trades against damage from paint activities. Correct damage by cleaning, repairing, replacing, and repaint as acceptable to Architect.
2. Provide "Wet Paint" signs and other methods to protect newly coated surfaces. Remove when directed or when no longer needed.
3. Refer to Material and Finish Legend on Contract Drawings.

END OF SECTION

SECTION 101400 – EXTERIOR SIGNAGE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

A. Photopolymer exterior panel signs.
   1. Male and Female Restroom signage.
   2. Signage shall meet the requirements of the Americans with Disabilities Act – 1990 Accessibility Guidelines for Buildings and Facilities and ANSI A117.1 – 1992.

1.3 RELATED SECTIONS

A. Section 042200 - Masonry

1.4 REFERENCES

A. ANSI 117.1 - For Buildings and Facilities.

B. ASTM International (ASTM):
   1. ASTM D149 - Standard Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies.
   2. ASTM D150 - Standard Test Methods for AC Loss Characteristics and Permittivity (Dielectric Constant) of Solid Electrical Insulation.
   3. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.
   4. ASTM D542 - Standard Test Method for Index of Refraction of Transparent Organic Plastics.
   5. ASTM D570 - Standard Test Method for Water Absorption of Plastics.
   6. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.
   7. ASTM D638 - Standard Test Method for Tensile Properties of Plastics.
   8. ASTM D648 - Standard Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position.
   9. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics.
   10. ASTM D696 - Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30 degrees C and 30 degrees C with a Vitreous Silica Dilatometer.
   11. ASTM D732 - Standard Test Method for Shear Strength of Plastics by Punch Tool.
   12. ASTM D785 - Standard Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials.
   13. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
   14. ASTM D792 - Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
   15. ASTM D1003 - Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics.
   16. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics.
   17. ASTM D2843 - Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics.
   18. ASTM D3418 - Standard Test Method for Transition Temperatures and Enthalpies of Fusion and Crystallization of Polymers by Differential Scanning Calorimetry.
   19. ASTM D3763 - Standard Test Method for High Speed Puncture Properties of Plastics Using Load and Displacement Sensors.
   20. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
   21. ASTM E2072-04 - Standard Specification for Photoluminescent (Phosphorescent) Safety Marketing.
   22. ASTM E2073-02 - Standard Test Method for Photopic Luminance of Photo Luminescent

(Phosphorescent) Markings.

C. Underwriters Laboratories (UL):
   1. UL 94 - Tests for Flammability of Plastic Materials for Parts in Devices and Appliances.
   2. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Shop Drawings: Detail drawings showing sizes, lettering and graphics, construction details of each type of sign and mounting details with appropriate fasteners for specific project substrates.

D. Manufacturer's Installation Instructions: Printed installation instructions for each signage system.

E. Message List: Signage report indicating signage location, text, and sign type.

F. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and available pictograms, characters, and Braille indications.

G. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and typical pictograms, characters, and Braille indications.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum two years documented experience in work of this Section.

B. Installer Qualifications: Minimum two years documented experience in work of this Section.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in unopened factory packaging.

B. Inspect materials at delivery to verify there are no defects or damage.

C. Store products in manufacturer's original packaging until ready for installation in climate controlled location away from direct sunlight.

D. Store and dispose of solvent-based materials, and materials used with solvent-based materials in accordance with requirements of local authorities having jurisdiction.

1.8 PROJECT CONDITIONS

A. Install products in an exterior salt-air, high humidity environment.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Fabricator: Nova Polymers, Inc., which is located at: 8 Evans St. Suite 201; Fairfield, NJ 07004; Toll Free Tel: 888-484-NOVA (6682); Email:request info (info@novapolymers.com); Web:https://www.novapolymers.com

B. Requests for substitutions will be considered in accordance with provisions of Section 016000 - Product Requirements.

2.2 PERFORMANCE REQUIREMENTS

A. Provide photopolymer signage that conforms to the requirements of all regulatory agencies holding jurisdiction.

B. Provide glow in the dark, photo luminescent material that complies with applicable provisions of ASTM E 2073-02 and DIN 67510. Photo luminescent material must have up to eight hours of luminance.

C. Requirements:
1. Comply with all applicable provisions of the 2010 ADA Standard for Accessible Design.
2. Character Proportion: Letters and numbers on signs must have a width-to-height ratio between 3:5 and 1:1 and a stroke width-to-height ratio between 1:5 and 1:10.
3. Color Contrast: Characters and symbols must contrast with their background - either light characters on a dark background or dark characters on a light background.
4. Raised Characters or Symbols: Letters and numbers on signs must be raised 1/32 in (0.8 mm) minimum and be sans serif characters. Raised characters or symbols must be at least 5/8 in (16 mm) high but no higher than 2 in (50 mm). Symbols or pictograms on signs must be raised 1/32 in (0.8 mm) minimum.
5. Symbols of Accessibility: Accessible facilities required to be identified must use the international symbol of accessibility.
6. Braille: Grade II with accompanying text.

D. Fire Performance Characteristics:
1. Provide photopolymer signage with surface burning characteristics that consist of a flame spread of 75 and a smoke development of 120 when tested in accordance with UL 723 (ASTM E 84).
2. Self-Extinguishing: Provide photopolymer signage with a CC1 classification for .060 in thick material when tested in accordance with the procedures in ASTM D 635, Standard Test Method for Rate of Burning and/or Extent and Time of Burning Plastics in a Horizontal Position.
3. Vertical Burn: Provide photopolymer material that is classified as 94V-2 for material .118 in thick or greater and 94HB for material .118 in thick or less when tested in accordance with UL 94, Tests for Flammability of Plastic Materials for Parts in Devices and Appliances.
4. Self-Ignition Temperature: Provide photopolymer material that has a self-ignition temperature of 800 degrees F (427 degrees C) when tested in accordance with ASTM D 1929.

E. Novacryl PETG: Polyethylene terephthalate glycol. A thermoplastic polyester with high chemical resistance, and fomability.
1. ADA Compliant.
2. NSF: Listed.
3. FDA: Conforms to food contact regulations.
4. Physical Properties:
   a. Specific Gravity per ASTM D792: 1.27.
   b. Optical Refractive Index per ASTM D542: 1.57.
   c. Light Trans - Total per ASTM D1003: 86 percent.
   d. Light Trans - Haze per ASTM D1003: 1 percent.
   e. Water Absorption by weight per ASTM D570: 0.2 percent.
5. Mechanical Properties:
   a. Tensile Strength per ASTM D638: 7,700 psi.
   b. Tensile Modulus of Elasticity per ASTM D790: 320,300 psi.
   c. Flexural Strength per ASTM D790: 11,200 psi.
   d. Flexural Modulus of Elasticity per ASTM D790: 10,000 psi.
   e. Izod Impact Strength Molded - Milled Notch per ASTM D256: 1.7 Ft-lb per inch Notch.
   f. Rockwell Hardness per ASTM D785: R-115.
   g. Drop Dart Impact per ASTM D3763: 22 ft-lbs.
   h. Shear Strength per ASTM D732: 9,000 psi.
   i. Compressive Strength per ASTM D695: 8,000 psi.
6. Thermal Properties:
   a. Deflection Temperature at 264 psi ASTM D648: 157 degrees F.
   b. Deflection Temperature at 66 psi ASTM D648: 164 degrees F.
   c. Coefficient of Thermal Expansion ASTM D696: 3.8x10 Inches per inch per degrees F.
   d. Flammability (Burning Rate) ASTM D635: 0.06 Inches per minute.
   e. Flammability UL 94: HB.
   f. Smoke Density Rating ASTM D2843: 53.8 percent.
   g. Self-Ignition Temp ASTM D1929: 880 degrees F.
   h. Flame Spread Index ASTM E84: 85.

i. Smoke Development Index ASTM D84: 450.
j. Glass Transition Temperature ASTM D3418: 178 degrees F.

7. Electrical Properties:
   a. Dielectric Constant at 1KHz ASTM D150: 2.6.
   b. Dielectric Constant at 1MHz ASTM D150: 2.4.
   c. Dielectric Strength ASTM D149: 410 Volts per mil.

2.3 SIGNAGE - GENERAL

A. It is the intent of these specifications to establish a sign standard for the Owner including but not limited to, wall-mounted restrooms, code compliant Braille signage.

B. Comply with all applicable provisions of the 2010 ADA Standard for Accessible Design codes that apply to the State and Local jurisdiction of the project.

C. Graphics are not indicated in specification or on drawings, obtain Owner's instructions as to text and graphics prior to preparation of shop drawings.

D. Typography: Copy shall be a clean and accurate reproduction of typeface(s) specified. Upper and lower case and all caps as required. Letter spacing to be set by manufacturer.

E. Arrows, symbols, and pictograms will be provided in style, sizes, colors and spacing to be selected from manufacturer’s standard signage system.

F. Braille:
   1. Grade 1 Braille.

G. Design:
   1. Text/Graphics Placement: Centered.
   2. Font: Helvetica Bold.

2.4 EXTERIOR SIGNAGE

A. Panel Material: Novacryl EX Series Photopolymer.
   1. Composition: 0.032 inch (0.8 mm) thick exterior-grade photopolymer resin bonded to 0.016 inch (0.4 mm) thick aluminum alloy base.
   2. Base thickness: 0.016 inch (0.4 mm) thick brushed aluminum alloy base.
   3. Type and Color: To be selected from manufacturer's full color range by Architect.
   4. Size: 8”x8”.

2.5 ACCESSORIES

A. Fasteners: As recommended by manufacturer for permanent mounting to specific application to ground face cmu.

2.6 FABRICATION

A. Fabricate panel material in accordance with manufacturer's instructions and approved shop drawings.

B. Fabricate signs by photo polymer process using film negatives to produce characters and graphics in contrasting color, raised..

C. Provide Braille Grade indications for each character.

D. Frames:
   1. Miter corners; fit to hairline joint.
   2. Secure frame to sign with adhesive.

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.

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.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions for permanent installation.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Replace damaged products before Substantial Completion.

END OF SECTION

SECTION 102100 - STAINLESS STEEL TOILET PARTITIONS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

A. Stainless Steel toilet compartment partitions:
1. Overhead braced.

1.3 RELATED SECTIONS

A. Section 042000 - Unit Masonry. For compartment anchorage to masonry substrates.

1.4 REFERENCES

A. ASTM International (ASTM):
1. ASTM A240 - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
2. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
3. ASTM A743/A 743M - Standard Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application.
4. ASTM B86 - Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings.
5. ASTM B221 - Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
6. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

B. International Code Council (ICC)/American National Standards Institute (ANSI):
1. ICC/ANSI A117.1 - Accessible and Usable Buildings and Facilities, as applicable to toilet compartments designated as accessible.

C. United States Department of Justice:
1. Americans with Disabilities Act (ADA):
a. Excerpt from 28CFR Part 36 - ADA Standards for Accessible Design.

D. GREENGUARD Environmental Institute (GREENGUARD):
1. GREENGUARD certified low emitting products.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data:
1. Manufacturer's data sheets on each product to be used.
2. Preparation instructions and recommendations.
3. Storage and handling requirements and recommendations.
4. Typical installation methods.
5. Maintenance and cleaning instructions.

C. Verification Samples: Two representative units of each type, size, pattern and color.
1. Size: 2 x 2 inch (52 x 52 mm) minimum, in type of finish specified.

D. Shop Drawings: Include details of materials, construction and finish. Include relationship with adjacent construction.

E. Warranty: Sample of special warranty.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Approved manufacturer listed in this section, with minimum five years experience in the manufacture of toilet compartments.
   1. Manufacturers seeking approval must submit the following in accordance with Division 01 requirements:
      a. Product data, including test data from qualified independent testing agency indicating compliance with requirements.
      b. Samples of each component of product specified.
      c. List of successful installations of similar products available for evaluation by Architect.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.

C. Installer Qualifications: Company specializing in performing Work of this section with minimum three years documented experience with projects of similar scope and complexity.

D. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

1.7 PRE-INSTALLATION CONFERENCE

A. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver toilet compartments to site until building is enclosed.

B. Deliver toilet compartments in manufacturer's original packaging.

C. Store in an upright condition. and handle in strict compliance with manufacturer's written instructions and recommendations.

D. Protect from damage due to weather, excessive temperature, and construction operations.

1.9 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 recommended limits.

1.10 WARRANTY

A. Special Manufacturer's Warranty: Manufacturer's form in which manufacturer agrees to repair or replace products that fail in materials or workmanship during the following period after substantial completion:
   1. Stainless Toilet Partitions: Against rust-out: 15 years.
      a. Stainless Steel Hardware: Lifetime.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Bradley Corp., which is located at: W142 N9101 Fountain Blvd.; Menomonee Falls, WI 53051; Toll Free Tel: 800-BRADLEY; Tel: 262-251-6000; Fax: 262-251-5817

B. Substitutions: Requests for substitutions will be considered in accordance with provisions of Section 016000.

2.2 PERFORMANCE REQUIREMENTS

A. Accessibility Requirements: Comply with requirements of ICC/ANSI 117.1, and with requirements of authorities having jurisdiction.

B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Stainless Steel Partitions:
      a. Flame-Spread Index: 0.
      b. Smoke-Developed Index: 0.

C. Indoor Environmental Quality Certification: Certificate indicating products have been certified under the following programs, or a comparable certification acceptable to Owner:
   1. GREENGUARD Indoor Air Quality Certified.
   2. GREENGUARD Certified for Children and Schools.

2.3 STAINLESS STEEL

A. Materials:
   1. Stainless Steel Sheet: A 666, 300 series commercial stainless steel sheet suitable for exposed applications. Smooth material, without creases or ripples, Finish: No. 4.
   2. Stainless Steel Castings: ASTM A 743/A 743M.
   3. Zinc Aluminum Magnesium and Copper Alloy (Zamac): ASTM B 86.
   4. Aluminum: ASTM B 221/B 221M.

B. Toilet Compartment Partitions:
   1. Overhead Braced Basis of Design: Bradley, Mills Partitions, Sentinel, Series 400.

C. General Construction: Door, Panel, and Pilaster.
   1. Form edges with interlock. Watertight fit without crown molding. Braze corners and finish smooth.
      a. Exposed Surfaces: No pitting, visible seams, fabrication marks, stains, telegraphing of core material, or other imperfections.
      b. Core Material: Manufacturer's sound-deadening, water resistant honeycomb in thickness required to provide finished thickness for doors, panels and pilasters.

D. Door Construction: 1 inch (25 mm) thick.
   1. Stainless Steel Sheet: 22 gage, 0.0313 inch (0.794 mm) stainless steel.
   2. Internal Welded Reinforcements: At top and bottom hinge locations; 16 gage, 0.0625 inch (1.59 mm) and 14 gage, 0.0781 inch (1.98 mm).
   3. Concealed True Gravity Cam Hinges: Factory installed.
   4. Pre-punched hole permitting field installation of ADA-compliant concealed slide latch.

E. Panel Construction: 1 inch (25 mm) thick.
   1. Stainless Steel Sheet: 22 gage, 0.0313 inch (0.794 mm) stainless steel.
   2. Grab-Bar Reinforcement: Concealed internal reinforcement for grab bars mounted on units.

F. Pilaster Construction: 1 1/4 inch (32 mm) thick.
   1. Stainless Steel Sheet: 20 gage, 0.0375 inch (0.953 mm).
   2. Stainless Steel Sheet: 18 gage, 0.048 inch (1.219 mm).
   3. Pilaster with internally welded bracket suitable to accept a 3 inch (76 mm) long, 5/16 inch (8 mm) stainless steel hex bolt for leveling.

G. Headrail: Extruded anodized aluminum headrail with anti-grip profile. Fasteners for attachment to pilaster and stainless steel brackets to secure to wall.

H. Shoes: Height: 4 inches (102 mm) minimum. Material: 304 stainless steel. Finish: No. 4 satin brushed. Secured to Floor: Tamper-resistant screws.

I. Brackets aka. Fittings:
   1. Full-Height, Continuous Type: Manufacturer's design; stainless steel.

J. Hardware:
1. Heavy Duty: Manufacturer's heavy-duty stainless steel castings, including stainless steel tamper-resistant fasteners:
a. Adjustable Self-Closing Hinges: Holds doors open any angle up to 90 degrees. Emergency Access: Lift door. Mount with stainless steel through-bolts.
1) Wrap-around gravity-type.
2) Continuous spring-loaded type.
b. Latch and Keeper: Emergency access provisions meeting accessibility requirements at accessible compartments.
1) Latch Type: Surface-mounted slide.
2) Door Strike and Keeper Combination, Rubber-Faced: Flat.
c. Coat Hook: Combination hook and rubber-tipped stop, sized to prevent door from hitting compartment-mounted accessories. Formed L-shaped hook without stop at outswing doors.
d. Wall Bumper: Where door abuts wall.
e. Door Pull: Standard unit on outside of inswing doors. Pulls on both sides of outswing doors.

K. Fabrication:
1. Overhead-Braced Units: Manufacturer's corrosion-resistant supports, leveling mechanism, and anchors
2. Door Size and Swings: Unless otherwise indicated;
a. In-Swinging Doors for Standard Toilet Compartments: 26 inch (660 mm) wide.
b. Out-swinging doors with 36 inch (813 mm) wide minimum clear opening for compartments designated as accessible.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine work area to verify that measurements, substrates, supports, and environmental conditions are in accordance with manufacturer's requirements to allow installation.

B. Do not begin installation until substrates have been properly constructed and prepared. To manufacturer's requirements.

C. If substrate preparation is the responsibility of another installer, notify Architect in writing 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.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

B. Clearances: Install with clearances indicated on Drawings. Where clearances are not indicated, allow maximum 1/2 inch (13 mm) between pilasters and panels, and 1 inch (25 mm) between panels and walls.

3.4 ADJUSTING

A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation.
1. In-Swing Doors: Set hinges to hold doors open approximately 15 degrees from closed position when unlatched.
2. Out-Swing Doors: Set hinges to return doors to fully closed position.
3. Privacy Screen Doors: Set hinges to return doors to fully closed position.

3.5 FIELD QUALITY CONTROL

A. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

B. Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01.

3.6 CLEANING AND PROTECTION

A. Remove packaging and construction debris and legally dispose of offsite.

B. Clean partition and screen surfaces with materials and cleansers in accordance with manufacturer's recommendations.

C. Replace damaged products before Substantial Completion.

END OF SECTION

SECTION 102800 - TOILET ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Toilet accessories.

1.3 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual compo- nents and profiles, and finishes.
2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Include electrical characteristics.

B. Samples: Full size, for each exposed product and for each finish specified.

1. Approved full-size Samples will be returned and used in the Work.

C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.
2. Identify accessories using designations indicated.

1.5 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For accessories to include in maintenance manuals.

1.7 WARRANTY

A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, visible silver spoilage defects.
2. Warranty Period: 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 OWNER-FURNISHED MATERIALS

A. Owner-Furnished Materials: As indicated. Coordinate with owner.

2.2 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.3 TOILET ACCESSORIES

A. Source Limitations: Obtain accessories from single source from single manufacturer.

B. Basis of Design: As scheduled on Toilet Accessories Schedule in the Drawings.

C. Other Acceptable Manufacturers:

1. Bobrick Washroom Equipment, Inc., Clifton Park, NY 12065.
2. A&J Washroom Accessories, New Windsor, NY 12553.
3. American Specialties, Inc., Yonkers, NY 10701.
4. Bradley Corporation, Milwaukee, WI 53223.
5. Accepted Substitute in accordance with Section 016000 for Substitution Procedures.

2.4 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.

B. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.

C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch minimum nominal thickness.

D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.

E. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

H. Sanitary Sealant: One part silicone, FS-TT-S-001543, FDA Regulation 21 CFR177.2600, and FDA Food Additive Regulation 121.2514.

1. Color: White.
2. Acceptable Products:
   a. No. 786 Silicone Rubber Sealant, Dow Corning.
   b. SCS1700, General Electric.

2.5 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load of at least 500 lbf, when tested according to ASTM F 446.

1. At CMU Partitions: Fasten with expansion anchors to grouted CMU cells.
2. Performance Requirements:
   a. Grab Bars: Install to support 500 pound hanging load placed at any point along bar length.
   b. Comply with ADA requirements.
   c. Mount as shown.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION 102800

SECTION 104413 - FIRE EXTINGUISHERS AND CABINETS

PART 1 - - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Related Requirements: Comply with following:

1. Metal Finishes: Section 050510.

1.3 DEFINITIONS

A. Where indicated on Drawings, abbreviation FEC defines fire extinguisher and cabinet and abbreviation FE is for fire extinguisher without cabinet.

1.4 SUBMITTALS

A. General: Submit in accordance with Section 013300.

B. Product Data: Furnish manufacturer's descriptive literature.

1. Include physical dimensions, operational features, color and finish, anchorage details, material descriptions, and type of hardware.

C. Shop Drawings: Include rough-in measurements, locations, and details for cabinets.

D. Samples: Submit sample of manufacturer's standard finish and color on actual base metal.

E. Informational Submittals: Submit following packaged separately from other submittals:

1. Certifications: Comply with Quality Assurance requirements.
2. Manufacturer's Instructions: Installation instructions for fire extinguisher cabinets.

1.5 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain products in this Section from one manufacturer.

B. Certifications: Submit certification of following:

1. Extinguishers: UL listed and bear UL rating for type and classification or conform to NFPA-10 requirements for extinguishers.

1.5 PROJECT CONDITIONS

A. Environmental Requirements: Do not store products subject to freeze damage in environments where damage could occur.

PART 2 - - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers, Fire Extinguisher Cabinets:
1. JL Industries, Bloomington, MN 55435.

2. Larsen's Manufacturing Co., Fridley, MN 55432.
3. Potter Roemer, Santa Ana, CA 92704.
4. Accepted Substitute in accordance with Section 012500.

2.2 FIRE EXTINGUISHERS

A. Fire Extinguisher Type 4A:60B:C: Multi-purpose Dry Chemical Type (Siliconized Mono Ammonium Phosphate) with Pressure Gage.

1. Capacity: 10.0 pounds.
2. UL Rating: 4A-60B:C.
3. Acceptable Product: MP10, Larsen's.

2.3 CABINETS

A. Fire Extinguisher Cabinet: Formed sheet metal 20 gage or 0.040 inch.

1. Semi -Recessed type.
2. Size to accommodate fire extinguisher and accessories.
3. Basis of Design: Fire FX2, JL Industries.

B. Cabinet Components:

1. Trim: Flat, face, stainless steel .
2. Door: Stainless steel.
   a. Thickness: 20 gage or 0.040 inch minimum, reinforced for flatness and rigidity.
   b. Latch: Lever handle with cam latch.
   c. Door Style: Vertical view panel.
   d. Glass: 1/8 inch thick tempered glass.

3. Mounting Hardware: Appropriate to cabinet.
4. Graphic Identification: Individual, die-cut, press-on letters.

2.4 ACCESSORIES

A. Fire Extinguisher Brackets: Similar to Larsen's B series or Potter-Roemer 3900 full length wall brackets, size as required for cylinder used.

2.5 FABRICATION

A. Form body of cabinet with tight inside corners and seams.

1. Predrill holes for anchorage.
2. Form perimeter trim and door stiles by welding, filling, and grinding smooth.
3. Hinge doors for 180 degree opening with continuous piano hinge. Provide lever handle with cam latch.
4. Glaze doors using manufacturers™ standard methods.

2.6 FINISHES

A. Cabinet Door and Trim: UNS S30400 Stainless Steel: Finish: In accordance with Section 050510.

PART 3 - - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with Work in accordance with Section 017300.

1. Verify rough openings for cabinets are correctly sized and located.

3.2 INSTALLATION

A. Fire Extinguishers and Cabinets: Install in accordance with Section 017300 and manufacturer's printed instructions.

1. Cabinets: Install plumb and level in wall openings 48 inches from finish floor to door handle of cabinets at locations indicated on Drawings.

B. Securely attach cabinets and mounting brackets in place CMU walls.

C. Identification: Identify Fire Extinguisher Locations with Following Methods:

1. Fire Extinguisher Locations Without Cabinets: Use vertical decal spelling FIRE EXTINGUISHER applied to adjacent wall surface.
2. Fire Extinguisher Cabinet Locations: Use individual press-on letters, in vertical format, of contrasting color to cabinet, spelling FIRE EXTINGUISHER.

END OF SECTION

SECTION 107516 - GROUND-SET FLAGPOLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes ground-set flagpoles made from aluminum with finial supported flag down lighting.

B. Owner-Furnished Material: Flags.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, operating characteristics, fittings, accessories, and finishes for flagpoles and down lighting.

B. Shop Drawings: For flagpoles.

1. Include plans, elevations, and attachment details. Show general arrangement, jointing, fittings, accessories, grounding, anchoring, and support.
2. Include section, and details of foundation system.

C. Samples for Verification: For each type of exposed finish, in manufacturer's standard sizes.

D. Delegated-Design Submittal: For flagpoles.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For flagpoles and down lighting to include in operation and maintenance manuals.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Spiral wrap flagpoles with heavy paper and enclose in a hard fiber tube or other protective container.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Flagpole assemblies, including anchorages and supports, shall withstand design loads indicated within limits and under conditions indicated.

1. Wind Loads: Determine according to NAAMM FP 1001. Basic wind speed for Project location is 134 MPH, 3 second gusts at 33 feet above ground.
2. Base flagpole design on polyester flags of maximum standard size suitable for use with flagpole or flag size indicated, whichever is more stringent.

2.2 MANUFACTURERS

A. Source Limitations: Obtain flagpoles as complete units, including fittings, accessories, bases, and anchorage devices, from single source from single manufacturer.

B. Basis-of-Design Products: Subject to compliance with requirements, provide specified products, or an approved comparable product by the following:

1. The Flagpole Warehouse; 3600 Cantrell Industrial Ct., Acworth, GA 30101. ASD. Toll Free Tel: (800) 962-0956. Fax (770)-974-4560. Email: flagpoles@flagco.com . Web: www.flagpolewarehouse.com.

2.3 ALUMINUM FLAGPOLES

A. Aluminum Flagpoles: Cone-tapered flagpoles fabricated from seamless extruded tubing complying with ASTM B 241/B 241M, Alloy 6063, with a minimum wall thickness of 1/4 inch.

B. Basis-of-Design Product: The Flagpole Warehouse, "Illuminator Hurricane Series", Model ILHIH30V (www.flagpolewarehouse.com)

1. Exposed Height: 30 feet
2. Overall Length: 33 feet
3. Diameter: 6 inch base and 3.5 inch top
4. Wall Thickness: 0.250 inch
5. Wind Speed: 170 mph flagged
6. Mounting Device: ground sleeve.

2.4 FLAGPOLE LIGHT

A. Down-Lit design that allows the flag to be illuminated with a one-piece flagpole finial and light combination.

B. Basis-of-Design Product: The Flagpole Warehouse, "Item # ORN-750020 / FPB-IH-6.5-D-120V" (www.flagpolewarehouse.com)

1. LED 6-Watt bulb, MR-16, 25,000 hours, 110-volt, white.
2. Revolves full 359 degrees.
3. Internal Halyard: M-Winch system
4. 40 foot, electrical wire, 18/3 (pulley) for external halyard.

2.5 FITTINGS

A. Internal Halyard, Winch System: Manually operated winch with control stop device and removable handle, stainless-steel cable halyard, and concealed revolving truck assembly with plastic-coated counterweight and sling. Furnish flush access door secured with cylinder lock. Finish truck assembly to match flagpole.

1. Halyard Flag Snaps: Stainless-steel swivel snap hooks with neoprene or vinyl covers. Furnish two per halyard.
2. Plastic Halyard Flag Clips: Made from injection-molded, UV-stabilized, acetal resin (Delrin). Clips attach to flag and have two eyes for inserting both runs of halyards. Furnish two per halyard.

2.6 MISCELLANEOUS MATERIALS

A. Drainage Material: Crushed stone, or crushed or uncrushed gravel; coarse aggregate.

B. Sand: ASTM C 33/C 33M, fine aggregate.

C. Elastomeric Joint Sealant: Multicomponent nonsag urethane joint sealant complying with requirements in Section 079200 "Joint Sealants."

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

2.7 ALUMINUM FINISHES

A. Directional Sanded Satin Finish: fine, directional, medium satin polish; buff complying with AA-M20; seal aluminum surfaces with clear, hard-coat wax.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare uncoated metal flagpoles that are set in foundation tubes by painting below-grade portions with a heavy coat of bituminous paint.

B. Foundation Excavation: Excavate to neat clean lines in undisturbed soil. Remove loose soil and foreign matter from excavation and moisten earth before placing concrete. Place and compact drainage material at excavation bottom.

C. Provide forms where required due to unstable soil conditions and for perimeter of flagpole base at grade. Secure and brace forms to prevent displacement during concreting.

D. Foundation Tube: Place foundation tube, center, and brace to prevent displacement during concreting. Place concrete. Plumb and level foundation tube and allow concrete to cure.

E. Sleeves: Locate and secure sleeves in forms by bracing to reinforcement and forms.

F. Place concrete, as specified in Section 033000 "Cast-in-Place Concrete." Compact concrete in place by using vibrators. Moist-cure exposed concrete for no fewer than seven days or use nonstaining curing compound.

G. Trowel exposed concrete surfaces to a smooth, dense finish, free of trowel marks, and uniform in texture and appearance. Provide positive slope for water runoff to perimeter of concrete base.

3.2 FLAGPOLE INSTALLATION

A. General: Install flagpoles where indicated and according to Shop Drawings and manufacturer's written instructions.

B. Foundation Tube: Place flagpole in tube, seated on bottom plate between steel centering wedges, and install hardwood wedges to secure flagpole in place. Place and compact sand in foundation tube and remove hardwood wedges. Seal top of foundation tube with a 2-inch layer of elastomeric joint sealant and cover with flashing collar.

END OF SECTION 107516

SECTION 123613 - PRECAST CONCRETE COUNTERTOPS

PART 1: GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes:
1. Templating, fabrication and installation of precast concrete countertops.

1.3 SUBMITTALS

A. Shop Drawings: Indicate profiles of members, jointing, fastening, cut-outs for mechanical services, sinks, accessories, backsplashes, thickness, and related items.

B. Samples: Submit following:
1. 4 inch by 4 inch samples of concrete with appropriate finish and color for acceptance before proceedingwith Work. Indicate maximum range of variation.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Conform to ANSI A117.1 or local code if more stringent requirements are applicable for installing work for accessibility to handicapped.

B. Manufacturer Qualifications: Company specializing in fabricating work specified in this Section with minimum fouryears experience in type work required for Project.

C. Concrete fully engineered to comply with appropriate ACI 318 guidelines.

1.5 DELICVERY, STORAGE AND HANDLING

A. If units are shipped via commercial freight, open crates and inspect each slab in the presence of the driver. Note any and all damage, and do not accept shipment if damage is present. Claims due to shipping damage must be submitted to the freight carrier.

B. Handle, transport and store units to prevent damage to materials or structure. Handle with care to prevent damage to corners and edges.

1.6 SITE CONDITIONS

A. Templating
1. All cabinets, millwork or other supporting structures must be fully installed prior to templating, unless otherwise arranged with manufacturer.
2. All cabinets, millwork or other supporting structures must be free of debris or obstructions.
3. All fixtures that penetrate the concrete, such as sinks, faucets, drop-in cook tops, soap dispensers, etc.,must be on site at the time of templating.
4. Electricity must be available on site, with outlets or extension cords, and running water must be available in proximity of area to be templated.

B. Installation
1. Installer's vehicle must be able to park within 10 yards of installation area's key point of entry.
2. Pathway to installation area must be free of debris or obstructions and accessible to two to three

personnel carrying slabs weighing up to 350 pounds and up to eight feet in length.

3. All cabinets, millwork or other supporting structures must be free of debris or obstructions.
4. Electricity must be available on site, with outlets or extension cords within 25 yards of installation area.
5. Running water must be available on site within 100 yards of the installation area.

1.7 SEQUENCING

A. Templating

1. All cabinets, millwork or other supporting structures must be fully installed prior to templating, unless otherwise arranged with manufacturer.
2. All fixtures that penetrate the concrete, such as sinks, faucets, drop-in cook tops, soap dispensers, etc., must be on site at the time of templating. Manufacturer does not supply fixtures. Manufacturer may takecustody of some or all of the fixtures at his discretion.

B. Installation

1. All support brackets, hard point connections, etc., must be on site at the time of installation.Manufacturer does not supply these items.
2. Electrical and plumbing hookup should be scheduled after installation is completed. Manufacturer does not perform electrical and plumbing hookup.

1.8 WARRANTY

A. Manufacturer must offer at least a one-year structural warranty as follows: During the first year after installation, manufacturer, at its sole option, shall repair or replace product if it fails to maintain functional structural integrity for the intended purpose of the product solely due to a manufacturing defect. This applies only to products that have been handled, fabricated, installed and maintained in the manner recommended by the manufacturer. Hairline cracks, surface scratches and chips are not included as part of this warranty, nor is structural damage caused by severe impacts, physical overloading or damage stemming from loss of support and/or excessive deflections by the supporting cabinetry or hardware. Individual slabs are designed to safely support a maximum 300 lb. point load centered on the slab.

B. Manufacturer must offer at least a one-year coating/sealer warranty as follows: During the first year after installation, manufacturer, at its sole option, shall repair or replace sealer if it fails to maintain functional integrity for the intended purpose of the product solely due to a manufacturing defect. General food preparation will not stain the concrete as long as spills are wiped up promptly. This warranty does not cover damage to the sealer resulting from impacts, cuts, scrapes or damage by harsh chemicals or intense heat. Prolonged exposure to acids and acidic food items may cause etching. Spills should be removed as soon as possible; however, the resistance to oils, alcohol and normal food items is very good. The sealer used is resistant to hot objects up to 450 degrees Fahrenheit. Above this temperature, the sealer may become damaged. Repeated placement of objects over 450 degrees Fahrenheit should be avoided. Cutting directly on the countertop or exposure to open flame voids the warranty.

1.9 MAINTENANCE

A. Variations in texture, dimension, color and aggregate distribution and exposure within a final product are an inherent property of concrete countertops. Hairline cracks that may occur in the finished product are a natural characteristic of concrete. Minor non-structural hairline cracks or crazing may result from shrinkage or substrate movement and shall not be considered a manufacturing defect. All units are sealed to resist moisture and staining. As with natural materials, samples of any material may not accurately represent installed material. All sizes are nominal and slight variations in thickness are to be expected.

B. Use common normal care with respect to oil, acids, and food. Spills should be wiped up as soon as possible. Clean using damp cloth or sponge and only with mild, non-surfactant neutral-pH cleaners. Manufacturer recommends StoneTech's Revitalizer cleanser. Do not use harsh cleansers or chemicals, or abrasive cleansers or scrubbers. These include Comet, Brillo pads and 3M scrubbing pads, and all similar products.

C. Staining can occur if staining agents are left on for more than a few minutes. Exposure to acids and acidic food items may cause etching.

D. With normal use and care, the factory-applied sealer should provide 3 to 5 years of protection before requiring reapplication. Reapplication is a simple process that can be performed on site by maintenance personnel. The sealer used is highly heat resistant, but discoloration and physical damage may occur with very hot items (greater than 450 degrees F) or open flame. Discoloration or damage may occur to any wax applied to the countertops. Wax shall not be applied to countertops sealed as specified.

PART 2: PRODUCTS

2.1 MANUFACTURERS

A. The following manufacturer is acceptable.
Trueform Concrete, LLC
105 W. Dewey Avenue
Suite 509
Wharton, NJ 07885
(888) 392-3620
makers@trueformconcrete.com

B. Substitutions: Requests for substitutions will be considered in accordance with provisions of Section 016000.

2.2 MATERIAL

A. GFRC Precast Concrete Countertop
1. All units to be structurally engineered and custom made using a precast, custom-blended, structurally reinforced GFRC Portland cement based concrete.
2. Density: approx. 140 lbs. per cubic foot. Weight per unit area: 14lbs/sq. ft. for 1.75" thick slabs.
3. Standard Thickness: 3” nominal.
4. Standard Edge: eased radius and corners.
5. Color: Various shades, hues and tones using integral pigment. Options: Custom colors and premium colors with embedded glass, stones or other items.
6. Standard Maximum Seamless Casting: approximately 8 ft. L for standard depth countertops (25”). Options: Custom sizes and shapes as specified in shop drawings.
7. Backsplashes: Length matched to slab section. Max 96" L x 6” height. Height, length and thickness will affect maximum length. Backsplashes are cast separate from the countertops.
8. Sealer: All units to be factory sealed with a high performance topical sealer, 3 coats, industrial-grade topical sealer. This sealer must exhibit the following properties:
   a. Safe for food contact surfaces.
   b. Colorless.
   c. Suitable for interior use
   d. Water repellent
   e. Non-yellowing (UV resistant).
   f. Scratch resistant.
   g. Peel, chip and flake resistant
   h. Highly heat resistant.
   i. Stain resistant to food and oil when wiped up immediately.
   j. Long lasting.
   k. Environmentally safe.
   l. Simple and quick reapplication only when necessary.
   m. Cracks: Non-structural hairline cracks are possible and may result from shrinkage or substrate movement over time. These are not covered under standard warranty.

B. Joint Sealant
1. Supplied by manufacturer.
2. Colors: Matched to countertop or 100% clear silicone unless otherwise requested.
3. Acceptable products:
   a. Accucolor TA-850 sanded, siliconized acrylic caulk by TEC Specialty Products, Inc., Palatine, IL., or equivalent

C. Adhesive
1. Supplied by installer.
2. Countertop: Clear 100% silicone caulk.
a. GE Silicone I Kitchen & Bath or equivalent.
3. Backsplashes: Clear 100% silicone caulk.
a. GE Silicone I Kitchen & Bath or equivalent.

2.3 FABRICATION

A. All units to be custom made in manufacturer's manufacturing shop. Options: Delivery and installation; availability varies by location.

B. All units to be structurally reinforced to accommodate appropriate spans, cutouts and cantilevers. Slabs must be handled and moved while in a vertical orientation, similar to the technique used for handling plate glass.

C. All units to be fabricated straight, smooth, and true to size and shape prior to finishing. Exposed edges to be finished as per edge specifications. Maximum dimensional variations: +0", - 1/4" at maximum slab length; typical variations are usually half of the maximum or less.

D. All units to be fabricated to accommodate specified appliances (i.e. sinks, cook tops, faucets, etc.). No cutting is done in the field.

E. All units to be hand finished prior to sealing. Hand finishing includes first grinding the surface, then filling voids and honeycomb with colored grout, easing all edges (where appropriate), and leveling and polishing.

F. Units to be air dried and sealed.

G. Countertops will not be ready for delivery or installation until steps A through F have been completed to manufacturer's satisfaction.

2.4 FINISHES

A. All units to be factory sealed with sealer that meets requirements in Article 2.02 (A) 8.

PART 3: EXECUTION

3.1 TEMPLATING

A. Manufacturer performs templating, or, manufacturer provides detailed templating instructions to contractor, and contractor provides templates to manufacturer.

3.2 INSTALLATION

A. Manufacturer performs installation, or, manufacturer provides detailed installation instructions to contractor, and contractor performs installation.

3.3 CLEANING

A. General:
1. Keep installed work clean as work progresses.
2. Wipe up spills as soon as possible. Clean using damp cloth or sponge and mild, non-surfactant, neutral pH detergent or other water-based cleansers, as recommended by manufacturer. Do not use harsh chemicals, abrasive cleansers or abrasive scrubbers.

END OF SECTION

SECTION 220529 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES
- A. Support and attachment components.

1.2 REFERENCE STANDARDS
- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- C. ASTM A181/A181M - Standard Specification for Carbon Steel Forgings, for General - Purpose Piping 2014 (Reapproved 2020).
- D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- E. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings 1999, with Editorial Revision (2018).
- F. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates 2018.
- G. ASTM A395/A395M - Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures 1999 (Reapproved 2018).
- H. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel 2019.
- I. FM (AG) - FM Approval Guide current edition.
- J. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation 2018.
- K. UL (DIR) - Online Certifications Directory Current Edition.

PART 2 – PRODUCTS

2.1 SUPPORT AND ATTACHMENT COMPONENTS
- A. General Requirements:
  - 1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of plumbing work.
  - 2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
  - 3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported. Include consideration for vibration, equipment operation, and shock loads where applicable.
  - 4. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
    - a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
    - b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel, or approved equivalent unless otherwise indicated.
    - c. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
    - d. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Hanger Rods:
  - 1. Threaded zinc-plated steel unless otherwise indicated.
  - 2. Minimum Size, Unless Otherwise Indicated or Required:
    - a. Equipment Supports: 1/2 inch (13 mm, DN) diameter.
    - b. Piping up to 1 inch (25 mm, DN): 1/4 inch (6 mm, DN) diameter.
    - c. Piping larger than 1 inch (25 mm, DN): 3/8 inch (10 mm, DN) diameter.
- C. Pipe Supports:

1. Material: ASTM A395/A395M ductile iron, ASTM A36/A36M carbon steel, ASTM A47/A47M malleable iron, ASTM A181/A181M forged steel, or ASTM A283/A283M steel.
2. Liquid Temperatures Up To 122 degrees F (50 degrees C):
    a. Overhead Support: MSS SP-58 Types 1, 3 through 12 clamps.
    b. Support From Below: MSS SP-58 Types 35 through 38.

D. Pipe Hangers:
1. Hangers:
    a. Provide hinged split ring and yoke roller hanger with epoxy copper or plain finish.
    b. Material: ASTM A47/A47M malleable iron or ASTM A36/A36M carbon steel.
    c. Provide hanger rod and nuts of the same type and material for a given pipe run.
    d. Provide coated or plated hangers to isolate steel hangers from dissimilar metal tube or pipe.
2. Swivel Ring Hangers, Adjustable:
    a. MSS SP-58 Type 10, epoxy-painted, zinc-colored.
    b. Material: ASTM A395/A395M ductile iron, ASTM A36/A36M carbon steel, ASTM A47/A47M malleable iron, ASTM A181/A181M forged steel, or ASTM A283/A283M steel.
    c. FM (AG) and UL (DIR) listed for specific pipe size runs and loads.
3. Clevis Hangers, Adjustable:
    a. Copper Tube: MSS SP-58 Type 1, epoxy-plated copper.
    b. Light-Duty: MSS SP-58 Type 1, zinc-colored, epoxy plated.
    c. Standard-Duty: MSS SP-58 Type 1, zinc-colored, epoxy plated.

E. Dielectric Barriers: Provide between metallic supports and metallic piping and associated items of dissimilar type; acceptable dielectric barriers include rubber or plastic sheets or coatings attached securely to pipe or item.

F. Anchors and Fasteners:
1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.
B. Verify that mounting surfaces are ready to receive support and attachment components.
C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

D. Install products in accordance with manufacturer's instructions.
E. Provide independent support from building structure. Do not provide support from piping, ductwork, conduit, or other systems.
F. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
G. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
H. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
I. Equipment Support and Attachment:
1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.

J. Secure fasteners according to manufacturer's recommended torque settings.

K. Remove temporary supports.

END OF SECTION

SECTION 220719 – PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

A. Section 078400 - Firestopping.

1.2 REFERENCE STANDARDS

B. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus 2019.

C. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation 2019.

D. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel 2008 (Reapproved 2018).

E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.

F. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.

G. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

PART 2 - PRODUCTS

2.1 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.2 GLASS FIBER INSULATION

A. Manufacturers:
   1. CertainTeed Corporation: www.certainteed.com/#sle.
   2. Johns Manville Corporation: www.jm.com/#sle.
   3. Owens Corning Corporation; Fiberglas Pipe Insulation ASJ: www.ocbuildingspec.com/#sle.

B. Insulation: ASTM C547 and ASTM C795; semi-rigid, noncombustible, end grain adhered to jacket.
   1. K (Ksi) Value: ASTM C177, 0.24 at 75 degrees F (0.035 at 24 degrees C).
   2. Maximum Service Temperature: 650 degrees F (343 degrees C).
   3. Maximum Moisture Absorption: 0.2 percent by volume.

C. Vapor Barrier Jacket: White Kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm inch (0.029 ng/(Pa s m)).

D. Vapor Barrier Lap Adhesive: Compatible with insulation.

2.3 JACKETING AND ACCESSORIES

A. ABS Plastic:
   1. Jacket: One piece molded type fitting covers and sheet material, off-white color.
      a. Minimum Service Temperature: Minus 40 degrees F (Minus 40 degrees C).
      b. Maximum Service Temperature: 180 degrees F (82 degrees C).
      c. Moisture Vapor Permeability: 0.012 perm inch (0.018 ng/(Pa s m)), when tested in accordance with ASTM E96/E96M.
      d. Thickness: 30 mil, 0.03 inch (0.75 mm).
      e. Connections: Brush on welding adhesive.

B. Canvas Jacket: UL listed 6 oz/sq yd (220 g/sq m) plain weave cotton fabric treated with dilute fire-retardant lagging adhesive.

C. Aluminum Jacket:
   1. Thickness: 0.016 inch (0.40 mm) sheet.
   2. Finish: Smooth.
   3. Joining: Longitudinal slip joints and 2 inch (50 mm) laps.

4. Fittings: 0.016 inch (0.40 mm) thick die-shaped fitting covers with factory-attached protective liner.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that piping has been tested before applying insulation materials.

B. Verify that surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with North American Insulation Manufacturers Association (NAIMA) National Insulation Standards.

C. Glass fiber insulated pipes conveying fluids below ambient temperature:
   1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
   2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.

D. Glass fiber insulated pipes conveying fluids above ambient temperature:
   1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples.
   2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.

E. Inserts and Shields:
   1. Application: Piping 1-1/2 inches (40 mm) diameter or larger.
   2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
   3. Insert Location: Between support shield and piping and under the finish jacket.

F. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions.

G. Exterior Applications: Provide vapor barrier jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor barrier cement. Cover with aluminum jacket with seams located on bottom side of horizontal piping.

3.3 SCHEDULES

A. Plumbing Systems:
   1. Domestic Hot Water Supply:
      a. Glass Fiber Insulation:
         1) Pipe Size Range:: 2" and less
         2) Thickness: [2"] inch ([_____] mm).
   2. Domestic Hot Water Recirculation:
      a. Glass Fiber Insulation:
         1) Pipe Size Range: All sizes.
         2) Thickness: 1 inch (25 mm).
   3. Domestic Cold Water:

END OF SECTION

SECTION 221005 – PLUMBING PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Sanitary waste piping, buried within 5 feet (1500 mm) of building.
B. Sanitary waste piping, above grade.
C. Domestic water piping, buried within 5 feet (1500 mm) of building.
D. Domestic water piping, above grade.
E. Pipe flanges, unions, and couplings.
F. Pipe hangers and supports.
G. Ball valves.
H. Pressure relief valves.

1.2 RELATED REQUIREMENTS

A. Section 220553 - Identification for Plumbing Piping and Equipment.

1.3 REFERENCE STANDARDS

A. ANSI Z21.22 - American National Standard for Relief Valves for Hot Water Supply Systems 2015 (Reaffirmed 2020).
B. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings 2018.
C. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings 2018.
D. ASME B31.9 - Building Services Piping 2020.
E. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings 1999, with Editorial Revision (2018).
F. ASTM B32 - Standard Specification for Solder Metal 2020.
G. ASTM B42 - Standard Specification for Seamless Copper Pipe, Standard Sizes 2020.
H. ASTM B88 - Standard Specification for Seamless Copper Water Tube 2020.
I. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric) 2020.
J. ASTM B813 - Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube 2016.
K. ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings 2016.
L. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems 2020.
M. ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings 2020.
N. ASTM D2855 - Standard Practice for the Two-Step (Primer & Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets 2020.
O. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings 2016.
P. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
Q. AWWA C606 - Grooved and Shouldered Joints 2015.
R. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation 2018.
S. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends 2010.

T. NSF 61 - Drinking Water System Components - Health Effects 2020.

U. NSF 372 - Drinking Water System Components - Lead Content 2020.

V. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

1.4 SUBMITTALS

W. See Section 013000 - Administrative Requirements for submittal procedures.

X. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

1.5 QUALITY ASSURANCE

Y. Perform work in accordance with applicable codes.

Z. Valves: Manufacturer's name and pressure rating marked on valve body.

AA. Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.

BB.

1.6 DELIVERY, STORAGE, AND HANDLING

CC. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

DD. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

B. Plenum-Installed Acid Waste Piping: Flame-spread index equal or below 25 and smoke- spread index equal or below 50 according to ASTM E84 or UL 723 tests.

2.2 SANITARY WASTE PIPING, BURIED WITHIN 5 FEET (1500 MM) OF BUILDING

A. PVC Pipe: ASTM D2665 or ASTM D3034.
   1. Fittings: PVC.
   2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.3 SANITARY WASTE PIPING, ABOVE GRADE

A. PVC Pipe: ASTM D2665.
   1. Fittings: PVC.
   2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.4 DOMESTIC WATER PIPING, BURIED WITHIN 5 FEET (1500 MM) OF BUILDING

A. Copper Pipe: ASTM B42, hard drawn.
   1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22 wrought copper and bronze.
   2. Joints: ASTM B32, alloy Sn95 solder.

2.5 DOMESTIC WATER PIPING, ABOVE GRADE

A. Copper Tube: ASTM B88 (ASTM B88M), Type K (A), Drawn (H).
   1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
   2. Joints: ASTM B32, alloy Sn95 solder.

2.6 PIPE FLANGES, UNIONS, AND COUPLINGS

A. Unions for Pipe Sizes 3 inch (80 mm, DN) and Under:
   1. Copper Tube and Pipe: Class 150 bronze unions with soldered joints.

B. Flanges for Pipe Sizes Over 1 inch (25 mm, DN):
   1. Copper Tube and Pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.

C. Mechanical Couplings for Grooved and Shouldered Joints: Two or more curved housing segments with continuous key to engage pipe groove, circular C-profile gasket, and bolts to secure and compress gasket.
   1. Dimensions and Testing: In accordance with AWWAC606.
   2. Housing Material: Provide ASTM A47/A47M malleable iron, ductile iron, or [_____],

galvanized.
3. Bolts and Nuts: Hot dipped galvanized or zinc-electroplated steel.
4. When pipe is field grooved, provide coupling manufacturer's grooving tools.

D. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.7 PIPE HANGERS AND SUPPORTS

A. Provide hangers and supports that comply with MSS SP-58.
1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
3. Trapeze Hangers: Welded steel channel frames attached to structure.
4. Vertical Pipe Support: Steel riser clamp.

B. Plumbing Piping - Drain, Waste, and Vent:
1. Hangers for Pipe Sizes 2 inch (50 mm, DN) and Over: Carbon steel, adjustable, clevis.

C. Plumbing Piping - Water:
1. Hangers for Pipe Sizes 1/2 to 1-1/2 inch (15 to 40 mm, DN): Malleable iron, adjustable swivel, split ring.
2. Hangers for Cold Pipe Sizes 2 inch (50 mm, DN) and Over: Carbon steel, adjustable, clevis.
3. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

2.8 BALL VALVES

A. Manufacturers:
1. Anvil International: www.anvilintl.com/#sle.
2. Apollo Valves: www.apollovalves.com/#sle.
3. Grinnell Products: www.grinnell.com/#sle.
4. Viega LLC; [_____]: www.viega.us/#sle.

B. Construction, 4 inch (100 mm, DN) and Smaller: MSS SP-110, Class 150, 400 psi (2760 kPa) CWP, bronze or ductile iron body, 304 stainless steel or chrome plated brass ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, threaded or grooved ends with union.

2.9 PRESSURE RELIEF VALVES

A. ANSI Z21.22, AGA certified, bronze body, teflon seat, steel stem and springs, automatic, direct pressure actuated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

D. Install piping to maintain headroom, conserve space, and not interfere with use of space.

E. Group piping whenever practical at common elevations.

F. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

G. Provide access where valves and fittings are not exposed.

H. Establish elevations of buried piping outside the building to ensure not less than [1.5] ft ([_] m) of cover.

I. Install valves with stems upright or horizontal, not inverted. See Section 220523.

J. Install water piping to ASME B31.9.

K. Copper Pipe and Tube: Make soldered joints in accordance with ASTM B828, using specified solder, and flux meeting ASTM B813; in potable water systems use flux also complying with NSF 61 and NSF 372.

L. PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.

M. Sleeve pipes passing through partitions, walls, and floors.

N. Pipe Hangers and Supports:
   1. Install in accordance with ASME B31.9.
   2. Support horizontal piping as indicated.
   3. Place hangers within 12 inches (300 mm) of each horizontal elbow.
   4. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

O. Pipe Sleeve-Seal Systems:
   1. Install manufactured sleeve-seal systems in sleeves located in grade slabs and exterior concrete walls at piping entrances into building.
   2. Provide sealing elements of the size, quantity, and type required for the piping and sleeve inner diameter or penetration diameter.
   3. Locate piping in center of sleeve or penetration.
   4. Install field assembled sleeve-seal system components in annular space between sleeve and piping.
   5. Tighten bolting for a watertight seal.
   6. Install in accordance with manufacturer's recommendations.

3.4 TOLERANCES

A. Drainage Piping: Establish invert elevations within 1/2 inch (10 mm) vertically of location indicated and slope to drain at minimum of 1/4 inch per foot (1:50) slope.

B. Water Piping: Slope at minimum of 1/32 inch per foot (1:400) and arrange to drain at low points.

3.5 FIELD TESTS AND INSPECTIONS

A. Verify and inspect systems according to requirements by the Authority Having Jurisdiction. In the absence of specific test and inspection procedures proceed as indicated below.

B. Domestic Water Systems:
   1. Perform hydrostatic testing for leakage prior to system disinfection.
   2. Test Preparation: Close each fixture valve or disconnect and cap each connected fixture.
   3. General:
      a. Fill the system with water and raise static head to 10 psi (345 kPa) above service pressure. Minimum static head of 50 to 150 psi (345 to 1,034 kPa). As an exception, certain codes allow a maximum static pressure of 80 psi (551.6 kPa).

C. Test Results: Document and certify successful results, otherwise repair, document, and retest.

3.6 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Prior to starting work, verify system is complete, flushed, and clean.

B. Inject disinfectant, free chlorine in liquid, powder, tablet, or gas form throughout system to obtain 50 to 80 mg/L residual.

C. Maintain disinfectant in system for 24 hours.

D. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.

3.7 SERVICE CONNECTIONS

A. Provide new sanitary sewer services. Before commencing work, check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and cover to avoid freezing.

3.8 SCHEDULES

A. Pipe Hanger Spacing:

1. Metal Piping:

a. Pipe Size: 1/2 inch (15 mm, DN) to 1-1/4 inch (32 mm, DN):

1) Maximum Hanger Spacing: 6.5 ft (2 m).

2) Hanger Rod Diameter: 3/8 inches (9 mm).

b. Pipe Size: 1-1/2 inch (40 mm, DN) to 2 inch (50 mm, DN):

1) Maximum Hanger Spacing: 10 ft (3 m).

2) Hanger Rod Diameter: 3/8 inch (9 mm).

2. Plastic Piping:

a. All Sizes:

1) Maximum Hanger Spacing: 6 ft (1.8 m).

2) Hanger Rod Diameter: 3/8 inch (9 mm).

END OF SECTION

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less. B.

1.3 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber. B.

NBR: Acrylonitrile-butadiene rubber.

1.4 ACTION SUBMITTALS

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

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency. B.

Field quality-control test reports.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

2. American Insulated Wire Corp.; a Leviton Company.
3. General Cable Corporation.
5. Senator Wire & Cable Company.
6. Southwire Company.

B. Copper Conductors: Comply with NEMA WC 70.

C. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN and XHHW and SO.

D. Multi-conductor Cable: Comply with NEMA WC 70 for armored cable, Type AC, metal- clad cable, Type MC with ground wire. The use of Type AC and Type MC cable shall be limited to special situations such as whips to lighting fixtures or as approved on shop drawings or where approved by the Contract Manager.

2.2 CONNECTORS AND SPLICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or other manufacturers with equal products:

1. AFC Cable Systems, Inc.
2. Hubbell Power Systems, Inc.
3. O-Z/Gedney; EGS Electrical Group LLC.
4. 3M; Electrical Products Division.
5. Tyco Electronics Corp.

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper, stranded, in sizes AWG #12 and larger.

B. Branch Circuits: Copper, stranded, in sizes AWG #12 and larger.

C. Control Circuits: Copper, stranded, in sizes AWG #14 and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type XHHW-2, single conductors in raceway.

B. Exposed Feeders: Type XHHW-2, single conductors in raceway.

C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type XHHW-2, single conductors in raceway.

D. Exposed Branch Circuits, Including in Crawlspaces: Type THHN-THWN, single conductors in raceway.

E. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.

F. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.

G. Branch Circuits Installed Below Raised Flooring: Type THHN-THWN, single conductors in raceway.

H. Cord Drops and Portable Appliance Connections: Type SO, multi-conductor stranded copper hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors, in offices and finished spaces unless otherwise indicated.

B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members and follow surface contours where possible.

E. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems."

F. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems."

3.4 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

C. Wiring at Outlets: Install conductor at each outlet with at least six inches of slack.

3.5 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies.

3.6 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Division 07 Section "Penetration Firestopping."

3.7 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

B. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Grounding and bonding components.

1.2 REFERENCE STANDARDS

A. ANSI/IEEE Standard 142: IEEE Recommended Practice for Grounding of Industrial and Commercial Power Systems (IEEE Green Book)

B. NFPA 70 - National Electrical Code; National Fire Protection Association; 2011.

1.3 PERFORMANCE REQUIREMENTS

A. Grounding System Resistance: 5 ohms or less.

1.4 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.1 CONNECTORS AND ACCESSORIES

A. Wire: Stranded copper.
B. Grounding Electrode Conductor: Size to meet NFPA 70 requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing conditions prior to beginning work.

3.2 INSTALLATION

A. Provide bonding to meet requirements described in Quality Assurance.

B. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

C. Interface with site grounding system.

D. Interface with existing lightning protection system.

END OF SECTION

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Conduit and equipment supports.

B. Anchors and fasteners.

1.2 REFERENCE STANDARDS

A. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; 2006.

B. NFPA 70 - National Electrical Code; National Fire Protection Association; 2008.

1.3 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Hangers, Supports, Anchors, and Fasteners - General: Corrosion-resistant materials of size and type adequate to carry the loads of equipment and conduit, including weight of wire in conduit.

B. Supports: Fabricated of structural steel or formed steel members; galvanized. C.

Anchors and Fasteners:

1. Concrete Structural Elements: Use precast inserts, expansion anchors, powder-actuated anchors, or preset inserts.
2. Steel Structural Elements: Use beam clamps.
3. Concrete Surfaces: Use self-drilling anchors or expansion anchors.
4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts or hollow wall fasteners.
5. Solid Masonry Walls: Use expansion anchors or preset inserts.
6. Sheet Metal: Use sheet metal screws.
7. Wood Elements: Use wood screws.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install hangers and supports as required to adequately and securely support electrical system components, in a neat and workmanlike manner, as specified in NECA 1.

1. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.
2. Obtain permission from Live Oak Consultants, LLC before drilling or cutting structural members.

B. Rigidly weld support members or use hexagon-head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.

C. Install surface-mounted cabinets and panelboards with minimum of four anchors.

D. In wet and damp locations use steel channel supports to stand cabinets and panelboards 1 inch (25 mm) off wall.

E. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

END OF SECTION

SECTION 260534 – CONDUIT

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Conduit, fittings and conduit bodies.

1.2 RELATED REQUIREMENTS

A. Section 078400 - Firestopping.

B. Section 260526 - Grounding and Bonding for Electrical Systems.

C. Section 260529 - Hangers and Supports for Electrical Systems.

D. Section 260553 - Identification for Electrical Systems.

E. Section 260537 - Boxes.

1.3 REFERENCE STANDARDS

A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2005.

B. ANSI C80.3 - American National Standard for Steel Electrical Metallic Tubing (EMT); 2005.

C. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; 2006.

D. NECA 101 - Standard for Installing Steel Conduit (Rigid, IMC, EMT); National Electrical Contractors Association; 2006.

E. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; National Electrical Manufacturers Association; 2007.

F. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Tubing and Conduit; National Electrical Manufacturers Association; 2003.

G. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing; National Electrical Manufacturers Association; 2004.

H. NFPA 70 - National Electrical Code; National Fire Protection Association; 2008.

PART 2 - PRODUCTS

2.1 CONDUIT REQUIREMENTS

A. Conduit Size: Comply with NFPA 70.
   1. Minimum Size: 1/2 inch (13 mm) unless otherwise specified.

B. Underground Installations:
   1. In or Under Slab on Grade: Use thickwall nonmetallic conduit.

C. Outdoor Locations Above Grade: Use rigid steel conduit or intermediate metal conduit. D.

   In Slab Above Grade:
   1. Use rigid steel conduit or electrical metallic tubing.

E. Wet and Damp Locations: Use rigid steel conduit or intermediate metal conduit.

F. Dry Locations:

1. Concealed: Use rigid steel conduit, intermediate metal conduit, or electrical metallic tubing.
2. Exposed: Use rigid steel conduit, intermediate metal conduit, or electrical metallic tubing.

2.2 METAL CONDUIT

A. Rigid Steel Conduit: ANSI C80.1.

B. Intermediate Metal Conduit (IMC): Rigid steel.

C. Fittings and Conduit Bodies: NEMA FB 1; material to match conduit.

2.3 ELECTRICAL METALLIC TUBING (EMT)

A. Description: ANSI C80.3; galvanized tubing.

B. Fittings and Conduit Bodies: NEMA FB 1; steel compression type.

2.4 NONMETALLIC CONDUIT

A. Description: NEMA TC 2; Schedule 40 PVC.

B. Fittings and Conduit Bodies: NEMA TC 3.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as shown on drawings.

B. Verify routing and termination locations of conduit prior to rough-in.

C. Conduit routing is shown on drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

3.2 INSTALLATION

A. Install conduit securely, in a neat and workmanlike manner, as specified in NECA 1.

B. Install steel conduit as specified in NECA 101.

C. Install nonmetallic conduit in accordance with manufacturer's instructions.

D. Arrange supports to prevent misalignment during wiring installation.

E. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits.

F. Fasten conduit supports to building structure and surfaces under provisions of Section 260529.

G. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.

H. Do not attach conduit to ceiling support wires.

I. Arrange conduit to maintain headroom and present neat appear-

ance. J. Route exposed conduit parallel and perpendicular to walls.

K. Route conduit in and under slab from point-to-point.

L. Do not cross conduits in slab.

M. Maintain adequate clearance between conduit and piping.

N. Cut conduit square using saw or pipecutter; de-burr cut ends.

O. Bring conduit to shoulder of fittings; fasten securely.

P. Install no more than equivalent of three 90 degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use factory elbows for bends in metal conduit larger than 2 inch (50 mm) size.

Q. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.

R. Provide suitable fittings to accommodate expansion and deflection where conduit crosses seismic.

S. Provide suitable pull string in each empty conduit except sleeves and nipples.

T. Use suitable caps to protect installed conduit against entrance of dirt and moisture.

U. Ground and bond conduit under provisions of Section 260526.

V. Identify conduit under provisions of Section 260553.

3.3 INTERFACE WITH OTHER PRODUCTS

A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.

B. Route conduit through roof openings for piping and ductwork wherever possible. Where separate roofing penetration is required, coordinate location and installation method with roofing installation.

END OF SECTION

SECTION 260537 - BOXES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Wall and ceiling outlet boxes.

B. Pull and junction boxes.

1.2 RELATED REQUIREMENTS

A. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

A. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; 2006.

B. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; National Electrical Manufacturers Association; 2007.

C. NEMA OS 1 - Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; National Electrical Manufacturers Association; 2008.

D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); National Electrical Manufacturers Association; 2008.

E. NFPA 70 - National Electrical Code; National Fire Protection Association; 2008. F.

ANSI/NEMA ICS6: Enclosures for Industrial Control Equipment and Systems

G. NEMA PB-1: Panelboards

H. UL 67: Panelboards

I. UL 50: Cabinets and Boxes

1.4 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Provide products listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.1 OUTLET BOXES

A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.
   1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 1/2 inch (13 mm) male fixture studs where required.

B. Cast Boxes: NEMA FB 1, Type FD, aluminum. Provide gasketed cover by box manufacturer. Provide threaded hubs.

2.2 PULL AND JUNCTION BOXES

A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify locations of floor boxes and outlets in offices and work areas prior to rough-in.

3.2 INSTALLATION

A. Install boxes securely, in a neat and workmanlike manner, as specified in NECA 1.

B. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections, and as required by NFPA 70.

C. Set wall mounted boxes at elevations to accommodate mounting heights indicated.

D. Electrical boxes are shown on Drawings in approximate locations unless dimensioned.
   1. Adjust box locations up to 10 feet (3 m) if required to accommodate intended purpose.

E. Orient boxes to accommodate wiring devices oriented as specified in Section 262726.

F. Maintain headroom and present neat mechanical appearance.

G. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches (150 mm) from ceiling access panel or from removable recessed luminaire.

H. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.

I. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.

J. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.

K. Use flush mounting outlet box in finished areas.

L. Locate outlet boxes so that wall plates do not span different building finishes.

M. Locate outlet boxes so that wall plates do not cross masonry joints.

N. Do not install flush mounting box back-to-back in walls; provide minimum 6 inches (150 mm) separation.

O. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.

P. Use stamped steel bridges to fasten flush mounting outlet box between studs.

Q. Install flush mounting box without damaging wall insulation or reducing its effectiveness. R.

   Use adjustable steel channel fasteners for hung ceiling outlet box.

S. Do not fasten boxes to ceiling support wires.

T. Support boxes independently of conduit, except cast box that is connected to two rigid metal conduits both supported within 12 inches (305 mm) of box.

U. Use gang box where more than one device is mounted together. Do not use sectional box.

V. Use cast outlet box in exterior locations exposed to the weather and wet locations.

W. Large Pull Boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.

3.3 ADJUSTING

A. Install knockout closures in unused box openings.

3.4 CLEANING

A. Clean interior of boxes to remove dust, debris, and other material.

B. Clean exposed surfaces and restore finish.

END OF SECTION

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Nameplates and labels.

B. Wire and cable markers.

1.2 REFERENCE STANDARDS

A. NFPA 70 - National Electrical Code; National Fire Protection Association; 2008.

1.3 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

PART 2 – PRODUCTS

2.1 IDENTIFICATION APPLICATIONS

A. Identification for Conductors and Cables:
   1. Color Coding for Power Conductors 600 V and Less: Comply with Section 260519.

B. Identification for Boxes:
   1. Use voltage markers to identify highest voltage present.
   2. Use warning labels to identify electrical hazards for boxes containing exposed live parts or exposed conductors operating at over 600 V nominal with the word message "DANGER; HIGH VOLTAGE; KEEP OUT".

C. Identification for Devices:
   1. Use identification label to identify serving branch circuit for all receptacles.

D. Communication Cabinets: Name-

plates.

E Control Device Station: Labels.

F. Electrical Distribution and Control Equipment Enclosures: Nameplates.

2.2 NAMEPLATES AND LABELS

A. Identification Nameplates:
   1. Materials:
      a. Indoor Clean, Dry Locations: Use plastic nameplates.
   2. Plastic Nameplates: Two-layer or three-layer laminated electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch (1.6 mm); engraved text. White background with black lettering.
      a. Exception: Provide minimum thickness of 1/8 inch (3 mm) when any dimension is greater than 4 inches (100 mm).
   3. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch (25 mm) high; Four, located at corners for larger sizes.

B. Format for Equipment Identification:
   1. Minimum Size: 1 inch (25 mm) by 2.5 inches (64 mm).

C. Nameplates: Engraved three-layer laminated plastic, black letters on white background.

D. Labels: Embossed adhesive tape, with 3/16 inch (5 mm) white letters on black background. Use only for identification of individual wall switches and receptacles.

2.3 WIRE MARKERS

A. Manufacturers:
1. Brady Corporation: www.bradycorp.com.

B. Description: Tape type self-adhesive wire markers.

C. Color: Black on white.

D. Legend:
1. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.
2. Control Circuits: Control wire number indicated on schematic and interconnection diagrams on drawings.

PART 3 – EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive nameplates and labels.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
1. Surface-Mounted Equipment: Enclosure front.
2. Boxes: Outside face of cover.
3. Conductors and Cables: Legible from the point of access.

C. Install identification products centered, level, and parallel with lines of item being identified.

D. Secure nameplates to exterior surfaces of enclosures using self-adhesive backing and to interior surfaces using self-adhesive backing.

E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.

F. Install underground warning tape above buried lines with one tape per trench at 3 inches (75 mm) below finished grade.

3.3 FIELD QUALITY CONTROL

A. Replace self-adhesive labels and markers that exhibit bubbles, wrinkles, curling or other signs of improper adhesion.

B. Install nameplates and labels parallel to equipment lines.

C. Secure nameplates to equipment front using adhesive.

END OF SECTION

SECTION 260923 - LIGHTING CONTROL DEVICES

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Single Room Lighting Control Panel.

1.2 RELATED REQUIREMENTS

A. Section 260526 - Grounding and Bonding for Electrical Systems. B.

Section 260537 - Boxes.

C. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

D. Section 262726 - Wiring Devices: Devices for manual control of lighting, including wall switches, wall dimmers, fan speed controllers, and wall plates.

E. Section 265100 - Interior Lighting.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Coordinate the placement of lighting control devices with millwork, furniture, equipment, etc. installed under other sections or by others.
2. Notify Live Oak Consultants, LLC of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Include ratings, configurations, standard wiring diagrams, dimensions, colors, service condition requirements, and installed features.

C. Shop Drawings:

D. Manufacturer's Installation Instructions: Include application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

E. Operation and Maintenance Data: Include detailed information on device programming and setup. F.

Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 016000 - Product Requirements, for additional provisions.

G. Project Record Documents: Record actual installed locations and settings for lighting control devices.

1.5 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

1.6 DELIVERY, STORAGE, AND PROTECTION

A. Store products in a clean, dry space in original manufacturer's packaging in accordance with manufacturer's written instructions until ready for installation.

1.7 FIELD CONDITIONS

A. Maintain field conditions within manufacturer's required service conditions during and after installation.

PART 2 - PRODUCTS

2.1 ALL LIGHTING CONTROL DEVICES

A. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

B. Unless specifically indicated to be excluded, provide all required conduit, wiring, connectors, hardware, components, accessories, etc. as required for a complete operating system.

C. Products for Switching of Electronic Fluorescent Ballasts: Tested and rated to be suitable for peak inrush currents specified in NEMA 410.

D. Coordinate lighting control system/devices with light fixtures to be controlled/dimmed.

2.2 SINGLE ROOM LIGHTING CONTROL PANEL

A. Refer to Drawings for Manufacturer and Model Number.
   1. Source Limitations: Furnish products produced by a single manufacturer and obtained from a single supplier.
   2. Provide with all control wiring, power packs, dimming ballast/driver interface modules and other equipment as required for a complete, fully-functional system.
   3. Input Supply Voltage: As indicated on the drawings.
   4. Output Switch Configuration: As required to control the load indicated on the drawings.
   5. Output Switch Contact Ratings: As required to control the load indicated on the drawings.
   6. Provide flush-mounted unit where indicated, where mounted in public areas, or where mounted adjacent to flush-mounted equipment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as shown on the drawings.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.

C. Verify that openings for outlet boxes are neatly cut and will be completely covered by devices or wall plates.

D. Verify that final surface finishes are complete, including painting.

E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to lighting control devices.

F. Verify that the service voltage and ratings of lighting control devices are appropriate for the service voltage and load requirements at the location to be installed.

G. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.

B. Coordinate locations of outlet boxes provided under Section 260537 as required for installation of lighting

control devices provided under this section.

C. Install lighting control devices in accordance with manufacturer's instructions.

D. Unless otherwise indicated, connect lighting control device grounding terminal or conductor to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

E. Install lighting control devices plumb and level, and held securely in place.

F. Where required and not furnished with lighting control device, provide wall plate in accordance with Section 262726.

G. Where applicable, install lighting control devices and associated wall plates to fit completely flush to mounting surface with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

H. Lamp Burn-In: Operate lamps at full output for minimum of 100 hours or prescribed period per manufacturer's recommendations prior to use with any dimming controls. Replace lamps that fail prematurely due to improper lamp burn-in.

3.3 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for additional requirements.

B. Inspect each lighting control device for damage and defects.

C. Test system to verify proper operation.

D. Correct wiring deficiencies and replace damaged or defective lighting control devices.

3.4 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

B. Adjust programmed settings to achieve desired operation as indicated or as directed.

3.5 CLOSEOUT ACTIVITIES

A. Demonstration: Demonstrate proper operation of lighting control devices to Owner and Live Oak Consultants, LLC, and correct deficiencies or make adjustments as directed.

B. Training: Train Owner’s personnel on operation, adjustment, programming, and maintenance of lighting control devices.
   1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
   2. Provide minimum of two hours of training.
   3. Instructor: Qualified contractor familiar with the project and with sufficient knowledge of the installed lighting control devices.
   4. Location: At project site.

END OF SECTION

SECTION 262416 - PANELBOARDS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Power distribution panelboards.

B. Lighting and appliance panelboards.

C. Overcurrent protective devices for panelboards.

1.2 RELATED REQUIREMENTS

A. Section 260526 - Grounding and Bonding for Electrical Systems.

B. Section 260529 - Hangers and Supports for Electrical Systems.

C. Section 260553 - Identification for Electrical Systems: Nameplates.

1.3 REFERENCE STANDARDS

A. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service; Federal Specification; Revision D, 2006.

B. NECA 1 - Standard for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; 2006.

C. NECA 407 - Standard for Installing and Maintaining Panelboards; National Electrical Contractors Association; 2009.

D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2008.

E. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum); National Electrical Manufacturers Association; 2001 (R2006).

F. NEMA PB 1 - Panelboards; National Electrical Manufacturers Association; 2006.

G. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less; National Electrical Manufacturers Association; 2007.

H. NETA STD ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association; 2009.

I. NFPA 70 - National Electrical Code; National Fire Protection Association; 2008.

J. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

K. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

L. UL 67 - Panelboards; Current Edition, Including All Revisions.

M. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.

N. UL 869A - Reference Standard for Service Equipment; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other

potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.

2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
4. Notify Live Oak Consultants, LLC of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

A. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, overcurrent protective device arrangement and sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.
   1. Clearly indicate whether proposed short circuit current ratings are fully rated or, where acceptable, series rated systems.

1.6 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. UL labeling of the assembled panelboard

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Eaton Corporation; Cutler-Hammer Products: www.eaton.com.

B. General Electric Company: www.geindustrial.com.

C. Schneider Electric; Square D Products: www.schneider-electric.us.

D. Source Limitations: Furnish panelboards and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.

2.2 ALL PANELBOARDS

A. Provide products listed and labeled by Underwriters Laboratories Inc. as suitable for the purpose indicated.

B. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
   1. Altitude: Less than 6,600 feet (2,000 m).
   2. Ambient Temperature:
      a. Panelboards Containing Circuit Breakers: Between 23 degrees F (-5 degrees C) and 104 degrees F (40 degrees C).

C. Short Circuit Current Rating:
   1. Provide panelboards with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.

D. Panelboards Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.

E. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation. F.

Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.

G. Bussing: Sized in accordance with UL 67 temperature rise requirements.
   1. Provide fully rated neutral bus unless otherwise indicated, with a suitable lug for each feeder or

branch circuit requiring a neutral connection.

2. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.

H. Conductor Terminations: Suitable for use with the conductors to be installed.

I. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.

1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
   a. Indoor Clean, Dry Locations: Type 12.
2. Boxes: Galvanized steel unless otherwise indicated.
   a. Provide wiring gutters sized to accommodate the conductors to be installed.
3. Fronts:
   a. Fronts for Surface-Mounted Enclosures: Same dimensions as boxes.
4. Lockable Doors: All locks keyed alike unless otherwise indicated.

J. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.

K. Surge Protective Devices: Where factory-installed, internally mounted surge protective devices are provided in accordance with Section 264300, list and label panelboards as a complete assembly including surge protective device.

2.3 POWER DISTRIBUTION PANELBOARDS

A. Description: Panelboards complying with NEMA PB 1, power and feeder distribution type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.

B. Conductor Terminations:
1. Main and Neutral Lug Material: Copper, suitable for terminating copper conductors only.
2. Main and Neutral Lug Type: Mechanical.

C. Bussing:
1. Phase and Neutral Bus Material: Copper.
2. Ground Bus Material: Copper.

D. Circuit Breakers:
1. Provide plug-in type.

E. Enclosures:
1. Provide surface-mounted enclosures unless otherwise indicated.

2.4 LIGHTING AND APPLIANCE PANELBOARDS

A. Description: Panelboards complying with NEMA PB 1, lighting and appliance branch circuit type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.

B. Conductor Terminations:
1. Main and Neutral Lug Material: Copper, suitable for terminating copper conductors only.
2. Main and Neutral Lug Type: Mechanical.

C. Bussing:
1. Phase Bus Connections: Arranged for sequential phasing of overcurrent protective devices.
2. Phase and Neutral Bus Material: Copper.
3. Ground Bus Material: Copper.

D. Circuit Breakers: Thermal magnetic plug-in type _____.

E. Enclosures:
   1. Provide surface-mounted enclosures as indicated.
   2. Provide clear plastic circuit directory holder mounted on inside of door.

2.5 OVERCURRENT PROTECTIVE DEVICES

A. Molded Case Circuit Breakers:
   1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
   2. Interrupting Capacity:
      a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
         1) 10,000 rms symmetrical amperes at 240 VAC or 208 VAC.
         2) 14,000 rms symmetrical amperes at 480 VAC.
      b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
   3. Conductor Terminations:
      a. Provide mechanical lugs unless otherwise indicated.
      b. Lug Material: Copper, suitable for terminating copper conductors only.
   4. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.
   5. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.
   6. Provide listed switching duty rated circuit breakers with SWD marking for all branch circuits serving fluorescent lighting.
   7. Provide listed high intensity discharge lighting rated circuit breakers with HID marking for all branch circuits serving HID lighting.
   8. Provide multi-pole circuit breakers for multi-wire branch circuits as required by NFPA 70.

2.6 SOURCE QUALITY CONTROL

A. Factory test panelboards according to NEMA PB 1.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as shown on the drawings.

B. Verify that the ratings and configurations of the panelboards and associated components are consistent with the indicated requirements.

C. Verify that mounting surfaces are ready to receive panelboards.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install panelboards securely, in a neat and workmanlike manner in accordance with NECA 1 (general workmanship), NECA 407 (panelboards), and NEMA PB 1.1.

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Provide required supports in accordance with Section 260529.

E. Install panelboards plumb.

F. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches (2000 mm) above the floor or working platform.

G. Provide grounding and bonding in accordance with Section 260526.

H. Install all field-installed branch devices, components, and accessories. I.

Provide filler plates to cover unused spaces in panelboards.

J. Provide computer-generated circuit directory for each lighting and appliance panelboard, and each power distribution panelboard provided with a door, clearly and specifically indicating the loads served. Identify spares and spaces.

K. Provide identification nameplate for each panelboard in accordance with Section 260553.

L. Provide floor markings to clearly indicate required working clearances where indicated or where required by the authority having jurisdiction.

3.3 FIELD QUALITY CONTROL

A. Perform inspection, testing, and adjusting in accordance with Section 014000. B.

Inspect and test in accordance with NETA STD ATS, except Section 4.

C. Molded Case Circuit Breakers: Perform inspections and tests listed in NETA STD ATS, Section 7.6.1.1 for all main circuit breakers and circuit breakers larger than _____amperes. Tests listed as optional are not required.

D. Correct deficiencies and replace damaged or defective panelboards or associated components.

3.4 ADJUSTING

A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

B. Adjust alignment of panelboard fronts.

3.5 CLEANING

A. Clean dirt and debris from panelboard enclosures and components according to manufacturer's instructions.

B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

SECTION 262726 - WIRING DEVICES

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Wall switches.

B. Receptacles.

C. Wall plates.

D. Floor box service fittings.

1.2 REFERENCE STANDARDS

A. FS W-C-596 - Connector, Electrical, Power, General Specification for; Federal Specification; Revision G, 2001.

B. FS W-S-896 - Switches, Toggle (Toggle and Lock), Flush-mounted (General Specification); Federal Specification; Revision F, 1999.

C. NECA 1 - Standard for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; 2006.

D. NEMA WD 1 - General Color Requirements for Wiring Devices; National Electrical Manufacturers Association; 1999 (R 2005).

E. NEMA WD 6 - Wiring Device -- Dimensional Requirements; National Electrical Manufacturers Association; 2002 (R2008).

F. NFPA 70 - National Electrical Code; National Fire Protection Association; 2008.

G. UL 20 - General-Use Snap Switches; Current Edition, Including All Revisions.

H. UL 498 - Attachment Plugs and Receptacles; Current Edition, Including All Revisions.

I. UL 514D - Cover Plates for Flush-Mounted Wiring Devices; Current Edition, Including All Revisions.

J. UL 943 - Ground-Fault Circuit-Interrupters; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the placement of outlet boxes with millwork, furniture, equipment, etc. installed under other sections or by others.
   2. Coordinate wiring device ratings and configurations with the electrical requirements of actual equipment to be installed.
   3. Coordinate the placement of outlet boxes for wall switches with actual installed door swings.
   4. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
   5. Notify Live Oak Consultants, LLC of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Hubbell Incorporated; _____: www.hubbell-wiring.com.

B. Leviton Manufacturing Company, Inc; _____: www.leviton.com.

C. Pass & Seymour, a brand of Legrand North America, Inc; _____: www.legrand.us

2.2 APPLICATIONS

A. Provide wiring devices suitable for intended use and with ratings adequate for load served.

B. For single receptacles installed on an individual branch circuit, provide receptacle with ampere rating not less than that of the branch circuit.

C. Provide weather resistant GFI receptacles with specified weatherproof (while in use) covers for all receptacles installed outdoors or in damp or wet locations.

D. Provide GFI receptacles for all receptacles installed within 6 feet (1.8 m) of sinks. E.

Provide GFI receptacles for all receptacles installed in kitchens.

F. Provide GFI receptacles for all receptacles serving electric drinking fountains. G.

For flush floor service fittings, use tile rings for installations in tile floors.

H. For flush floor service fittings, use carpet flanges for installations in carpeted floors.

2.3 ALL WIRING DEVICES

A. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

2.4 WALL SWITCHES

A. Manufacturers:
1. Hubbell Incorporated; _____: www.hubbell-wiring.com.
2. Leviton Manufacturing Company, Inc; _____: www.leviton.com.
3. Pass & Seymour, a brand of Legrand North America, Inc; _____: www.legrand.us

B. All Wall Switches: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20 and where applicable, FS W-S-896; types as indicated on the drawings.
1. Wiring Provisions: Terminal screws for side wiring and screw actuated binding clamp for back wiring with separate ground terminal screw.

C. Standard Wall Switches: Industrial specification grade, 20 A, 120/277 V with standard toggle type switch actuator and maintained contacts; single pole single throw, double pole single throw, three way, or four way as indicated on the drawings.

2.5 RECEPTACLES

A. Manufacturers:
1. Hubbell Incorporated; _____: www.hubbell-wiring.com.
2. Leviton Manufacturing Company, Inc; _____: www.leviton.com.
3. Pass & Seymour, a brand of Legrand North America, Inc; _____: www.legrand.us

B. All Receptacles: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.
1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
2. NEMA configurations specified are according to NEMA WD 6.

C. Convenience Receptacles:
1. Standard Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R; single or duplex as indicated on the drawings.
2. Weather Resistant Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA

5-20R,, listed and labeled as weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations; single or duplex as indicated on the drawings.

D. GFI Receptacles:
   1. All GFI Receptacles: Provide with feed-through protection, light to indicate ground fault tripped condition and loss of protection, and list as complying with UL 943, class A.
      a. Provide test and reset buttons of same color as device.

   2. Weather Resistant GFI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations.

2.6 WALL PLATES

A. Manufacturers:
   1. Hubbell Incorporated; _____: www.hubbell-wiring.com.
   2. Leviton Manufacturing Company, Inc; _____: www.leviton.com.
   3. Pass & Seymour, a brand of Legrand North America, Inc; _____: www.legrand.us

B. All Wall Plates: Comply with UL 514D.
   1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
   2. Size: Standard.
   3. Screws: Metal with slotted heads finished to match wall plate finish.

C. Weatherproof Covers for Wet Locations: Gasketed, thermoplastic, with hinged lockable cover and corrosion-resistant screws; listed as suitable for use in wet locations while in use with attachment plugs connected.

2.7 FLOOR BOX SERVICE FITTINGS

A. Manufacturers:
   1. Hubbell Incorporated; _____: www.hubbell-wiring.com.
   2. Thomas & Betts Corporation; _____: www.tnb.com.
   3. Wiremold, a brand of Legrand North America, Inc; _____: www.legrand.us

B. Description: Service fittings compatible with floor boxes provided under Section 260537 with all components, adapters, and trims required for complete installation.

C. Flush Floor Service Fittings:
   1. Dual Service Flush Combination Outlets:
      a. Cover: Rectangular.
      b. Configuration:
         1) Power: One standard convenience duplex receptacle(s) with duplex flap opening(s).
         2) Communications: suitable to contain a minimum of four devices.
   2. Accessories:
      a. Tile Rings: Stainless Steel Finish to match covers; configuration as required to accommodate specified covers.
      b. Carpet Flanges: Stainless Steel Finish to match covers; configuration as required to accommodate specified covers.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as shown on the drawings.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.

C. Verify that wall openings are neatly cut and will be completely covered by wall plates. D.

Verify that final surface finishes are complete, including painting.

E. Verify that floor boxes are adjusted properly.

F. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

G. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface. B.

Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.3 INSTALLATION

A. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.

B. Coordinate locations of outlet boxes provided under Section 260537 as required for installation of wiring devices provided under this section.
   1. Orient outlet boxes for vertical installation of wiring devices unless otherwise indicated.
   2. Where multiple receptacles, wall switches, or wall dimmers are installed at the same location and at the same mounting height, gang devices together under a common wall plate.
   3. Locate receptacles for electric drinking fountains concealed behind drinking fountain according to manufacturer's instructions.

C. Install wiring devices in accordance with manufacturer's instructions.

D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

E. Where required, connect wiring devices using pigtails not less than 6 inches (150 mm) long. Do not connect more than one conductor to wiring device terminals.

F. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.

G. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

H. Provide GFI receptacles with integral GFI protection at each location indicated. Do not use feed-through wiring to protect downstream devices.

I. Install wiring devices plumb and level with mounting yoke held rigidly in place. J.

Install wall switches with OFF position down.

K. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.

L. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

M. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.

N. Identify wiring devices in accordance with Section 260553.

O. Install identification label for all receptacles in accordance with Section 260526 indicating serving branch circuit.

3.4 FIELD QUALITY CONTROL

A. Perform field inspection, testing, and adjusting in accordance with Section 014000. B.

Inspect each wiring device for damage and defects.

C. Operate each wall switch, wall dimmer, and fan speed controller with circuit energized to verify proper operation.

D. Test each receptacle to verify operation and proper polarity.

E. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions. F.

Correct wiring deficiencies and replace damaged or defective wiring devices.

3.5 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

3.6 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

END OF SECTION

SECTION 265100 - INTERIOR LIGHTING

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Interior luminaires.

B. Emergency lighting units.

C. Exit signs.

D. Ballasts.

E. Fluorescent emergency power supply units.

F. Lamps.

G. Luminaire accessories.

1.2 RELATED REQUIREMENTS

A. Section 260537 - Boxes.

B. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

C. Section 262726 - Wiring Devices: Manual wall switches and wall dimmers.

D. Section 265600 - Exterior Lighting.

1.3 REFERENCE STANDARDS

A. ANSI C82.4 - American National Standard for Ballasts for High-Intensity-Discharge and Low Pressure Sodium Lamps (Multiple-Supply Type); 2002.

B. ANSI C82.11 - American National Standard for Lamp Ballasts - High Frequency Fluorescent Lamp Ballasts - Supplements; Consolidated-2002.

C. IEEE C62.41.2 - Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits; 2002 (R2008).

D. NECA 1 - Standard for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; 2006.

E. NECA/IESNA 500 - Standard for Installing Indoor Commercial Lighting Systems; National Electrical Contractors Association; 2006.

F. NECA/IESNA 502 - Standard for Installing Industrial Lighting Systems; National Electrical Contractors Association; 2006.

G. NEMA 410 - Performance Testing for Lighting Controls and Switching Devices with Electronic Fluorescent Ballasts; National Electrical Manufacturers Association; 2004.

H. NEMA LE 4 - Recessed Luminaires, Ceiling Compatibility; National Electrical Manufacturers Association; 2006.

I. NFPA 70 - National Electrical Code; National Fire Protection Association; 2008.

J. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures; National Fire Protection Association; 2009.

K. UL 924 - Emergency Lighting and Power Equipment; Current Edition, Including All Revisions.

L. UL 935 - Fluorescent-Lamp Ballasts; Current Edition, Including All Revisions.

M. UL 1029 - High-Intensity-Discharge Lamp Ballasts; Current Edition, Including All Revisions.

N. UL 1598 - Luminaires; Current Edition, Including All Revisions.

O. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Coordinate the installation of luminaires with mounting surfaces installed under other sections or by others. Coordinate the work with placement of supports, anchors, etc. required for mounting. Coordinate compatibility of luminaires and associated trims with mounting surfaces at installed locations.
2. Coordinate the placement of luminaires with structural members, ductwork, piping, equipment, diffusers, fire suppression system components, and other potential conflicts installed under other sections or by others.
3. Coordinate the placement of exit signs with furniture, equipment, signage or other potential obstructions to visibility installed under other sections or by others.
4. Notify Live Oak Consultants, LLC of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

1.5 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.

C. Maintenance Materials: Furnish the following for Baker Motor Company's use in maintenance of project.
1. See Section 016000 - Product Requirements, for additional provisions.
2. Extra Lamps: Ten percent of total quantity installed for each type, but not less than two of each type.

1.6 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

1.7 DELIVERY, STORAGE, AND PROTECTION

A. Receive, handle, and store products according to NECA/IESNA 500 (commercial lighting), NECA/IESNA 502 (industrial lighting), and manufacturer's written instructions.

B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

1.8 FIELD CONDITIONS

A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.9 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

PART 2 – PRODUCTS

2.1 LUMINAIRE TYPES

A. Furnish products as indicated in luminaire schedule included on the drawings.

2.2 LUMINAIRES

A. Provide products that comply with requirements of NFPA 70.

B. Provide products that are listed and labeled as complying with UL 1598, where applicable.

C. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

D. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.

F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

G. Fluorescent Luminaires:
   1. Provide ballast disconnecting means complying with NFPA 70 where required.
   2. Fluorescent Luminaires Controlled by Occupancy Sensors: Provide programmed start ballasts.

H. LED Luminaires: Listed and labeled as complying with UL 8750.

I. Luminaires Mounted in Continuous Rows: Provide quantity of units required for length indicated, with all accessories required for joining and aligning.

2.3 EMERGENCY LIGHTING UNITS

A. Description: Emergency lighting units complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.

B. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.

C. Battery:
   1. Size battery to supply all connected lamps, including emergency remote heads where indicated.

D. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.

E. Provide low-voltage disconnect to prevent battery damage from deep discharge.

F. Accessories:
   1. Provide compatible accessory mounting brackets where indicated or required to complete installation.

2.4 EXIT SIGNS

A. All Exit Signs: Internally illuminated with LEDs unless otherwise indicated; complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
   1. Number of Faces: Single or double as indicated or as required for the installed location.
   2. Directional Arrows: As indicated or as required for the installed location.

B. Self-Powered Exit Signs:
   1. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.
   2. Provide low-voltage disconnect to prevent battery damage from deep discharge.

2.5 BALLASTS

A. All Ballasts:
   1. Provide ballasts containing no polychlorinated biphenyls (PCBs).
   2. Minimum Efficiency/Efficacy: Provide ballasts complying with all current applicable federal and state ballast efficiency/efficacy standards.

B. Fluorescent Ballasts:

   1. All Fluorescent Ballasts: Unless otherwise indicated, provide high frequency electronic ballasts complying with ANSI C82.11 and listed and labeled as complying with UL 935.
      a. Input Voltage: Suitable for operation at voltage of connected source, with variation tolerance of plus or minus 10 percent.
      b. Total Harmonic Distortion: Not greater than 20 percent.
      c. Power Factor: Not less than 0.95.
      d. Thermal Protection: Listed and labeled as UL Class P, with automatic reset for integral thermal protectors.
      e. Sound Rating: Class A, suitable for average ambient noise level of 20 to 24 decibels.
      f. Lamp Compatibility: Specifically designed for use with the specified lamp, with no visible flicker.
      g. Lamp Operating Frequency: Greater than 20 kHz, except as specified below.
      h. Lamp Current Crest Factor: Not greater than 1.7.
      i. Provide automatic restart capability to restart replaced lamp(s) without requiring resetting of power.
      j. Provide end of lamp life automatic shut down circuitry for T5 and smaller diameter lamp ballasts.
      k. Surge Tolerance: Capable of withstanding characteristic surges according to IEEE C62.41.2, location category A.
      l. Electromagnetic Interference/Radio Frequency Interference (EMI/RFI) Limits: Comply with FCC requirements of CFR, Title 47, Part 18, for Class A, non-consumer application.
      m. Ballast Marking: Include wiring diagrams with lamp connections.
   2. Non-Dimming Fluorescent Ballasts:
      a. Lamp Starting Method:
         1) T8 Lamp Ballasts: Instant start unless otherwise indicated.
         2) T5 Lamp Ballasts: Programmed start unless otherwise indicated.
         3) Compact Fluorescent Lamp Ballasts: Programmed start unless otherwise indicated.
      b. Lamp Starting Temperature: Capable of starting standard lamp(s) at a minimum of 0 degrees F (-18 degrees C), and energy saving lamp(s) at a minimum of 60 degrees F (16 degrees C) unless otherwise indicated.

C. High Intensity Discharge (HID) Ballasts: Complying with ANSI C82.4 and listed and labeled as complying with UL 1029.
   1. Electronic Metal Halide Ballasts:
      a. All Electronic Metal Halide Ballasts:
         1) Input Voltage: Suitable for operation at voltage of connected source, with variation tolerance of plus or minus 10 percent.
         2) Total Harmonic Distortion: Not greater than 15 percent.
         3) Power Factor: Not less than 0.90.

4) Provide thermal protection with automatic reset.
5) Sound Rating: Class A, suitable for average ambient noise level of 20 to 24 decibels.
6) Lamp Operating Frequency: Less than 200 Hz or as required to avoid acoustic resonance in lamp arc tube.
7) Lamp Current Crest Factor: Not greater than 1.5.
8) Provide end of lamp life automatic shut down circuitry.
9) Surge Tolerance: Capable of withstanding characteristic surges according to IEEE C62.41.2, location category A.
10) Electromagnetic Interference/Radio Frequency Interference (EMI/RFI) Limits: Comply with FCC requirements of CFR, Title 47, Part 18, for Class A, non-consumer application.

2.6 FLUORESCENT EMERGENCY POWER SUPPLY UNITS

A. Description: Self-contained fluorescent emergency power supply units suitable for use with indicated luminaires, complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.

B. Compatibility:
1. Ballasts: Compatible with electronic, standard magnetic, energy saving, and dimming AC ballasts, including those with end of lamp life shutdown circuits.

C. Operation: Upon interruption of normal power source, solid-state control automatically switches connected lamp(s) to the fluorescent emergency power supply for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.

2.7 LAMPS

A. All Lamps:
1. Unless explicitly excluded, provide new, compatible, operable lamps in each luminaire.
2. Verify compatibility of specified lamps with luminaires to be installed. Where lamps are not specified, provide lamps per luminaire manufacturer's recommendations.
3. Minimum Efficiency: Provide lamps complying with all current applicable federal and state lamp efficiency standards.
4. Color Temperature Consistency: Unless otherwise indicated, for each type of lamp furnish products which are consistent in perceived color temperature. Replace lamps that are determined by the Live Oak Consultants, LLC to be inconsistent in perceived color temperature.

B. Compact Fluorescent Lamps: Wattage and bulb type as indicated, with base type as required for luminaire.

C. Linear Fluorescent Lamps: Wattage and bulb type as indicated, with base type as required for luminaire. D.

High Intensity Discharge (HID) Lamps: Wattage as indicated, with bulb type, burning position, and base type as required for luminaire.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as shown on the drawings.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.

C. Verify that suitable support frames are installed where required.

D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.3 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 260537 as required for installation of luminaires provided under this section.

B. Install products according to manufacturer's instructions.

C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship), NECA 500 (commercial lighting), and NECA 502 (industrial lighting).

D. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires. E.

Suspended Ceiling Mounted Luminaires:

1. Do not use ceiling tiles to bear weight of luminaires.
2. Do not use ceiling support system to bear weight of luminaires unless ceiling support system is certified as suitable to do so.
3. Secure lay-in luminaires to ceiling support channels using listed safety clips at four corners.
4. In addition to ceiling support wires, provide two galvanized steel safety wire(s), minimum 12 gage, connected from opposing corners of each recessed luminaire to building structure.
5. See appropriate Division 9 section where suspended grid ceiling is specified for additional requirements.

F. Recessed Luminaires:

1. Install trims tight to mounting surface with no visible light leakage.
2. Non-IC Rated Luminaires: Maintain required separation from insulation and combustible materials according to listing.

G. Wall-Mounted Luminaires: Unless otherwise indicated, specified mounting heights are to center of luminaire.

H. Install accessories furnished with each luminaire.

I. Bond products and metal accessories to branch circuit equipment grounding conductor.

J. Emergency Lighting Units:

1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.

K. Exit Signs:

1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.

L. Fluorescent Emergency Power Supply Units:

1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal ballast(s) in luminaire. Bypass local switches, contactors, or other lighting controls.

M. Identify luminaires connected to emergency power system in accordance with Section 260553. N.

Install lamps in each luminaire.

O. Lamp Burn-In: Operate lamps at full output for prescribed period per manufacturer's recommendations prior to use with any dimming controls. Replace lamps that fail prematurely due to improper lamp burn-in.

3.4 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for additional requirements.

B. Inspect each product for damage and defects.

C. Operate each luminaire after installation and connection to verify proper operation.

D. Test self-powered exit signs, emergency lighting units, and fluorescent emergency power supply units to verify proper operation upon loss of normal power supply.

E. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Live Oak Consultants, LLC.

3.5 ADJUSTING

A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Live Oak Consultants, LLC. Secure locking fittings in place.

B. Aim and position adjustable emergency lighting unit lamps to achieve optimum illumination of egress path as required or as directed by Live Oak Consultants, LLC or authority having jurisdiction.

C. Exit Signs with Field-Selectable Directional Arrows: Set as indicated or as required to properly designate egress path as directed by Live Oak Consultants, LLC or authority having jurisdiction.

3.6 CLEANING

A. Clean surfaces according to NECA 500 (commercial lighting), NECA 502 (industrial lighting), and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

END OF SECTION

SECTION 265600 - EXTERIOR LIGHTING

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Exterior luminaires.
B. Ballasts.
C. Lamps.
D. Poles and accessories.
E. Luminaire accessories.

1.2 RELATED REQUIREMENTS

A. Section 033000 - Cast-in-Place Concrete: Materials and installation requirements for concrete bases for poles.

B. Section 260526 - Grounding and Bonding for Electrical Systems.

C. Section 260537 - Boxes.
D. Section 262726 - Wiring Devices: Receptacles for installation in poles.

1.3 REFERENCE STANDARDS

A. ANSI C82.4 - American National Standard for Ballasts for High-Intensity-Discharge and Low Pressure Sodium Lamps (Multiple-Supply Type); 2002.

B. ANSI C82.11 - American National Standard for Lamp Ballasts - High Frequency Fluorescent Lamp Ballasts - Supplements; Consolidated-2002.

C. IEEE C2 - National Electrical Safety Code; 2007.

D. IEEE C62.41.2 - Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits; 2002 (R2008).

E. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.

F. NECA/IESNA 501 - Recommended Practice for Installing Exterior Lighting Systems; 2006.

G. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

H. UL 935 - Fluorescent-Lamp Ballasts; Current Edition, Including All Revisions.

I. UL 1029 - High-Intensity-Discharge Lamp Ballasts; Current Edition, Including All Revisions. J.

UL 1598 - Luminaires; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Coordinate placement of poles and associated foundations with utilities, curbs, sidewalks, trees, walls, fences, striping, etc. installed under other sections or by others. Coordinate elevation to obtain specified foundation height.
2. Notify Live Oak Consultants, LLC of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

1.5 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, weight, effective projected area (EPA), and installed accessories; include model number nomenclature clearly marked with all proposed features.
   1. Poles: Include information on maximum supported effective projected area (EPA) and weight for the design wind speed.

C. Certificates for Poles and Accessories: Manufacturer's documentation that products are suitable for the luminaires to be installed and comply with designated structural design criteria.

D. Maintenance Materials: Furnish the following for Baker Motor Company's use in maintenance of project.
   1. See Section 016000 - Product Requirements, for additional provisions.
   2. Extra Lamps: Ten percent of total quantity installed for each type, but not less than two of each type.

1.6 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Receive, handle, and store products according to NECA/IESNA 501 and manufacturer's written instructions.

C. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

PART 2 – PRODUCTS

2.1 LUMINAIRE TYPES

A. Furnish products as indicated in luminaire schedule included on the Drawings.

2.2 LUMINAIRES

A. Provide products that comply with requirements of NFPA 70.

B. Provide products that are listed and labeled as complying with UL 1598, where applicable.

C. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

D. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, poles, foundations, supports, trims, accessories, etc. as necessary for a complete operating system.

F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

G. Exposed Hardware: Stainless steel.

2.3 BALLASTS

A. All Ballasts:
   1. Provide ballasts containing no polychlorinated biphenyls (PCBs).
   2. Minimum Efficiency/Efficacy: Provide ballasts complying with all current applicable federal and state ballast efficiency/efficacy standards.

B. Fluorescent Ballasts: Unless otherwise indicated, provide high frequency electronic ballasts complying with ANSI C82.11 and listed and labeled as complying with UL 935.
   1. Input Voltage: Suitable for operation at voltage of connected source, with variation tolerance of plus or minus 10 percent.
   2. Total Harmonic Distortion: Not greater than 20 percent.
   3. Power Factor: Not less than 0.95.
   4. Thermal Protection: Listed and labeled as UL Class P, with automatic reset for integral thermal protectors.
   5. Sound Rating: Class A, suitable for average ambient noise level of 20 to 24 decibels.
   6. Lamp Compatibility: Specifically designed for use with the specified lamp, with no visible flicker.
   7. Lamp Operating Frequency: Greater than 20 kHz, except as specified below.
   8. Lamp Current Crest Factor: Not greater than 1.7.
   9. Provide automatic restart capability to restart replaced lamp(s) without requiring resetting of power.
   10. Provide end of lamp life automatic shut down circuitry for T5 and smaller diameter lamp ballasts.
   11. Surge Tolerance: Capable of withstanding characteristic surges according to IEEE C62.41.2, location category A.
   12. Electromagnetic Interference/Radio Frequency Interference (EMI/RFI) Limits: Comply with FCC requirements of CFR, Title 47, Part 18, for Class A, non-consumer application.
   13. Ballast Marking: Include wiring diagrams with lamp connections.

C. High Intensity Discharge (HID) Ballasts: Unless otherwise indicated, provide electromagnetic ballasts complying with ANSI C82.4 and listed and labeled as complying with UL 1029.
   1. Input Voltage: Suitable for operation at voltage of connected source, with variation tolerance of plus or minus 5 percent.
   2. Power Factor: Not less than 0.90 unless otherwise indicated.

2.4 LAMPS

A. All Lamps:
   1. Unless explicitly excluded, provide new, compatible, operable lamps in each luminaire.
   2. Verify compatibility of specified lamps with luminaires to be installed. Where lamps are not specified, provide lamps per luminaire manufacturer's recommendations.
   3. Minimum Efficiency: Provide lamps complying with all current applicable federal and state lamp efficiency standards.
   4. Color Temperature Consistency: Unless otherwise indicated, for each type of lamp furnish products which are consistent in perceived color temperature. Replace lamps that are determined by the Live Oak Consultants, LLC to be inconsistent in perceived color temperature.

B. Compact Fluorescent Lamps: Wattage and bulb type as indicated, with base type as required for luminaire.

C. Linear Fluorescent Lamps: Wattage and bulb type as indicated, with base type as required for luminaire. D.

High Intensity Discharge (HID) Lamps: Wattage as indicated, with bulb type, burning position, and base type as required for luminaire.

2.5 POLES

A. All Poles:
   1. Provide poles and associated support components suitable for the luminaire(s) and associated supports and accessories to be installed.
   2. Structural Design Criteria:
      a. Wind Load: Include effective projected area (EPA) of luminaire(s) and associated supports and accessories to be installed.
         1) Design Wind Speed: 130 MPH, with gust factor of 1.3.
      b. Dead Load: Include weight of proposed luminaire(s) and associated supports and accessories.

c. Include structural calculations demonstrating compliance with submittals.

3. Material: Steel, unless otherwise indicated.
4. Shape: Square straight, unless otherwise indicated.
5. Finish: Match luminaire finish, unless otherwise indicated.
6. Pole Length: 20', unless otherwise indicated.
7. Mounting: Install on concrete foundation, height as indicated on the drawings, unless otherwise indicated.
8. Unless otherwise indicated, provide with the following features/accessories:
   a. Top cap.
   b. Handhole.
   c. Anchor bolts with leveling nuts or leveling shims.
   d. Anchor base cover.

B. Metal Poles: Provide ground lug, accessible from handhole or transformer base.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as shown on the drawings.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.

C. Verify that suitable support frames are installed where required.

D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires. E.

Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 260537 as required for installation of luminaires provided under this section.

B. Install products according to manufacturer's instructions.

C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship) and NECA/IESNA 501 (exterior lighting).

D. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

E. Pole-Mounted Luminaires:
1. Foundation-Mounted Poles:
   a. Provide cast-in-place concrete foundations for poles as indicated, in accordance with Section 033000.
      1) Install anchor bolts plumb per template furnished by pole manufacturer.
      2) Position conduits to enter pole
   shaft. b. Install foundations plumb.
   c. Install poles plumb, using leveling nuts or shims as required to adjust to plumb.
   d. Tighten anchor bolt nuts to manufacturer's recommended torque.
   e. Install non-shrink grout between pole anchor base and concrete foundation, leaving small channel for condensation drainage.
   f. Install anchor base covers or anchor bolt covers as indicated.
2. Grounding:
   a. Bond luminaires, metal accessories, metal poles, and foundation reinforcement to branch circuit equipment grounding conductor.
   b. Provide supplementary ground rod electrode as specified in Section 260526 at each pole

bonded to grounding system as indicated.

3. Install separate service conductors from each luminaire down to handhole for connection to branch circuit conductors.

F. Install accessories furnished with each luminaire.

G. Bond products and metal accessories to branch circuit equipment grounding conductor.

H. Install lamps in each luminaire.

3.3 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for additional requirements.

B. Inspect each product for damage and defects.

C. Operate each luminaire after installation and connection to verify proper operation.

D. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Live Oak Consultants, LLC.

3.4 ADJUSTING

A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Live Oak Consultants, LLC. Secure locking fittings in place.

B. Luminaires with Field-Rotatable Optics: Position optics according to manufacturer's instructions to achieve lighting distribution as indicated or as directed by Live Oak Consultants, LLC.

3.5 CLEANING

A. Clean surfaces according to NECA/IESNA 501 and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

END OF SECTION

SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. This section covers all work associated with the removal of trees and vegetation and the disposal of such material.

1.2 DEFINITIONS

A. Clearing: The felling, trimming, cutting and disposal of trees and other vegetation to include brush.

B. Grubbing: The removal and disposal of roots, matted roots, stumps, organic and metallic debris, and refuse to a depth not less than 18 inches.

C. Saleable Timber: Felled trees which could be used as saw logs, pulpwood, posts, poles, ties or fuel wood.

D. Non-Saleable timber: Timber, scrub, vegetation and other debris considered as non-saleable.

E. Tree: Any living, self-supporting, woody perennial plant.

1. Diameter Breast Height (DBH): The diameter of a tree measured at breast height (4.5 feet above ground).
2. Grand or Historic Tree: DBH equal to or greater than 24 inches.
3. Significant Tree: DBH equal to or greater than 16 inches.
4. Protected Tree: DBH equal to or greater than 8 inches.

F. Protective Barricade: A physical structure not less than 4 feet in height, limiting access to a tree.

1.3 LUMP SUM PRICE

A. The items listed in the bid shall be considered sufficient to complete the work in accordance with the drawings and specifications. Any portion of the work not specifically listed in the bid form shall be deemed a part of the item with which it is associated and shall be included in the lump sum price. The price shall be full compensation for all material, equipment, labor, testing, construction supervision and all other work required for satisfactory completion of site clearing.

1.4 UNIT PRICES

A. None this Section.

1.5 SUBMITTALS

A. None this Section.

1.6 REGULATORY REQUIREMENTS

A. Comply with Federal, State, and local regulations.

B. Comply with the requirements of the land disturbance permit and stamped approved drawings issued for this project by South Carolina Department of Health and Environmental Control (SCDHEC) and/or the MS4.

C. Burning shall not be allowed.

1.7 QUALITY ASSURANCE

A. Subcontractor: A subcontractor for any part of the work must have experience on similar work. At the option of the Engineer, a list of projects and the contacts who are familiar with his competence may be required to be submitted to verify experience.

B. Equipment: Shall be well maintained, suited for the intended work and capable of delivering the finished product to the standards shown on drawings and as specified herein.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 CLEARING

A. Clearing shall consist of the felling and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including down timber, snags, brush, and rubbish occurring within the area to be cleared. Trees, stumps roots, brush and other vegetation in areas to be cleared shall be removed completely from the site to an area designated by the Owner, except such trees and vegetation as may be indicated or directed to be left standing.

B. Trees designated to be left standing within the cleared areas shall be trimmed of dead branches 1.5 inches or more in diameter. Limbs and branches to be trimmed shall be neatly cut close to the hole of the tree or main branches. Cuts more than 1.5 inches in diameter thus made shall be painted with a tree wound paint.

C. Trees and vegetation to be left standing shall be protected from damage incident to clearing, grubbing, and construction operations, by erection of timber barriers or by such other means as circumstances require. Such barriers must be placed and be approved by the Engineer before construction activities can proceed.

D. Clearing shall also include the removal and disposal of structures that obtrude, encroach upon, or otherwise obstruct the work.

E. Clearing operations shall be conducted to prevent damage by falling trees to trees left standing, to existing structures and installation, and to those under construction, and so as to provide for the safety of employees and others.

3.2 GRUBBING

A. Grubbing shall consist of the removal and disposal of stumps, roots larger than 0.25 inches in diameter, and matted roots from the designated grubbing areas. This material, together with logs and other organic or metallic debris not suitable for foundation purposes, shall be excavated and removed to a depth of not less than 18 inches below the original surface level of the ground in embankment areas and not less than 24 inches below the finished earth surface in excavated areas.

B. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform with the original adjacent surface of the ground at no additional cost to the Owner.

3.3 TREE REMOVAL

A. Where indicated or directed, trees and stumps shall be removed from areas outside those areas designated for clearing and grubbing. The work shall include felling of such trees and the removal of their stumps and roots. Trees shall be disposed of as specified.

3.4 DISPOSAL

A. Disposal of trees, branches, snags, brush, stumps, etc., resulting from the clearing and grubbing shall be the responsibility of the Contractor and shall be disposed of by removal from the site.

B. Disposal by hauling, if necessary, shall be at no additional cost to the Owner.

C. All liability of any nature resulting from the disposal of the cleared and grubbed material shall become the responsibility of the Contractor.

D. Disposal by burning shall not be allowed.

E. All costs in connection with disposing of the material will be at the Contractor's expense.

3.5 EXISTING TREE PROTECTION

A. All trees on the site will be saved except those marked specifically for removal. No trees, either those marked for removal on the site or any other tree, may be removed from the site prior to the preconstruction conference.

B. All trees not to be removed will be protected from injury to their roots and to their top to a distance 3 feet beyond the drip line and no grading, trenching, pruning, or storage of materials may go in this area.

END OF SECTION 311000

SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

A. This section covers all work associated with stripping, subgrade preparation, filling, backfilling, compaction and disposition of surplus soil materials.

1.2 DEFINITIONS

A. Subgrade: Existing, in-situ soil or other material that is remaining after stripping or excavation. The subgrade is always existing material on which fill, or new structures are to be placed.

B. Excavation: The removal of soil or material to obtain a specified depth or elevation.

C. Borrow: Material that must be transported to the site. A material that must be developed by others and transported to the site. Not available on site.

D. Fill: Soil or material placed above the subgrade to the point of new construction such as a sub-base, base course, pavement, foundation, footing, or building component.

E. Backfill: Fill material used in refilling a cut, trench or other excavation.

F. Lift: A layer or course of material placed on top of a previously prepared or placed material.

G. Rock: Solid, homogeneous interlocking crystalline material with firmly cemented, laminated or foliated masses or conglomerate deposits, neither of which can be removed without systematic drilling and blasting, drilling and the use of expansion jacks or feather wedges, or the use of backhoe mounted pneumatic hole punchers or rock breakers; also, large boulders, buried masonry, or concrete other than pavement, exceeding 25 cubic yards in volume. Removal of hard material will not be considered rock excavation because of intermittent drilling and blasting that is performed merely to increase production.

H. Topsoil: In natural or undisturbed soil formations, the fine grained, weathered material on the surface or directly below any loose or partially decomposed organic matter. Topsoil may be dark-colored, fine, silty or sandy material with a high content of well decomposed organic matter, often containing traces of the parent rock material. The material shall be representative of productive soils in the vicinity.

I. Unsuitable Material: Existing, in situ soil or other material which can be identified as having insufficient strength characteristics or stability to carry intended loads in fill or embankment without excessive consolidation or loss of stability. Materials classified as PT, OH, or OL by ASTM D 2487 are unsuitable. Unsuitable materials also include man-made fills, refuse, frozen material, uncompacted backfills from previous construction, unsound rock or soil lenses, or other deleterious, organic or objectionable material.

J. Granular Material: Soils classified as GW, GP, SW or SP by ASTM D 2487. Materials classified as GM and SM will be identified as granular only when fines have a plasticity index of zero.

K. Compaction: The process of mechanically stabilizing a material by increasing its density at a controlled moisture condition. “Degree of Compaction” is expressed as a percentage of the maximum density obtained by the test procedure described in ASTM D1557 for general soil types or ASTM D 4253 or ASTM D 4254 for isolated cohesionless materials, abbreviated in this specification as “___ percent maximum density.”

1.3 LUMP SUM PRICE

A. The items listed in the bid shall be considered as sufficient to complete the work in accordance with the drawings and specifications. Any portion of the work not specifically listed in the bid form shall be deemed a part of the item with which it is associated and shall be included in the lump sum price. The price shall be full compensation for the removing and replacing of topsoil and all excavating, filling, transporting of material, compaction, shaping, finishing, dressing, disposal of surplus material, testing, staking, construction supervision and all other work required for satisfactory completion of the grading operation. The building pad shall include all areas to 10 feet outside the building wall and the area under all footings including trench walls and bottom. Also included in this price shall be that necessary to complete the grubbing and root raking operation as required by this section and elsewhere.

B. Base bids on the following criteria:

1. Surface elevations as indicated.
2. No pipes or other man-made structures other than those indicated will be encountered. The utility locations shown are based on available information and are approximate and shall be field verified prior to beginning any work.
3. The character of the material to be excavated or used for subgrade is as indicated.
4. The Geotechnical Report indicates the location and characteristics of unsuitable materials. Removal of these materials will be required as indicated in the Geotechnical Report and as required in this Section.
5. Ground water elevations indicated are those existing at the time of subsurface investigations and do not necessarily represent ground water elevation at the time of construction.
6. Borrow material in the quantities required are not available on site and must be developed and obtained by the Contractor.

1.4 UNIT PRICES

A. Payment for the unit shown on the bid form shall be considered complete to cover the cost of all labor, material, equipment, testing and performing all operations necessary to complete the work in place. Payment shall be made based upon the actual quantity multiplied by the unit prices. Measurement will be made by means acceptable to the Owner and the Engineer. Direction to perform work must be given by the Owner and the Engineer.

B. Material is to be paid for in its final position after placement or compaction by means acceptable to the Owner or Engineer. If actual amounts differ from the Base Bid quantities, the contract amount altered by change order at the unit price established on the bid form.

1. Removal of Unsuitable Materials and Replacement with Controlled Fill (per CY).

a. Base Bid Quantity: **1,500 CY**. The Contractor shall include in the Base Bid this assumed quantity of removal of unsuitable materials and replacement with controlled fill.
b. The Contractor shall provide a unit price ($/CY) for removal of unsuitable materials and replacement with controlled fill.

1.5 SUBMITTALS

A. Dewatering Plan: Submit plan that indicates the method proposed for removing collected water from open trenches and diverting surface water or piped flow away from work area. Include the following:

1. Equipment and procedures for installing and operating the dewatering system indicated.
2. Basic components of the proposed dewatering system and its planned method of operation.
3. Record of performance and effectiveness of method or system in use.
4. Comply with requirements identified in the paragraph entitled “Drainage and Dewatering”.

B. Shoring and Sheeting Plan: Submit plan that describes the materials of the shoring system to be used. Include the following:

1. Provide plans, sketches, or details along with calculations by a professional engineer.
2. Indicate sequence and method of installation and removal.
3. Indicate if components will remain after filling or backfilling.

C. Certifications

1. Independent Testing Laboratory
2. Manufacturer or supplier certifications of compliance indicating conformance to this specification or the referenced standard(s) for the following:

a. Topsoil
b. Gravel
c. Sand

D. Laboratory Testing: Submit test results as identified in the paragraph titled "Laboratory Testing" for any of the following materials to be used on the project. Obtain approval before any material is delivered to the site.

1. Subgrade
2. Common fill
3. Controlled fill
4. Granular fill

E. Field Testing: Submit field test results as identified in the paragraph titled "Field Testing" for the following:

1. Subgrade
2. Excavation
3. Fill/backfill

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver and store materials in a manner to prevent contamination or segregation. Do not stockpile materials in a manner or location that will cause excessive wetting or transporting of materials off-site or into storm drainage collection systems.

1.7 REGULATORY REQUIREMENTS

A. Materials and workmanship specified herein with reference to SCDOT Standard Specifications for Highway Construction shall be in accordance with the referenced article or section of the standard except that contractual and payment provisions do not apply. Where the term "State" is used, it shall mean "Owner."

B. Comply with Federal, State, and local regulations.

C. Comply with the requirements of the land disturbance permit and stamped approved plans issued for this project by South Carolina Department of Health and Environmental Control (SCDHEC) and/or the MS4.

1.8 QUALITY ASSURANCE

A. Materials: The Contractor will furnish the Engineer and Owner a description of all materials before ordering. The Engineer will review the Contractor's submittals and provide in writing an acceptance or rejection of material.

B. Manufacturer: Material and equipment shall be the standard products of a manufacturer who has manufactured them for a minimum of 2 years and who provides published data on the quality and performance of the projects.

C. Subcontractor: A subcontractor for any part of the work must have experience on similar work. At the option of the Owner and/or Engineer, a list of projects and the contacts who are familiar with his competence may be required to be submitted to verify experience.

D. Design: Devices, equipment, structures, and systems not designed by the Engineer that the Contractor wishes to furnish shall be designed by either a registered professional engineer or by someone the Engineer accepts as qualified. Complete design calculations and assumptions shall be furnished to the Engineer or Owner before acceptance.

E. Testing Agencies: Mill certificates of tests on materials made by the manufacturers will be accepted provided the manufacturer maintains an adequate testing laboratory, makes regularly scheduled tests that are spot checked by an outside laboratory, and furnishes satisfactory certificates with the name of the one making the test. Agencies to be used shall be submitted to the Engineer for review prior to engagement.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Provide materials free from debris, roots, wood, scrap materials, vegetable matter, refuse or frozen material. Maximum particle size permitted is 3 inches. Use excavated material from the site for the work indicated when material falls within the requirements specified herein. When materials available on site do not meet the quantity required nor the requirements specified herein, the Contractor shall obtain borrow materials from off-site.

1. Common Fill: Provide a soil material from the site or borrow that can be readily compacted to the specified densities. Materials shall be unclassified. Soft, spongy, highly plastic, or otherwise unsuitable material is prohibited. Material shall be unclassified but shall contain sufficient fines to ensure proper compaction.
2. Controlled Fill: Provide materials classified as GW, GP, GC, SW, SP, SM or SC by ASTM D2487 where indicated.
   a. The liquid limit of such material shall not exceed 35% when tested in accordance with ASTM D4318.
   b. The plasticity index shall not be greater than 12% when tested in accordance with ASTM D4318, and not more than 35% by weight shall be finer than the No. 200 sieve when tested in accordance with ASTM D1140.
   c. Material shall be free from organics (less than 5% organics by weight) and have a standard proctor maximum dry density greater than 100 pcf.
3. Granular Fill: A dense, well graded aggregate mixture of sand, gravel or crushed stone mixed individually, in combination with each other, or with suitable binder soil. Granular fill may also consist of poorly graded sands or gravels.
4. Gravel: Clean, coarsely graded natural gravel, crushed stone or a combination thereof classified as GW or GP in accordance with ASTM D2487 as indicated. The maximum particle size shall not exceed 3 inches.
5. Sand: Clean, coarse-grained sand classified as SW or SP by ASTM D2487 as indicated.
6. Topsoil: Salvaged topsoil form stockpile created during stripping operations. Add necessary soil modifiers to bring material within the ranges specified in Table 1. Furnish additional topsoil meeting the requirements in Table 1 if stockpiled material is insufficient to complete the work indicated.
7. Soil materials shall be free of subsoil, stumps, roots larger than 0.75 inch in diameter (with maximum 3% retained on the 0.25 inch sieve, brush, weeds, toxic substances, and other material or substance detrimental to plant growth.

TABLE 1

DOA SSIR Soil Survey Investigation Report No. 1, Laboratory Test for	Acceptable Limits
Sand Content	20 - 45 percent by weight
Silty Content	25 - 50 percent by weight
Clay Content	10 - 30 percent by weight
Organic Material (Walkley-Block)	5 percent
Ph	5.0 to 7.6
Soluble Salts	600 ppm maximum
Absorption Rate	0.5 inch per hour minimum

2.2 GEOTEXTILE FABRICS

A. Filter Fabric

1. Provide a pervious sheet of polyester, nylon, glass or polypropylene, ultraviolet resistant filaments woven, spun bonded, fused, or otherwise manufactured into a non-raveling fabric with uniform thickness and strength.
2. Fabric shall have the following manufacturer certified minimum average roll properties as determined by ASTM D4759:

TABLE 2: Minimum Average Roll Properties	Class A	Class B
Grab Tensile Strength (ASTM D4632) Machine and Transverse Direction	min. 180	80 lbs
Grab Elongation (ASTM D4632) Machine and Transverse Direction	min. 15	15 percent
Puncture Resistance (ASTM D4833)	min. 80	25 lbs.
Mullen Burst Strength (ASTM D3786)	min. 290	130 psi
Trapezoidal Tear (ASTM D4533)	min. 50	25 lbs
Apparent Opening Size:	See Criteria Below	
Soil with 50 percent or less particles by weight passing US No. 200 Sieve, AOS less than 0.6 mm (greater than #30 US Std. Sieve)		
Soil with more than 50 percent particles by weight passing US No. 200 Sieve, AOS less than 0.297 mm (greater than #50 US Std. Sieve)		
Permeability (ASTM D4491)	k fabric greater than k Soil	
Ultraviolet Degradation (ASTM D4355)	70 percent Strength	Retained at 150 hrs

PART 3 - EXECUTION

3.1 STRIPPING

A. Perform clearing and grubbing operations as specified in SECTION “SITE CLEARING”.

B. Strip topsoil from the site where excavation or grading is indicated and stockpile separately from other excavated material. Material unsuitable for use as topsoil may be used for common fill provided that those requirements are met. Locate topsoil so that material can be used readily for the finished grading. Protect and store in segregated piles until needed.

3.2 EXCAVATIONS

A. Excavate to contours and dimensions indicated. Keep excavations free from water while construction is in progress. Notify the Engineer immediately in writing if it becomes necessary to remove rock, hard material, or other material defined as unsuitable to a depth greater than indicated. Refill excavations cut below the depths indicated with controlled fill and compact as specified herein. Excavate soil disturbed or weakened by construction operations or soils softened from exposure to weather. Refill with controlled fill or concrete and compact as specified herein.

B. Excavations for Structures and Spread Footings

1. Excavate to depth indicated. If excavation is deeper than indicated, then fill with concrete when the foundations or footings are placed or backfill with controlled fill material prior to placement of footings.

C. Pile Supported Foundations

1. Excavate to elevation of bottom of pile cap. Backfill and compact over excavations and changes in grade due to pile driving operations in accordance with the requirements for filling and backfilling for structures. Place and compact backfill adjacent to pile caps in a manner that prevents displacement of the pile cap.

D. Disposal of Excavated Material

1. Surplus or other soil material not required or suitable for filling, backfilling, or embankment shall be removed from the property. Comply with all federal, state and local laws regarding the transportation and disposal of such material.
2. Dispose of excavated material in such a manner that it will not obstruct the flow of runoff, streams, endanger a partly finished structure, impair the efficiency or appearance of facilities, or be detrimental to any property or work.

3.3 PREPARATION OF SUBGRADE

A. Subgrade Proof Rolling

1. Proof rolling shall be done in the presence of the Engineer. Notify the Engineer 72 hours prior to proof rolling.
2. After removal of topsoil or other overburden, proof roll the existing subgrade with six passes of a minimum 15 ton pneumatic-tired roller. Operate the roller in a systematic manner to assure the number of passes over all areas, and at speeds between 2.5 and 3.5 mph.
3. When proof rolling under structures, one-half of the passes made with the roller shall be in a direction perpendicular to the other passes.
4. Rutting or pumping shall indicate unsuitable material and that material shall be undercut as directed by the Engineer, to a depth of 24 inches, and replaced with the appropriate fill material. Unsuitable material removal shall be done in accordance with the paragraph titled “Excavations.”
5. Perform proof rolling only when weather conditions permit. Do not proof roll wet or saturated subgrades. Materials degraded by proof rolling a wet or saturated subgrade shall be replaced by the Contractor as directed by the Engineer at no cost to the Owner.

B. Preparation of Subgrade

1. Scarify the underlying subgrade surface to a depth of 6 inches before the fill is started. Step, bench, or break up sloped surfaces steeper than one vertical to 4 horizontal so that the fill material will bond with or be securely keyed to the existing material. Scarify existing surface to a minimum depth of 6 inches if subgrade density is less than the degree of compaction specified and recompact.
2. When the subgrade is part fill and part excavation or natural ground, scarify the excavated or natural ground portion to a depth of 12 inches and recompact as specified for the adjacent or overlying fill. Compact with

equipment well suited to the soil being compacted. Moisten or aerate material as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used.

C. Compaction of Subgrade

1. The subgrades shall be compacted to the following maximum densities:

Compaction of Subgrade Location	Percent Maximum Dry Density
Under sidewalks and grassed areas	92
Under building slabs, foundations, footings, pavements and base courses (Greater than 12 inches below bottom of structure or pavement)	96
Under building slabs, foundations, footings, pavements and base courses (Less than 12 inches below the bottom of structure or pavement)	96

2. Protect subgrade from excessive wheel loading during construction, including concrete trucks and dump trucks.
3. Remove areas of finished subgrade found to have insufficient compaction density to depth necessary and replace in a manner that will comply with compaction requirements by use of a material equal to or better than best subgrade material on site.
4. Surface of subgrade after compaction shall be hard, uniform, smooth, stable, and true to grade and cross section. Maintain subgrade for area to be paved and building pad subgrade, whether previously graded by others and accepted by Contractor or constructed by Contractor. Make adjustments that may be required in accordance with the Specifications at no additional expense to the Owner.

D. Tolerances

1. Grade to finished grades indicated within 0.10 foot. Grade area to drain water away from structures. Existing grades which are to remain but are disturbed by the Contractor's operations shall be restored to original condition.
2. Finish surface of subgrade to the elevation and cross section indicated. Finished surface shall be smooth and of uniform texture. Lightly scarify or blade the finished surface to bring the finished surface to within 0.10 foot of the indicated grade and to eliminate imprints made by compaction and shaping equipment. Surface shall show no deviations in excess of ½ inch when tested with a 10-foot straightedge.
3. Finished subgrade shall be verified to ensure proper elevation for construction above subgrade. Grading of building and pavement areas shall be checked by string line from grade stakes (blue tops) set at not more than 50' centers. Contractor is to provide engineering and field staking necessary for verification of lines, grades, and elevations.

3.4 FILL AND BACKFILL

A. Place required fill and backfill material adjacent to structures and compact in a manner that prevents wedging action or eccentric loading upon or against the structures.

B. Step or serrate slopes bounding or within areas to be filled or backfilled to prevent sliding of the fill.

C. Moisten or aerate material as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction and slopes with the equipment used. Do not place material on surfaces that are muddy, frozen, or contain frost.

D. Do not use equipment for filling or backfilling operations or for the formation of embankments against structures that will overload the structure. Filling or backfilling against structures will be done only after the structure has attained sufficient strength to withstand the loads anticipated during and after backfilling operations.

E. Fill and backfill operations shall be performed with the following materials:

1. Common Fill

a. Construct fill backfill and embankment at the locations and to lines and grades indicated. Use only approved materials in constructing fill on the prepared subgrade. Place satisfactory material in horizontal lifts not exceeding 8 inches in loose depth. Do not place material on surfaces that are muddy, frozen, or contain frost. Compact with equipment well suited to the soil being compacted. Moisten or aerate material as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction and slopes with the equipment used. Compact each lift as specified before placing the overlaying lift.

2. Controlled Fill

a. Place controlled fill under footings, concrete slabs not pile supported, structures, pavements and where indicated in maximum loose lifts of 8 inches. Do not place material on surfaces that are muddy, frozen, or contain frost. Compact with equipment well suited to the soil being compacted. Moisten or aerate material as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction and slopes with the equipment used. Compact each lift as specified herein before placing the overlaying lift. Compaction shall be accomplished continuously over the entire area. Sufficient passes shall be made to ensure that specified density is obtained.

3. Granular Fill, Gravel and Sand

a. Granular fill, gravel and sand shall be placed where indicated. Do not dump material, but place in maximum loose 12-inch lifts and compact as indicated.

F. Compaction of Fill/Backfill

1. Fill and backfill shall be compacted to the following maximum densities:

Compaction of Fill / Backfill Location	**Percent Maximum Dry Density**
Under sidewalks and grassed areas	92
Under building slabs, foundations, footings, pavements and base courses (Greater than 12 inches below bottom of structure or pavement)	96
Under building slabs, foundations, footings, pavements and base courses (Less than 12 inches below the bottom of structure or pavement)	96

2. Fill shall be placed at a moisture content within 2% of its optimum moisture content.

3. Protect compacted fill from excessive wheel loading during construction, including concrete trucks and dump trucks. Remove areas of compacted fill found to have insufficient compaction density to depth necessary and replace in a manner that will comply with compaction requirements by use of a material meeting the specifications. Surface of compacted fill after compaction shall be hard, uniform, smooth, stable, and true to grade and cross section. Maintain compacted fill for area to be paved and building pad subgrade, whether previously graded by others and accepted by Contractor or constructed by Contractor. Make adjustments that may be required in accordance with the Specifications at no additional expense to the Owner.

G. Tolerances

1. Grade to finished grades indicated within 0.10 foot. Grade area to drain water away from structures. Existing grades which are to remain but are disturbed by the Contractor's operations shall be restored to original condition.

2. Finish surface of fill or backfill to the elevation and cross section indicated. Finished surface shall be smooth and of uniform texture. Lightly scarify or blade the finished surface to bring the finished surface to within 0.10 foot of the indicated grade and to eliminate imprints made by compaction and shaping equipment. Surface shall show no deviations in excess of ½ inch when tested with a 10-foot straightedge.

3.5 TOPSOIL

A. Clear areas to receive topsoil for the finished surface of materials that would interfere with planting and maintenance operations. Scarify subgrade to a depth of 2 inches. Do not place topsoil when the subgrade or fill is frozen, extremely wet or dry, or in other conditions detrimental to seeding, planting, or grading. Spread topsoil to a uniform depth of 4 inches over the designated areas.

3.6 PROTECTION

A. Shoring and Sheeting

1. The Contractor is responsible for the design of all shoring and sheeting systems. Provide shoring, bracing or sheeting where required. In addition to the requirements of Section 25 A and B of COE EM-385-1-1, and other requirements of this contract meet the following:

   a. Prevent the undermining of pavements, foundations and slabs.
   b. Slope banks where space permits.
   c. Where shoring and sheeting materials remain in place in completed work to prevent settlements or damage to adjacent structures as directed, backfill the excavation to 3 feet below the finished grade and remove the remaining portion of the shoring before completing the backfill.

B. Drainage and Dewatering

1. Plan for and provide structures, equipment and construction for the collection and disposal of surface and subsurface water encountered during construction.

   a. Drainage

      1) Dispose of surface water which may accumulate in open excavations, unfinished fills, or other low areas. Remove water by trenching where approved, pumping, or other methods to prevent softening of exposed surfaces.
      2) Surface dewatering plan shall include rerouting of any storm water runoff or natural drainage if necessary.
      3) Collect and dispose of surface and subsurface water encountered in the course of construction.

   b. Dewatering

      1) Groundwater flowing toward or into excavations shall be controlled to prevent sloughing or excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction.
      2) French drains, sumps, ditches or trenches will not be permitted within three feet of the foundation of any structure, except with specific written approval, and after specific contractual provisions for restoration of the foundation area have been made.
      3) Control measures shall be taken by the time the excavation reaches the water level in order to maintain the integrity of the in-situ material. While the excavation is open, the water level shall be maintained continuously, at least one foot below the working level.

4) Operate the dewatering system continuously, 24 hours per day, 7 days per week until construction work below existing water levels is complete. Have a back-up pump and system available for immediate use.

C. Erosion Control

1. Protect existing streams, ditches, and storm drain inlets from water-borne soil by the means indicated on the contract drawings and as required to prevent sedimentation of downstream features.

D. Existing Utilities

1. All known utility facilities are shown schematically on the plans and are not necessarily accurate in location as to plan or elevation. Utilities such as service lines or unknown facilities not shown on plans will not relieve the Contractor of his responsibility under this requirement. "Existing Utilities Facilities" means any utility that exists on the project in its original, relocated or newly installed position. The Contractor will be held responsible for the cost of repairs to damaged underground facilities; even when such facilities are not shown on the plans.
2. The Contractor shall contact all utility companies prior to beginning work and request accurate field location of their respective utility lines.
3. Movement of construction machinery and equipment over pipes during construction shall be at the Contractor's risk. Repair or remove and provide new pipe for existing or newly installed pipe that has been displaced or damaged.

E. Structures and surfaces

1. Graded areas shall be protected from traffic, erosion, settlement, or any washing away that may occur from any cause prior to acceptance.
2. Any repair or reestablishment of final grades shall be made prior to final acceptance.

3.7 INSPECTION AND TESTING

A. Inspections

1. Notify the Owner, Project Representative and Engineer a minimum of 72 hours prior to all required observations, inspections or tests.
2. All work conducted and materials furnished shall be subject to review by the Engineer or the Project Representative. The Engineer will also have the right to require that any portion of the work be conducted in his presence.

    a. If the work is covered after such instruction, it shall be exposed by the Contractor for observation.
    b. However, if the Engineer is notified that such work is scheduled and the Engineer fails to appear within 72 hours, the Contractor may proceed without him.

3. All improper work shall be reconstructed and all materials which do not conform to the requirements of the specifications shall be removed from the work upon written notice.
4. The Engineer shall have the right to mark materials as rejected to distinguish them as such.

B. Testing

1. All testing shall be made at the Owner's expense. The Engineer shall approve test locations.
2. Notify the testing laboratory, Engineer, and Owner <u>a minimum of 72 hours prior to</u> all tests.
3. Test results shall be furnished to the Contractor, Engineer and Owner within 72 hours after field tests are taken.

4. Laboratory testing

   a. Independent Testing laboratory shall operate in accordance with ASTM E 329 (latest edition) and shall be submitted to the engineer for approval.
   b. Laboratory testing for maximum density and optimum moisture content shall be performed in accordance with ASTM D1557 for general soil types or ASTM D4253 or ASTM D4254 for isolated cohesionless materials.
   c. Laboratory testing for mechanical analysis shall be performed in accordance with ASTM D2487.
   d. Laboratory testing for plasticity index shall be performed in accordance with ASTM D4318

   e. Frequency of laboratory testing

      1) Native soil subgrade: One maximum density, optimum moisture content, mechanical analysis and plasticity index test for each material encountered that will serve as subgrade.
      2) Fill/Backfill: One maximum density, optimum moisture content, mechanical analysis and plasticity index for each source <u>and</u> type of material to be used.

5. Field Testing

   a. Independent Testing Laboratory shall prepare test reports that indicate test location, elevation data, and test results.
   b. If any test performed fails to meet these specifications, Independent Testing Laboratory shall immediately notify the Owner, Engineer and Contractor.
   c. The Owner reserves the right to employ an Independent Testing Laboratory and to direct any testing that it may deem necessary. The Contractor shall provide free access to the site for testing activities.

   d. Field density tests for in-place materials shall be performed in accordance with one of the following:

      1) Sand Cone Method: ASTM D 1556
      2) Balloon Method: ASTM D 2167
      3) Nuclear Method: ASTM D 6938

   e. Frequency of field testing

      1) Subgrade

         a) One test per 5,000 SF within building footprint (minimum of 3)
         b) One test per 1,000 SY of pavement (minimum of 3)
         c) One test per 250 LF of footing (minimum of 4 - one each face of building)

      2) Fill/Backfill

         a) One test per 5,000 SF per lift within building footprint (minimum of 4 per lift)
         b) One test per 1,000 SY of pavement per lift (minimum of 3 per lift)
         c) One test per 250 LF of footing (minimum of 4 - one each face of building

3.8 ACCEPTANCE

A. If a tested material does not meet or exceed the specified requirements, the Contractor shall perform additional testing as directed by the Owner and/or Engineer to adequately define the limits of the material not meeting the specifications. Materials shall be re-tested to the satisfaction of the Owner and/or Engineer until specified requirements are met.

B. All additional testing and work that is the result of a failed inspection or test shall be performed by the Contractor at no additional cost to the Owner.

END OF SECTION 312000

SECTION 312010 - FILTER FABRIC

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish all labor, equipment and services for the placement of silt fence, filter blanket protection under stone rip rap, as erosion control blanket for slope protection, and as a joint filter around all drainage pipe joints as shown on the drawings and as specified herein:

1.2 LUMP SUM PRICE

A. The items listed in the bid shall be considered sufficient to complete the work in accordance with the drawings and specifications. Any portion of the work not specifically listed in the bid form shall be deemed a part of the item with which it is associated and shall be included in the lump sum price. The price shall be full compensation for all material, equipment, labor, testing, construction supervision and all other work required for satisfactory completion of filter fabric installation.

1.3 UNIT PRICES

A. None this Section.

1.4 SUBMITTALS

A. None this Section.

1.5 DELIVERY, STORAGE AND HANDLING

A. During all periods of shipment and storage, the filter fabric shall be protected from direct sunlight, ultra-violet rays, temperatures greater than 140°F, mud, dirt, dust, and debris. The fabric shall be maintained, wrapped in a heavy-duty protective covering.

1.6 REGULATORY REQUIREMENTS

A. Comply with Federal, State, and local regulations.

B. Comply with the requirements of the land disturbance permit and stamped approved drawings issued for this project by South Carolina Department of Health and Environmental Control (SCDHEC) and/or the MS4.

1.7 QUALITY ASSURANCE

A. Materials: All material submittals shall be submitted by the contractor and reviewed and accepted in writing by the Engineer prior to ordering of any materials.

B. Manufacturer: Material and equipment shall be the standard products of a manufacturer who has manufactured them for a minimum of 2 years and who provides published data on the quality and performance of the projects.

C. Subcontractor: A subcontractor for any part of the work must have experience on similar work. At the option of the Owner and/or Engineer, a list of projects and the contacts who are familiar with his competence may be required to be submitted to verify experience.

D. Equipment: Shall be well maintained, suited for the intended work and capable of delivering the finished product to the standards shown on drawings and as specified herein.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Silt Fence

1. Fabric: Fabric shall be a 3 foot wide, woven, geotextile filter fabric. Fabrics shall be included on SCDOT's Qualified Products Listing (QPL), approval sheet #34; and shall meet the requirements of the most current edition of the SCDOT Standard Specifications for Highway Construction and addendums.
2. Wire Backing: Woven wire fence shall be required as a backing for filter fabric with an elongation as determined by ASTM D1682 of 50% or greater. The wire fence shall be a minimum of 32 inches in width and shall have a minimum of 6 line wires with 12 inch stay spacing.
3. Posts - Steel: A minimum of 48 inches long, weigh a minimum of 1.3 lb/ft, and have projections for fastening the wire or the fabric to the post. Metal post shall have a metal plate securely attached such that when the post is driven to the proper depth, the plate will be below ground level for additional stability.
4. Posts - Wood: A minimum of 42 inches long and 2 inches or more in diameter.

B. Filter Blanket

1. A non-woven heat bonded fiber of polypropylene and nylon filaments such as Mirafi-140 or equal. Filter blanket shall be used in the following situations:

   a. Under stone rip rap.
   b. For slope protection.
   c. Pipe joint filter wrap.
   d. Underdrains.

PART 3 - EXECUTION

3.1 SITE PREPARATION

A. The surface to receive the fabric shall be prepared to a relatively smooth condition free of obstructions, depressions, debris and soft or low density pockets of material. The elevations and contours shown on the drawings shall be the final grade to the top of the stone rip rap.

B. At the time of installation, the fabric shall be rejected if it has defects, rips, holes, flaws, deterioration or damage incurred during manufacture, transportation, or storage.

C. The filter fabric shall be placed in a manner and at the locations shown on the drawings.

3.2 SILT FENCING

A. Install silt fencing at locations shown on the drawings and as detailed on the drawings and as specified herein.

B. Posts shall be installed to a minimum depth of 24 inches, with 1 to 2 inches protruding above the top of the wire fence or fabric. In any case, no more than 3 feet of the post shall be above the ground. Post spacing shall be 10 feet when wire backing is used and 6 feet when wire backing is not used.

1. When wire backing is not required, fabric shall be attached to steel post using tie wires. The number and location of fasteners will be in a manner to prevent sagging or tearing of the fabric, but in all cases affixed to the post in no less than four places.
2. When woven wire is used, the wire will be attached to the post as described above and the filter fabric will be tied to the fence in such a manner to prevent sagging or tearing of the fabric.

3.3 FILTER BLANKET UNDER STONE RIP RAP and EROSION CONTROL BLANKET FOR SLOPE PROTECTION

A. The fabric shall be placed on a smooth subgrade. The fabric is unrolled in overlapping strips with the long dimension running up the slope. The filter fabric shall be anchored in place with securing pins of the type recommended by the fabric manufacturer. Pins shall be placed on or within 1 foot of the centerline of the overlap. The fabric shall be placed so that the upstream strip will overlap the downstream strip. Maximum overlap is 3 feet. No traffic other that foot traffic will be allowed on the unprotected fabric. The fabric shall be loosely placed loosely to avoid stretching and tearing during placement of stones.

B. The fabric shall be protected at all times during construction from contamination by surface runoff. Contaminated fabric shall be removed and replaced with uncontaminated fabric. Any damage to the fabric during its installation and placement shall be replaced by the Contractor at no additional cost to the Owner. Any damaged fabric shall be covered with new fabric and shall have a minimum of 3 feet of overlap in all directions.

C. Work shall be scheduled so that a layer of stone is immediately placed after fabric installation. Protect the fabric from damage from placement of the stone by limiting the drop height of the material.

3.4 PIPE JOINT FILTER WRAP

A. A filter fabric shall be used to protect the joints of corrugated aluminum, concrete, and plastic pipe. After each joint is assembled, a minimum width of 4 feet of fabric shall be used to completely wrap each joint two times. The joint should be clean and free from debris. The fabric should be pulled tightly around the joint to prevent soil or debris from working its way into the joint.

3.5 PROTECTION

A. Protect fabric from damage and displacement after installation. Damaged or displaced fabric shall be repaired or replaced at the contractor's expense.

3.6 INSPECTIONS

A. General

1. Notify the Owner, Project Representative and Engineer a minimum of 72 hours prior to all required observations, inspections or tests.
2. All work conducted and materials furnished shall be subject to review by the Engineer or the Project Representative. The Engineer will also have the right to require that any portion of the work be conducted in his presence.

a. If the work is covered after such instruction, it shall be exposed by the Contractor for observation.

b. However, if the Engineer is notified that such work is scheduled and the Engineer fails to appear within 72 hours, the Contractor may proceed without him.

3. All improper work shall be reconstructed and all materials which do not conform to the requirements of the specifications shall be removed from the work upon written notice.

a. The Engineer shall have the right to mark materials as rejected to distinguish them as such.

B. Silt Fencing

1. Inspect silt fencing for general condition and buildup of sediment as indicated on the drawings.

3.7 ACCEPTANCE

A. Final acceptance will be based on satisfactory placement of filter fabric as approved by the Owner and/or Engineer. Filter fabric shall be re-worked to the satisfaction of the Owner and/or Engineer until specified requirements are met.

B. All additional work that is the result of a failed inspection shall be performed by the Contractor at no additional cost to the Owner.

END OF SECTION 312010

SECTION 312324 - FLOWABLE FILL

PART 1 - GENERAL

1.1 SUMMARY

A. This section covers all work associated with the furnishing and placing of flowable fill as indicated on the drawings and in the specifications.

1.2 DEFINITIONS

A. Flowable Fill: A controlled low-strength material (CLSM) which can be placed in a self-leveling consistency or in a less flowable state to reduce fluid pressure exerted by the material.

1.3 LUMP SUM PRICE

A. The items listed in the bid shall be considered as sufficient to complete the work in accordance with the drawings and specifications. Any portion of the work not specifically listed in the bid form shall be deemed a part of the item with which is it associated and shall be included in the lump sum price. The price shall be full compensation for the material, compaction, shaping, finishing, dressing, disposal of surplus material, testing, construction supervision and all other work required for satisfactory completion of the flowable fill.

1.4 UNIT PRICES

A. None this Section.

B. Options

1. As specified herein, options are provided for use of materials specified in the applicable sections of the "South Carolina Department of Transportation Standard Specification for Highway Construction". Execution, administration, contractual and payment provisions do not apply. Where the term "State" is used, it shall mean "Owner."

1.5 SUBMITTALS

A. Certifications: Provide manufacturer or supplier certification of compliance indicating conformance to this specification or the referenced standard(s) for the flowable fill material.

1.6 DELIVERY, STORAGE AND HANDLING

A. Flowable fill shall be transported to the site and placed directly from a ready-mix truck. The material shall not be stored on site for subsequent placement.

1.7 REGULATORY REQUIREMENTS

A. Comply with Federal, State, and local regulations.

B. Comply with the requirements of the land disturbance permit and stamped approved drawings issued for this project by South Carolina Department of Health and Environmental Control (SCDHEC) and/or the MS4.

1.8 QUALITY ASSURANCE

A. Materials: All material submittals shall be submitted by the contractor and reviewed and accepted in writing by the Engineer prior to ordering of any materials.

B. Manufacturer: Material and equipment shall be the standard products of a manufacturer who has manufactured them for a minimum of 2 years and who provides published data on the quality and performance of the projects.

C. Subcontractor: A subcontractor for any part of the work must have experience on similar work. At the option of the Engineer, a list of projects and the contacts who are familiar with his competence may be required to be submitted to verify experience.

D. Equipment: Shall be well maintained, suited for the intended work and capable of delivering the finished product to the standards shown on drawings and as specified herein.

PART 2 - PRODUCTS

2.1 FLOWABLE FILL

A. Flowable fill shall be provided by a ready-mix concrete plant operating in accordance with the South Carolina Department of Transportation Standard Specifications for Highway Construction, Section 700 and applicable Special Provisions.

B. Flowable fill mixes shall fall into the categories of “less flowable” and “very flowable”, which is controlled by the amount of water added to the mix. Mix Designs shall comply with one of the following:

1. Mix shall comply with requirements for flowable fill as specified in Section 210 and SC-MC-210 of the SCDOT Standard Specifications for Highway Construction and addendums.
2. Mix shall be in accordance with the table below. Mixes shall fall into the categories of “less flowable/non-excavatable” and “very flowable/excavatable”, which is controlled by the amount of water added to the mix.]

	Mix 1 **Less Flowable** / Non-Excavatable		**Mix 2** **Very Flowable** / Excavatable	
	Weights	Volume	Weights	Volume
Cement	50 lbs	0.25	50 lbs	0.25
Fly Ash	600 lbs	4.24	600 lbs	4.24
Sand	2500 lbs	15.18	2500 lbs	15.18
Water	55 gal (458 lbs)	7.34	65 gal (541 lbs)	8.68
Total Cubic Feet		27.00		28.34*
* One cubic yard of very flowable fill will be mixed to contain more than 27 cubic feet due to additional water.				

3. The above values are based on the following specific gravities:

a.	Cement	3.15
b.	Fly Ash	2.27
c.	Sand	2.64
d.	Water	1.00

4. Sand and fly ash used shall be sufficient to produce a maximum density at optimum moisture content with load bearing capacity and stability characteristics as good or better than a well compacted granular base material.
5. Unconfined compressive strengths shall be 75 psi at 28 days and 150 psi at 56 days.
6. Unless specifically indicated otherwise, all flowable fill shall be **Mix 2 – Very Flowable**.

PART 3 - EXECUTION

3.1 EXISTING UTILITIES

A. Physically verify the location and elevation of existing utilities prior to starting construction. Location of the existing utilities on drawings is approximate.

B. Contact a utility locate firm or each applicable public utility for assistance in accurate locations of existing utilities.

3.2 EXCAVATIONS

A. Trenches and excavations shall be prepared as indicated in SECTION “EARTH MOVING” or the applicable Public Utility standard specifications.

B. All other construction shall progress and be performed as indicated in appropriate specification sections or as indicated on the drawings.

3.3 PLACING FLOWABLE FILL

A. The flowable fill shall be discharged directly from the ready-mix truck into the space to be filled or placed by other methods to be approved by the Engineer.

1. The mix may be placed part depth or full depth as conditions at the site dictate.

B. Ensuring that all formed walls or other structures are capable of handling the hydrostatic pressure exerted by the flowable fill.

C. Trench ends shall be blocked with sandbags or mounded soil, not wood or metal forms.

D. When backfilling utility lines or pipe culverts, the flowable fill shall be distributed evenly to prevent movement of the utility or culvert.

1. The volume of flowable fill required to completely fill the pipe or structure shall be calculated prior to placement. The volume of flowable fill discharged shall be equal to the volume required.

E. The hardened flowable fill can be shaped to grade the next day to allow the patch thickness as indicated. The patch shall be applied directly on top of the flowable fill.

3.4 PROTECTION

A. Existing Pavement: Protect existing pavements to remain from damage. Movement of construction machinery and equipment over existing pavements during construction shall be at the Contractor's risk.

1. Existing pavements damaged by the contractor's operations shall be repaired or replaced to their original condition at the contractor's expense.

B. Erosion Control: Protect existing streams, ditches, and storm drain inlets from water-borne soil by the means indicated on the drawings.

C. Structures and surfaces: Protect newly backfilled areas and adjacent structures, slopes, or grades from traffic, erosion settlement, or any other damage. Repair and re-establish damaged or eroded grades and slopes and restore surface construction prior to acceptance.

D. Traffic: Full traffic can be allowed on hardened flowable fill within 8 to 20 hours (depending on the mix used, site conditions, volume to be backfilled, etc.) without damage to the fill or any structure below. If it is necessary to return traffic in less than 8 hours or there is a concern that traffic flow will "rut" the hardening flowable fill, steel plates shall be used to bridge over the hardening flowable fill.

3.5 INSPECTIONS

A. General

1. Notify the Owner, Project Representative and Engineer a minimum of 72 hours prior to all required observations, inspections or tests.
2. All work conducted and materials furnished shall be subject to review by the Engineer or the Project Representative. The Engineer will also have the right to require that any portion of the work be conducted in his presence.

    a. If the work is covered after such instruction, it shall be exposed by the Contractor for observation.
    b. However, if the Engineer is notified that such work is scheduled and the Engineer fails to appear within 72 hours, the Contractor may proceed without him.

3. All improper work shall be reconstructed and all materials which do not conform to the requirements of the specifications shall be removed from the work upon written notice.

    a. The Engineer shall have the right to mark materials as rejected to distinguish them as such.

3.6 ACCEPTANCE

A. If a material does not meet or exceed the specified requirements, the Contractor shall perform additional tests as directed by the Engineer to adequately define the limits of the material not meeting the specifications. Materials shall be re-tested to the satisfaction of the Owner and/or Engineer until specified requirements are met.

B. All additional testing and work which is the result of a failed inspection or test shall be performed by the Contractor at no additional cost to the Owner.

END OF SECTION 312324

SECTION 312523 - EROSION AND SEDIMENTATION CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Installation of temporary and permanent erosion and sedimentation control systems.
2. Stormwater Pollution Prevention Plan (SWPPP) prepared by ADC Engineering, Inc.

1.2 REFERENCES

A. South Carolina NPDES General Permit for Stormwater Discharges from Construction Activities (SCR100000).

B. Berkeley County Stormwater Design Standards.

1.3 DEFINITIONS

A. *Comprehensive* Stormwater Pollution Prevention Plan (C-SWPPP) - A Stormwater Pollution Prevention Plan (SWPPP) which is prepared to obtain coverage under the NPDES Construction General Permit (CGP). The C-SWPPP must be submitted with the Notice of Intent (NOI) application and must include an Engineering Report (project design calculations). This document must be submitted and approved by SCDHEC, regulated MS4 entity, or an approved entity with Permitting Authority prior to obtaining coverage under this permit.

B. *On-Site* Stormwater Pollution Prevention Plan (OS-SWPPP) – The OS-SWPPP is a condensed version of the C-SWPPP and is stored on site. The OS-SWPPP does not include the Engineering Report (project design calculations). This document does not require submission or approval by the SCDHEC, regulated MS4 entity, or an approved entity with Permitting Authority prior to obtaining coverage under this permit.

C. Best Management Practices (BMPs) - Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants to Surface Waters of the State. BMPs also include treatment requirements, operating procedures, and practices to control Site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. In order to effectively reduce erosion and sedimentation impacts, Best Management Practices (BMPs) must be designed, installed, and maintained during land disturbing activities.

1.4 OS-SWPPP

A. The project specific OS-SWPPP is hereby incorporated as part of this specification and attached to this specification.

B. The Contractor shall obtain approved / stamped plans from SCDHEC and/or the regulated MS4 entity upon approval of the silt fence installation.

1.5 SUBMITTALS

A. Product Data

1. Certifications: All supplied BMPs.

B. Quality Assurance / Quality Control Submittals

1. Design Data
2. Field Test Reports
3. Certificates
4. Manufacturer's Instructions / Field Reports
5. Qualification Statements

C. Closeout Submittals

1. Stormwater As-Builts
2. Stormwater CCTV Videos. Refer to Section "Site Storm Drainage Utilities" for requirements.

1.6 QUALITY ASSURANCE

A. Qualifications

1. Manufacturer: Material and equipment shall be the standard products of a manufacturer who has manufactured them for a minimum of 2 years and who provides published data on the quality and performance of the projects.
2. Subcontractor: A subcontractor for any part of the work must have experience on similar work. At the option of the Engineer, a list of projects and the contacts who are familiar with his competence may be required to be submitted to verify experience.

B. Regulatory Requirements

1. Comply with federal, state, and local regulations.
2. Comply with the requirements of the stormwater / land disturbance permit and approved plans issued by South Carolina Department of Health and Environmental Control (SCDHEC) – Bureau of Water (BOW) and the MS4 (Berkeley County).

C. Certifications

1. Provide product certifications for all manufactured BMPs.

D. Pre-Construction Meetings

1. Prior to performing construction activities at the site, all contractors who will engage in land disturbing activities must attend and document attendance at a pre-construction meeting.
2. The contractor shall invite the Owner, Engineer, and agencies as indicated in the OS-SWPPP to the pre-construction meeting, a minimum of 7 days prior to conducting the meeting.

1.7 DELIVERY, STORAGE, AND HANDLING

A. During all periods of shipment and storage, the filter fabric shall be protected from direct sunlight, ultra-violet rays, temperatures greater than 140 degrees F., mud, dirt, dust, and debris. The fabric shall be maintained, wrapped in a heavy-duty protective covering.

B. Delivery

1. Seed: Protect from drying out and from contamination during delivery, on-site storage, and handling.
2. Fertilizer Delivery: Deliver to site in original, unopened containers bearing manufacturer's chemical analysis, name, trade name, trademark, and indication of conformance to state and federal laws. Instead of containers, fertilizer may be furnished in bulk with certificate indicating the above information.

C. Storage: Store Seed, Fertilizer & Mulch in cool, dry locations away from contaminants.

D. Handling: Do not drop or dump materials from vehicles.

1.8 MAINTENANCE

A. Maintain BMPs in accordance with OS-SWPPP and drawings.

PART 2 - PRODUCTS

2.1 SUMMARY

A. All products shall be provided and installed in accordance with the OS-SWPPP. All materials, construction methods, testing, and approvals shall be in accordance with this document.

2.2 MATERIALS

A. All erosion control products, sediment control devices and materials for non-stormwater BMPs as specified herein and on the Construction Drawings.

PART 3 - EXECUTION

3.1 SUMMARY

A. All work shall be performed in accordance with the OS-SWPPP. All materials, construction methods, testing, and approvals shall be in accordance with this document.

3.2 PREPARATION

A. Communicate SWPPP requirements, emphasizing construction sequence requirements, to Site Contractor, Erosion and Sediment Control Best Management Practice (BMP) installers, and all subcontractors working on-site.

B. Install initial BMPs according to the sequence of construction in the SWPPP. Disturb only those areas absolutely necessary to install the initial BMPs. No other earth disturbance is permitted until after the Stormwater Pre-construction meeting.

C. Inspect and certify the initial BMP installation with the AHJ and Engineer.

3.3 EROSION AND SEDIMENTATION CONTROL IMPLEMENTATION

A. Place erosion and sediment control systems in accordance with the drawings and SWPPP or as may be dictated by site conditions in order to maintain the intent of the specifications and permits.

B. The SWPPP and Construction Drawings shall be corrected, modified or updated as site conditions change. Contractor must obtain approval from the Engineer prior to any modification or substitution of specified Best Management Practices. All BMP changes (and references to approvals) shall be noted in the SWPPP and posted on the drawings. Construction Drawings should be updated daily to track progress when any of the following activities occur: BMP installation or modification, major construction (paving, storm sewer installation, footing installation, etc…), clearing, grubbing or grading, or temporary or permanent stabilization.

C. Owner has authority to limit surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and embankment operations and to direct Contractor to provide immediate permanent or temporary pollution control measures.

D. Maintain erosion and sedimentation control systems as dictated by site conditions, indicated in the construction documents, or as directed by governing authorities or Owner to control sediment until final stabilization. Contractor shall respond to maintenance or additional work ordered by Owner or governing authorities immediately and in compliance with requirements of the applicable permit, and in no case may the initiation of a response exceed 24 hours. If governing authority requests changes to site BMPs or the SWPPP, ensure that changes are properly documented on the SWPPP Construction Drawings and notify the Engineer as to the request to determine if official SWPPP amendments are required.

E. If, during the course of construction at a Site, the temporary removal or alteration of a BMP is necessary to accomplish the construction or to protect health and safety, the Project Superintendent shall note such removal or alteration on the Weekly Inspection Report Form, including specific information regarding the changes made and the day and time such changes were made. During the period the specified BMP is removed due to construction, the contractor must implement appropriate alternate BMPs at the end of each work day to serve a similar function to those BMPs temporarily removed. Contractor shall restore the original specified BMP as soon as practicable but in no case later than 24 hours after the completion of the activity that required the change. Contractor shall take all reasonable measures to prevent discharges from the Site to the waters of the United States during the time that the BMP has been altered or removed, including, but not necessarily limited to timing the removal or alteration of the BMP so that it occurs when precipitation is not forecasted and installing new or alternate BMPs outside the affected area.

F. Contractor shall incorporate permanent erosion control features, paving, and vegetation establishment into project at earliest practicable time within approved sequence of construction to minimize need for temporary controls.

3.4 INSPECTIONS

A. Notify the Owner, Project Representative and Engineer a minimum of 72 hours prior to all required observations, inspections or tests.

B. All work conducted and materials furnished shall be subject to review by the Engineer or the Project Representative. The Engineer will also have the right to require that any portion of the work be conducted in his presence.

1. If the work is covered after such instruction, it shall be exposed by the Contractor for observation.
2. However, if the Engineer is notified that such work is scheduled and the Engineer fails to appear within 72 hours, the Contractor may proceed without him.

C. All improper work shall be reconstructed and all materials which do not conform to the requirements of the specifications shall be removed from the work upon written notice.

1. The Engineer shall have the right to mark materials as rejected to distinguish them as such.

D. Inspections shall be in accordance with the OS-SWPPP and drawings.

END OF SECTION 312523

Comprehensive Stormwater Pollution Prevention Plan (C-SWPPP) For Construction Activities:

Project/Site Name:

Steward Street Park

Project Address/Location:

5920 Steward Street

Hanahan, SC 29410

Berkeley County

Primary Permittee:

City of Hanahan

Permittee/Owner Contact:

1255 Yeamans Hall Road

Hanahan, SC 29410

Mike Cochran

Ph: (843) 576-5250

MCochran@cityofhanahan.com

SWPPP Preparer:

ADC Engineering, Inc.

Chris Cook, P.E.

1226 Yeamans Hall Road

Hanahan, South Carolina 29410

Ph: (843) 566-0161 / Fax: (843) 566-0162

ChrisC@adcengineering.com

Day-to-Day Operator:

(Leave Blank if not known.)

C-SWPPP Preparation Date:

September 16, 2022 – Revision 1

May 27, 2022 - Permit Set

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CERTIFICATION STATEMENT:

I have placed my signature and seal on the design documents submitted signifying that I accept responsibility for the design of the system. Further, I certify to the best of my knowledge and belief that the design is consistent with the requirements of *Title 48, Chapter 14 of the Code of Laws of SC, 1976* as amended, pursuant to *Regulation 72-300* et seq. (if applicable), and in accordance with the terms and conditions of *SCR100000*.

	Name: Christopher B. Cook, P.E. Title: Principal Civil Engineer Date: 9/16/2022
(Signature and Seal)	

SECTION 1 – PROJECT OVERVIEW

1.1. Narrative

A. Construction Activities and BMP Summary

The construction site includes the demolition of the existing WWTP operations building, pavements and associated site appurtenances. The project will construct a new restroom building, renovation of an existing shed into a park pavilion, construction a new granular parking lot and associated sidewalks and concrete pads.

Perimeter Control BMPs will be installed prior to the initiation of the demolition, clearing/grubbing and grading of the site.

The construction activities at this site will be implemented in three distinct Erosion Prevention and Sediment Control Phases. The first phase includes the initial installation of perimeter controls, sediment control BMPs, and the construction entrance. The second phase includes the bulk of the construction activities and the implementation of internal stormwater management BMPs. The final phase, Phase 3, includes the final stabilization of the site and conversion of the sediment basin into a permanent water quality and quantity control structure.

B. Pre-Development Conditions

The existing site is divided into three basins. Basin A is a 0.63 acre basin that is along the eastern property line adjacent to the residential neighborhood. This basin is all pervious (grass and trees) and flows to the north sheet flowing into the Goose Creek.

Basin B is a 0.84 acre basin that discharges by sheet flow and through 2 catch basins and a pipe network into the Goose Creek. This basin has a small area of pavement (0.10 acre) and is mostly comprised of grass.

Basin C is a 1.96 acre basin that comprises the majority of the built upon area with the operations building to be demolished, the majority of the pavements to be demolished and the existing shed that is to be renovated to be a park pavilion. The majority of the basin flows by sheet flow into the tributary to the west. There is also a small network of catch basins and pipes that discharge to this tributary as well.

C. Post-Development Conditions

The overall drainage patterns will be maintained. With the removal of the existing building and the pavements on the site, the addition of a much smaller restroom building and the use of plantation mix for the new POV parking, results is an overall decrease in impervious area and post-development curve numbers that are equal to the pre-development.

The results are no increases in runoff rate or volume for the 2- through 100-year rainfall events.

Hydrodynamic stormwater separators are being installed on the 2 basins that will include construction of new impervious surfaces (Basin B and Basin C). These separators are sized to treat the runoff rate for the ½ inch volume over the entire basin and are sized to be able to bypass the 25 year-24-hour storm event.

Hydrology Analysis Summary

The table below provides a summary of the Basin Data, Pre-Development and Post-Development discharges for this project.

Basin Data	Storm Data	Pre-Development Conditions	Post-Development Conditions
Basin A	Impervious Area	0.0 ac	0.01 ac
	Pervious Area	0.63 ac	0.35 ac
	Total Area	0.63 ac	0.36 ac
	Composite C	0.15	0.16
	Cumulative CN	79	79
	T_c (min)	10 min	10 min
	I – 2 year (in/hr)	4.0	4.0
	I – 10 year (in/hr)	6.2	6.2
	I – 25 year (in/hr)	7.5	7.5
	I – 50 year (in/hr)	8.6	8.6
	I – 100 year (in/hr)	9.8	9.8
	2 yr runoff (cfs)	0.5 cfs	0.3 cfs
	10 yr runoff (cfs)	0.6 cfs	0.4 cfs
	25 yr runoff (cfs)	0.7 cfs	0.4 cfs
	50 yr runoff (cfs)	0.7 cfs	0.5 cfs
	100 yr runoff (cfs)	0.8 cfs	0.5 cfs

Basin Data	Storm Data	Pre-Development Conditions	Post-Development Conditions
Basin B	Impervious Area	0.10 ac	0.06 ac
	Pervious Area	0.74 ac	0.85 ac
	Total Area	0.84 ac	0.91 ac
	Composite C	0.25	0.33
	Cumulative CN	82	82
	T_c (min)	7 min	8 min
	I – 2 year (in/hr)	4.0	4.0
	I – 10 year (in/hr)	6.2	6.2
	I – 25 year (in/hr)	7.5	7.5
	I – 50 year (in/hr)	8.6	8.6
	I – 100 year (in/hr)	9.8	9.8
	2 yr runoff (cfs)	1.1 cfs	1.6 cfs
	10 yr runoff (cfs)	1.4 cfs	2.0 cfs
	25 yr runoff (cfs)	1.6 cfs	2.3 cfs
	50 yr runoff (cfs)	1.8 cfs	2.5 cfs
	100 yr runoff (cfs)	1.9 cfs	2.7 cfs

Basin Data	Storm Data	Pre-Development Conditions	Post-Development Conditions
Basin C	Impervious Area	0.66 ac	0.40 ac
	Pervious Area	1.3 ac	1.76 ac
	Total Area	1.96 ac	2.16 ac
	Composite C	0.42	0.38
	Cumulative CN	86	84
	T_c (min)	7 min	10 min
	I – 2 year (in/hr)	4.0	4.0
	I – 10 year (in/hr)	6.2	6.2
	I – 25 year (in/hr)	7.5	7.5
	I – 50 year (in/hr)	8.6	8.6
	I – 100 year (in/hr)	9.8	9.8
	2 yr runoff (cfs)	4.5 cfs	4.2 cfs
	10 yr runoff (cfs)	5.6 cfs	5.3 cfs
	25 yr runoff (cfs)	6.4 cfs	7.0 cfs
	50 yr runoff (cfs)	7.0 cfs	6.5 cfs
	100 yr runoff (cfs)	7.6 cfs	7.1 cfs

TOTAL	Impervious Area	0.76 ac	0.47 ac
	Pervious Area	2.67 ac	2.96 ac
	Total Area	3.43 ac	3.43 ac
	Composite C	0.33	0.35
	Cumulative CN	83	83
	T_c (min)	10 min	10 min
	I – 2 year (in/hr)	4.0	4.0
	I – 10 year (in/hr)	6.2	6.2
	I – 25 year (in/hr)	7.5	7.5
	I – 50 year (in/hr)	8.6	8.6
	I – 100 year (in/hr)	9.8	9.8
	2 yr runoff (cfs)	6.1 cfs	6.1 cfs
	10 yr runoff (cfs)	7.7 cfs	7.7 cfs
	25 yr runoff (cfs)	8.7 cfs	8.7 cfs
	50 yr runoff (cfs)	9.5 cfs	9.5 cfs
	100 yr runoff (cfs)	10.3 cfs	10.3 cfs

Water Quantity Control

The project is not increasing impervious area and will not have any increase in the rate or volume of stormwater runoff.

Because of the project's immediate proximity to the receiving waterbody and the fact that the project is not increasing the rate or volume of runoff, there will be no detrimental impact to any downstream properties or resources.

Water Quality Control

The project is reducing impervious area, using porous gravel (plantation mix) for the parking area, introducing sheet flow across large, grassed areas, and adding a significant amount of native plants to the site, the proposed project will have no significant adverse impact on the receiving natural waterway or downstream properties.

Additionally, hydrodynamic stormwater separators are proposed within each of the developed basins (Basin B and Basin C) to achieve the required stormwater quality requirements. The water quality volume was determined by using the greater of the ½ inch of runoff over the entire project area or 1 inch of runoff over the built upon area. In each case the ½ inch over the entire basin area created the largest water quality volume. Using TR55, the volumes were equated to the equivalent rainfall event to result in the required runoff volume. Each was nearly equivalent to a 1.7 inch rainfall event.

The water quality flow rates were 0.43 CFS for Basin B and 1.02 CFS for Basin C. The overlflow/bypass capacity was determined for the 25 year-24 hour storm event. These required flow rates were 2.30 CFS for Basin B and 6.00 CFS for Basin C.

Due to the peninsula shape of the property and the significant water frontage portions of the parcels direct/sheet flow to the creek. These areas are included in the calculations for the treatment and bypass rates to compensate for those areas having direct discharge.

The proposed project will have no significant adverse impact on the receiving natural waterway or downstream properties.

D. Flooding Issues

Per the survey performed by Parker Land Surveying, LLC dated February 17, 2021, and the FEMA Flood Insurance Rate Map (Panel 45015C, Community Number 0715E, dated 12/7/2018), the site is located in Zone “X” and in Flood Zone “AE” (10’ Elev.). The new restroom building is located in Flood Zone “X”, which is outside of the 100-year flood zone.

E. Residential Subdivision Information (As Applicable)

Not applicable.

1.2. Stormwater Management and Sediment Control

A. Erosion Prevention BMPs

As the existing site is cleared, grubbed and graded to the proposed contours shown on the construction site plans, erosion prevention BMPs shall be placed throughout the construction site to aid in the prevention of sediment-laden stormwater runoff. These BMPs shall be focused in areas with high potential of erosion, areas preceding infiltration practices, and shall be applied to all steep slopes. That is slopes equal to or greater than 3H:1V.

Each erosion prevention measure shall be selected on a site-specific basis and details have been provided on the site plans. The plans identify all proposed Erosion Prevention BMPs and the recommended installation, maintenance, and inspection procedures.

Examples of Erosion Prevention BMPs are, but are not limited to, surface roughening, temporary seeding, erosion control blankets, turf reinforcement mats, sodding, riprap, outlet protection, dust control, and polyacrylamide (PAM).

The purpose of soil stabilization is to prevent soil from eroding and leaving the site. In the natural condition, soil is stabilized by native vegetation. The primary technique to be used at this project for stabilizing site soils will be to provide a protective cover of grass, pavement, or building structure.

Temporary Seeding or Stabilization – All denuded areas that will be inactive for 14 days or more, must be stabilized temporarily with the use of fast-germinating annual grass/grain varieties appropriate for site soil and climate conditions, straw/hay mulch, wood cellulose fibers, tackifiers, netting and/or blankets. Stockpiles and diversion ditches/berms must be stabilized to prevent erosion and dust issues. Stormwater conveyance BMPs (diversion ditches, dikes, channels, etc.) shall be stabilized within 7 days of construction.

Permanent Seeding, Sod or Mulching – All areas at final grade must be seeded, mulched or covered with sod within 14 days after completion of work in that area. Seed immediately after final grade is achieved and soils are prepared to take advantage of soil moisture and seed germination. At the completion of ground-disturbing activities the entire site must have permanent vegetative cover, meeting vegetative density requirements, or mulch per landscape plan, in all areas not covered by hardscape (pavement, buildings, etc.).

Energy Dissipaters – Energy Dissipaters reduce runoff velocities from concentrated conveyance systems (pipes and swales), enhance the potential for infiltration and protect the soil from the erosive force of concentrated flows. Energy dissipaters include riprap aprons, level spreaders and soil reinforcement (such as erosion control blankets and turf reinforcement mats).

B. Sediment Control BMPs

Sediment Control BMPs are designed to remove some of the sediment accumulated within stormwater runoff, to the best extent practicable. These BMPs help prevent sediment impacts to adjacent properties and water bodies from stormwater discharges originating from construction sites.

Typically, these BMPs are placed near each of the site's outfalls and are installed prior to clearing and grubbing of the site (before large areas of soil are exposed). However, these BMPs can also be located throughout the construction site and, in these circumstances, are installed after mass grading has occurred. Placement, sizing and modifications of Sediment Control BMPs should be left to the SWPPP preparer and/or the Site Engineer.

Contractors must consult the SWPPP Preparer as listed at the front of this SWPPP before making any significant changes to these BMPs.

Each sediment control BMP shall be selected on a site-specific basis. Examples of Sediment Control BMPs are, but are not limited to sediment traps, sediment basins, silt fence, rock check dams, rock sediment dikes, sediment tubes, and inlet protection.

Sediment Traps – Temporary sediment traps are depressions constructed down slope of construction activity and located such that stormwater runoff from upland areas of less than 5 acres are diverted through the trap. Sediment traps shall be constructed as indicated by the SWPPP and shall be constructed as part of the initial BMPs whenever practical. An overflow weir is incorporated at the outlet to discharge flow from the trap. Sediment traps shall be phased with the earthwork activity where practical.

Silt Fence – Silt fence is a synthetic permeable woven or non-woven geotextile fabric incorporating metal support stakes at intervals sufficient to support the fence (5-feet maximum distance between posts), water, and sediment retained by the fence. The fence is designed to retain sediment-laden stormwater and allow settlement of suspended soils before the stormwater flows through the fabric and discharges from the site. Silt fence shall be located on the contour to capture overland, low-velocity sheet flows and is typically installed with a wire fence backing for additional support.

Install silt fence at a fairly level grade along the contour with the ends curved uphill to provide sufficient upstream storage volume for the anticipated runoff. Drainage areas shall not exceed ½ acre per 100 feet of wire-reinforced silt fence for slopes less than 2 percent.

Storm Sewer Inlet Protection – Drainage inlets are protected from the intrusion of sediment through a variety of measures as shown on the details included in the Construction drawings. The primary mechanism is to place controls in the path of flow sufficient to slow the sediment-laden water to allow settlement of suspended soils before discharging into the storm sewer. It is possible that as construction progresses from storm sewer installation through to paving that the inlet protection devices will change.

C. Structural Control BMPs and Floodplain Placement

The following structural control BMPs may be utilized: storm sewer systems. These practices have been designed to either divert flows from exposed soils, to retain/detain flows, and to otherwise limit the runoff and the discharge of pollutants from disturbed areas of the construction site.

Throughout the lifespan of the construction project these BMPs will be installed and maintained, as required by the SWPPP and the construction site plans, until final stabilization has been achieved for the areas draining to each BMP. Upon final stabilization, each structural control BMP must be modified to the post-construction conditions shown within the approved construction site plans or removed, if the structural BMP was a temporary structure.

Any Structural Control BMPs that are being proposed within the 100-yr floodplains will require approval from the local regulating agency, since SC DHEC does not have the authority to regulate within the associated flood plains. Approvals from the local agency will be located in the OS-SWPPP. If the required approval is not located in this SWPPP, please contact the Primary Permittee listed on the title sheet of this SWPPP before performing work within the floodplain.

D. Construction Entrances and Dust Control

All access areas into and out of the limits of disturbance, as shown on the construction site plans, are required to be equipped with a construction entrance. The use of this BMP will limit the amount of sediment being transported by construction vehicles onto existing roadways or other impervious areas. Any tracked sediment, along with any attached pollutants, deposited on impervious areas could be washed downstream during the next rain event. Each construction entrance must be installed as shown in the details section of the construction site plans.

If a new entrance or exit is required, that is not shown on the plans, install the construction entrance as noted by the construction entrance detail, mark the location on the plans and make a record of this minor modification in the SWPPP's modification log, which is located within one of the appendices of the On-site SWPPP.

Each stabilized construction entrance should be used in conjunction with Street Sweeping measures if it becomes apparent that sediment is still being tracked onto adjacent impervious areas, even with the use of the construction entrance.

During extremely dry conditions, drought, and/or excessive winds, the construction site should be treated for dust control to prevent the suspension of fine sediment particles into the air, being carried offsite, and deposited on adjacent properties or surface waters. This practice may not be directly called out for on the construction site plans. A water tanker used to spray the soil down may be an effective way to prevent excessive dust at a construction site.

E. Water Quality BMPs During Construction

Site-specific water quality BMPs (e.g., sediment basins, sediment traps, rock check dams, and rock sediment dikes) must be installed prior to the mass clearing, grubbing and grading of the site, and must be kept in functioning order throughout the lifespan of all construction activities. Each of these BMPs must be maintained and inspected until all areas draining to these BMPs have reached final stabilization, approved by the construction site inspector or the SWPPP Preparer, and recorded within the stabilization log located as an appendix of the On-site SWPPP.

The location, installation procedures, and maintenance procedures for each water quality BMP can be found within the approved construction site plans.

Sediment Traps – Temporary sediment traps are depressions constructed down slope of construction activity and located such that stormwater runoff from upland areas of less than 5 acres are diverted through the trap. Sediment traps shall be constructed as indicated by the SWPPP and shall be constructed as part of the initial BMPs whenever practical. An overflow weir is incorporated at the outlet to discharge flow from the trap. Sediment traps shall be phased with the earthwork activity where practical.

Storm Sewer Inlet Protection – Curb and grated inlets are protected from the intrusion of sediment through a variety of measures as shown on the details included in the Construction drawings. The primary mechanism is to place controls in the path of flow sufficient to slow the sediment-laden water to allow settlement of suspended soils before discharging into the storm sewer. It is possible that as construction progresses from storm sewer installation through to paving that the inlet protection devices will change.

F. Post-Construction Water Quality

All construction sites disturbing 5 acres or more, including construction activities associated with Larger Common Plans disturbing 5 acres or more (for sites located within an MS4 this may be 1 acre or more), must be designed to treat water quality post-construction. These water quality controls must be installed and stabilized prior to terminating coverage under the CGP. These controls will require routine maintenance to remain functional; this is to be conducted by the Primary Permittee or the entity that accepts responsibility for these structures once construction has been completed. Additional information, including permanent maintenance and inspection procedures, can be found in the OS-SWPPP or within the construction site plans.

Upon final stabilization, each construction site will have to make the transition from temporary BMPs to permanent BMPs. This transition may include the conversion of a sediment basin to a detention basin, a sediment trap to a bioretention area, or diversion swales to permanently vegetated swales. All post-construction (permanent) water quality and water quantity BMPs are identified in the final phase of the Erosion and Sediment Control located within the construction site plans.

Pre-Fabricated Water Quality Devices – Pre-fabricated water quality devices combine settling, filtration and various biological processes into one system. Post construction pre-fabricated storm water quality BMPs are designed to filter and trap trash, floatable contaminates, sediment, oil and grease, and other pollutants. These BMPs are incorporated into storm water conveyance systems for pretreatment of storm water runoff. Post construction pre-fabricated storm water quality BMPs include catch basin inserts, separation devices and filtration devices. Pre-fabricated water quality devices do not provide stormwater runoff storage and are typically used in conjunction with other storage type BMP's or in situations where waivers for stormwater quantity control are pursued.

Energy Dissipaters – Energy Dissipaters reduce runoff velocities from concentrated conveyance systems (pipes and swales), enhance the potential for infiltration and protect the soil from the erosive force of concentrated flows. Energy dissipaters include riprap aprons, level spreaders and soil reinforcement (such as erosion control blankets and turf reinforcement mats).

Vegetated Filter Strips - Vegetated filter strips are zones of vegetation where pollutant-laden runoff is introduced as sheet flow. Vegetated filter strips may take the form of grass filters, grass filter strips, buffer strips, vegetated buffer zones, riparian vegetated buffer strips, and constructed filter strips. Vegetated filter strips are used to remove pollutants from overland sheet flow but are not effective in removing sediment from concentrated flows. Vegetated filter strip effectiveness fluctuates considerably depending on vegetation type, vegetation height and density, season of the year, eroded particle characteristics, size of drainage area, and site topography.

Permeable Pavement – Permeable pavement include porous asphalt, permeable concrete, permeable pavers or grass paving. Permeable pavements reduce the runoff volume and extend the time of concentration for runoff. Permeable Pavements are ideal in low-traffic or overflow parking areas.

G. Other Stormwater Management Procedures

Based on the nature, conditions, and/or procedures associated with this construction site, the following items must be followed and adopted by all those conducting land disturbing activities at this site:

Stockpile Management - Stockpiles of soil shall be protected during construction. Silt fence shall be installed around the downstream side of the stockpile to prevent sedimentation. Additionally, stockpiles of soil shall be temporarily stabilized to control erosion. Stockpiles of construction debris, including soil, shall have all runoff directed to a sediment basin or trap.

Non-Stormwater Discharges / Dewatering – Non-stormwater components of site discharges must be clean water. Water used for construction which discharges from the site must originate from a public water supply or private well approved by the State Health Department. Water used for construction that does not originate from an approved public supply must not discharge from the site. It can be retained in the ponds until it infiltrates and evaporates. Other non-stormwater discharges would include ground water. Only uncontaminated ground water can be discharged from the site, as allowed by and in accordance with applicable local ground water dewatering permits/regulations. When non-stormwater is discharged from the site, it must be done in a manner such that it does not cause erosion of the soil during discharge.

Process water such as power washing and concrete cutting must be collected for treatment and disposal. It is not to be flushed into the site storm drain system. A groundwater dewatering permit is not required.

Verify discharges from dewatering activities are allowed non-stormwater discharges under the General Permit. Allowable non-stormwater discharges include:

1. Discharges from fire-fighting activities;
2. Fire hydrant flushings;
3. Waters used to wash vehicles where detergents are not used;
4. Water used to control dust in accordance with Section 3.2.2 (Stormwater Management and Sediment Control);
5. Potable water including uncontaminated water line flushings;
6. Routine external building wash down that does not use detergents;
7. Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used;
8. Uncontaminated air conditioning or compressor condensate;
9. Uncontaminated ground water or spring water;
10. Foundation or footing drains where flows are not contaminated with process materials such as solvents;
11. Uncontaminated excavation dewatering;
12. Landscape irrigation; and
13. Dechlorinated swimming pool discharges.

Obtain a dewatering permit according to state and local regulations, if discharges from dewatering activities are not allowed under the General Permit. Discharges from dewatering operations must be directed through an appropriate pollution prevention/treatment measure, such as a pump discharge filter bag, sediment trap or sediment basin prior to being discharged from the site or into a water body of the State. Under no circumstances are discharges from dewatering operations to

be discharged directly into streams, rivers, lakes or other areas beyond the permitted project area. Likewise, discharges into storm sewer systems that do not drain to a suitable on-site treatment facility, such as a basin, are also prohibited. Discharges from dewatering operations must also be conducted in a manner sufficient to prevent erosion from the discharge runoff.

Use best management practices when dewatering. Place intake hose on a flotation or similar device and do not pump directly from the bottom of the basin, trench, etc. Always pump through a sediment control BMP and dewater within the permitted limits of disturbance to ensure discharge criteria are achieved. Do not discharge on a slope greater than three percent or within 20' of a surface water body. Dewatering should not occur during or immediately after precipitation events, but exceptions will be evaluated on case by case basis.

Solid Waste Disposal - No solid materials, including building materials, are allowed to be discharged from the site with stormwater. All solid waste, including disposable materials incidental to the major construction activities, must be collected and placed in containers. The containers will be emptied when 95% full, or as necessary, by a certified trash disposal service and hauled away from the site. Covers for the containers will be provided as necessary to meet state and local requirements. Construct covers as practicable, or required, to prevent stormwater contact and pollutant discharges from solid waste receptacles. The location of solid waste receptacles shall be shown on the Drawings.

Substances that have the potential for polluting surface and/or groundwater must be controlled by whatever means necessary in order to ensure that they do not discharge from the site. As an example, special care must be exercised during equipment fueling and servicing operations. If a spill occurs, it must be contained and disposed of so that it will not flow from the site or enter groundwater, even if this requires removal, treatment, and disposal of soil. In this regard, potentially polluting substances should be handled in a manner consistent with the impact they represent.

Sanitary Facilities - All personnel involved with construction activities must comply with state and local sanitary system regulations. Temporary sanitary facilities will be provided at the site throughout the construction phase. They must be utilized by all construction personnel and will be serviced by a commercial operator. The location of sanitary facilities shall be shown on the Drawings. Portable toilets must be securely anchored and are not allowed within 30' of inlets or permitted limit of disturbance or within 50' of a water of the State.

Concrete Waste from Concrete Ready-Mix Trucks - Discharge of excess or waste concrete and/or wash water from concrete trucks will be allowed on the construction site, but only in approved aboveground portable concrete washout containers (preferred) or in specifically designated lined and diked areas prepared to prevent contact between the concrete and/or wash water and stormwater that will be discharged from the site. The General Contractor shall eliminate or minimize the number of seams in the liner.

Alternatively, waste concrete can be placed into forms to make rip rap or other useful concrete products. The cured residue from the concrete washout diked areas shall be disposed in accordance with applicable state and federal regulations. This jobsite superintendent is responsible for assuring that these procedures are followed. The location of concrete washout areas shall be shown on the Drawings. Follow all applicable environmental regulations for concrete wash out pits.

SCDHEC requires all concrete waste areas to be a minimum of 50 feet away from any inlet or other conveyance system.

Masons' Area - Contractor shall identify masons' area on the site and indicate location on the Drawing. To the extent practical, all masonry tools, material, including sand and sacked cement or mortar materials, and equipment shall be located within the area identified. Runoff control, such as berms or diversion ditches, silt fence, straw wattles, or other means of containment shall be provided to prevent the migration of stormwater pollutants in runoff from the masons' area. Receptacles for debris and trash disposal shall also be provided.

Fuel Tanks - Temporary on-site fuel tanks for construction vehicles shall meet all state and federal regulations. Tanks shall have approved spill containment with the capacity required by the applicable regulations. From NFPA 30: All tanks shall be provided with secondary containment (i.e. containment external to and separate from primary containment). Secondary containment shall be constructed of materials of sufficient thickness, density, and composition so as not to be structurally weakened as a result of contact with the fuel stored and capable of containing discharged fuel for a period of time equal to or longer than the maximum anticipated time sufficient to allow recovery of discharged fuel. It shall be capable of containing 110% of the volume of the primary tank if a single tank is used, or in the case of multiple tanks, 150% of the largest tank or 10% of the aggregate, whichever is larger.

The tanks shall be in sound condition free of rust or other damage which might compromise containment. Fuel storage areas will meet all EPA, OSHA and other regulatory requirements for signage, fire extinguisher, etc. Hoses, valves, fittings, caps, filler nozzles, and associated hardware shall be maintained in proper working condition at all times. The location of fuel tanks shall be shown on the Drawings and shall be located to minimize exposure to weather and surface water drainage features.

A Spill Prevention, Control and Countermeasure (SPCC) Plan must be developed if aboveground oil storage *capacity* at the construction site exceeds 1,320-gallons or as specified by SCDHEC. Containers with a storage capacity of 55-gallons or less are not included when calculating site storage capacity. The General Contractor shall work with the Engineer to develop and implement a SPCC Plan in accordance with the Oil Pollution Prevention regulation at Title 40 of the Code of Federal Regulations, Part 112, (40 CFR 112).

Hazardous Material Management and Spill Reporting Plan - Any hazardous or potentially hazardous material that is brought onto the construction site will be handled properly in order to reduce the potential for stormwater pollution. All materials used on this construction site will be properly stored, handled, dispensed and disposed of following all applicable label directions. Flammable and combustible liquids will be stored and handled according to 29 CFR 1926.152. Only approved containers and portable tanks shall be used for storage and handling of flammable and combustible liquids.

Material Safety Data Sheets (MSDS) information will be kept on site for any and all applicable materials.

In the event of an accidental spill, immediate action will be undertaken by the General Contractor to contain and remove the spilled material. All hazardous materials, including contaminated soil and liquid concrete waste, will be disposed of by the Contractor in the manner specified by federal, state and local regulations and by the manufacturer of such products.

As soon as possible, the spill will be reported to the appropriate agencies. As required under the provisions of the Clean Water Act, any spill or discharge entering waters of the United States will be properly reported. The General Contractor will prepare a written record of any spill and

associated clean-up activities of petroleum products or hazardous materials in excess of 1 gallon or reportable quantities, whichever is less.

The General Contractor will provide notice to Owner immediately upon identification of a reportable spill.

Any spills of petroleum products or hazardous materials in excess of Reportable Quantities as defined by EPA or the state or local agency regulations, shall be immediately reported to the EPA National Response Center (1-800-424-8802) and SCDHEC (1-888-481-0125).

- The State reportable quantity for petroleum products is 25 gallons.

The reportable quantity for hazardous materials can be found in 40 CFR 302 and South Carolina Code of Regulations 61-79 (www.scstatehouse.gov/coderegs/C061d.htm).

In order to minimize the potential for a spill of petroleum product or hazardous materials to come in contact with stormwater, the following steps will be implemented:

a) All materials with hazardous properties (such as pesticides, petroleum products, fertilizers, detergents, construction chemicals, acids, paints, paint solvents, additives for soil stabilization, concrete, curing compounds and additives, etc.) will be stored in a secure location, under cover and in appropriate, tightly sealed containers when not in use.

b) The minimum practical quantity of all such materials will be kept on the job site and scheduled for delivery as close to time of use as practical.

c) A spill control and containment kit (containing for example, absorbent material such as kitty litter or sawdust, acid neutralizing agent, brooms, dust pans, mops, rags, gloves, goggles, plastic and metal trash containers, etc.) will be provided on the construction site and location(s) shown on Drawings.

d) All of the product in a container will be used before the container is disposed of. All such containers will be triple rinsed, with water prior to disposal. The rinse water used in these containers will be disposed of in a manner in compliance with state and federal regulations and will not be allowed to mix with stormwater discharges.

e) All products will be stored in and used from the original container with the original product label.

f) All products will be used in strict compliance with instructions on the product label.

g) The disposal of excess or used products will be in strict compliance with instructions on the products label.

1.3. Sequence of Construction

The construction sequence for this project has been provided on the site plans. Each item/step of that construction sequence has been listed is the sequence that they should be implemented. For additional information or questions on the sequencing please contact the SWPPP Preparer or the Permittee referenced on the cover of this SWPPP.

1.4. Non-Numeric Effluent Limits

A. Stormwater Volume and Velocity Control

During the implementation of construction activities, all parties performing work at this construction site whose work may affect the implementation of the SWPPP must be informed of and directed on how to comply with this Non-Numeric Effluent Limit, which requires the management of stormwater runoff **within** the construction site and at **each outfall**. The purpose of this requirement is to control the stormwater volume and velocity at these locations to minimize erosion.

Specifically, each responsible party should be made aware of the practices that have been or should be implemented at the construction site to accomplish these particular stormwater management practices. Below is a list of practices that may be utilized within the disturbed area and at each outfall at construction sites to control stormwater volume and velocity:

Volume Control

- Limiting the amount of disturbed area and exposed soils;
- Staging and/or Phasing of the Construction Sequence;
- Sediment Basins and Sediment Traps;
- Diverting off-site flow around the construction site;
- Controlling the Drainage Patterns within the Construction Site;
- Temporary Stabilization of Disturbed Areas.

Velocity Control

- Surface Roughening and/or other Slope Stabilization Practices;
- Level Spreaders, Riprap Plunge Pools and/or other Velocity Dissipation BMPS located at the Construction Site's and Sediment Basin Outfalls;
- Use of Rock Checks, Sediment Tubes, Etc. in Temporary Diversions Swales and Ditches;
- Use of Erosion Control Blankets, Turf Reinforcement Mats, and other Non-Vegetative BMPs that can be used to Quickly Stabilize Disturbed Areas;
- The SWPPP Preparer/Engineer should approve any modifications (Additional BMPs or Changes to Existing BMPs) to address the management of stormwater volume and velocity prior to implementation. All approved SWPPPs that were issued coverage under the CGP should include ample BMPs and other control measures to address this specific Non-Numeric Effluent Limit.

B. Soil Exposure, Compaction and Preservation

Throughout construction activities, **the amount of soil exposed during construction should be kept to a minimum**. This may be accomplished by minimizing the amount the disturbed area within the permitted Limits of Disturbance (shown on the approved site plans) to only that which is necessary to complete the proposed work. For areas that have already been disturbed and where construction activities will not begin for a period of 14 days or more, temporary stabilization techniques must be implemented.

Prior to implementation of any major grading activities, **topsoil is to be preserved** by placing it in areas designated for stockpiling until final grades are reached. Each stockpile must be equipped with proper sediment and erosion controls to preserve the topsoil and protect adjacent areas from impacts. Once final grades have been reached, the preserved topsoil should be utilized to apply to areas identified for stabilization. Topsoil contains nutrients and organisms that aid in the growth of vegetation.

The **Compaction of Soil** should also be minimized to the degree practicable during grading activities. This is especially important during the replacement of topsoil to aid in a quick establishment of vegetative cover. Compaction of soil may also reduce rainfall's ability to infiltrate into the soil, increasing the amount of stormwater runoff.

C. Soil Stabilization

Throughout construction activities, soil stabilization techniques are to be initiated as soon as practicable whenever any clearing, grading, excavating, or other land-disturbing activities have permanently or temporarily ceased on any portion of the construction site and will not resume for a period exceeding 14 calendar days. For areas where initiating stabilization measures is infeasible, (e.g., where snow cover, frozen ground, or drought conditions preclude stabilization), initiate vegetative or non-vegetative stabilization measures as soon as practicable.

D. Steep Slopes (Slopes of 30% grade or greater)

All disturbed steep slopes (30% grade, ~3H:1V, or greater), and steep slopes to be created through grading activities must be managed in a fashion that limits the potential of erosion along the slopes. All parties whose work is/was responsible for the creation/disturbance of steep slopes must comply with the following items:

- **Minimize the Disturbance** of all steep slopes, when possible.
- **Divert Concentrated or Channelized Flows** of stormwater away from and around steep slope disturbances.
- **Use Specialized BMP Controls** including temporary and permanent seeding with soil binders, erosion control blankets, surface roughening, reducing continuous slope length with terracing or diversions, gradient terraces, interceptor dikes and swales, grass-lined channels, pipe slope drains, subsurface drains, level spreaders, check dams, seep berms, and triangular silt dikes to minimize erosion.
- **Initiate Stabilization Measures** as soon as practicable on any disturbed steep slope areas where construction activities have permanently or temporarily ceased, and will not resume for a period exceeding 7 calendar days.
- **A Vegetative and/or Non-Vegetative Cover** must be established within 3 working days from the time that stabilization measures were initiated.

Stabilization of steep slopes should be a priority for those performing work at the construction site. At the very least, runoff control BMPs should be implemented to transport stormwater runoff from the top of the slope to the toe of the slope. An example of this is to install diversion swales along the top of slope and direct the runoff towards pipe slopes drains to transports the runoff to the toe of the slope. All pipe slope drain outlets are to be equipped proper outlet protection.

E. Sediment Discharge Minimization

Permittees, Contractors, and all other parties responsible for conducting land-disturbing activities are required to install and maintain all erosion and sediment BMPs that are identified on the approved construction site plans. These BMPs have been designed and approved to address such factors as the amount, frequency, intensity and duration of precipitation, the nature of resulting stormwater runoff, and soil characteristics, including the range of soils particle sizes expected to be present on the construction site. **Proper installation, inspection, and maintenance will allow these BMPs to operate at maximum efficiencies in order to minimize sediment discharges to the maximum extent practical.**

F. Pollutant Discharge Minimization

Permittees, Contractors, and all other parties responsible for conducting land-disturbing activities are required to install, implement, and maintain effective pollution prevention measures to minimize the discharge of pollutants. At a minimum, the following items must be implemented:

- **Minimize the discharge of pollutants from dewatering trenches and excavations** by managing runoff with the appropriate controls. Otherwise these discharges are prohibited;
- **Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters**. Wash waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge;
- **Minimize the exposure of building materials, building products, construction wastes, trash,** landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials present on the site to precipitation and to stormwater; and
- **Minimize the discharge of pollutants from spills and leaks** and implement chemical spill and leak prevention and response procedures.

G. Prohibited Discharges

Permittees, Contractors, and all other responsible parties for conducting land-disturbing activities are prohibited to discharges, from the construction site, the following items:

- **Wastewater from washout of concrete**, unless managed by an appropriate control;
- **Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials**;
- **Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance**; and
- **Soaps or solvents used in vehicle and equipment washing**.

1.5. Buffer Zone Management

The project is new waterfront park for the City of Hanahan and is focused on the construction of the boardwalk, pier and kayak launch. The entire purpose of the park is in support of this waterfront dependent activity.

In accordance with the CGP Section 3.2.4.C, IV Exceptions, (b) Construction of Water Dependent Structures and Water Access Areas, this project is not required to meet the buffer requirements provided that the waterfront work is obtaining all appropriate CWA permits and authorizations.

Refer to Appendix C - Waters of the State/US & SC Navigable Waters for the required permit applications.

SECTION 2 – SITE FEATURES AND SENSITIVE AREAS

2.1. Sources of Pollution

Throughout construction activities, each permittee, contractor, and person responsible for conducting work will need to ensure that sources of pollution are managed to prevent their discharge from the construction site. Expected pollution sources during construction have been identified in **Table 2.1-A**, but due to the nature of construction activities, it is often tough to predict all pollution sources that may appear throughout the life of a construction project. For that reason, the following table has also been provided to help all those performing work at this construction site identify possible sources of pollution

Stormwater runoff subjected to the identified pollution sources must be treated by the appropriate BMPs as directed by this SWPPP.

In the event that any additional sources of pollution are identified during construction, the person(s) with day-to-day operational control at the site is to add the new source(s) to **Table 2.1-A** and consult with the SWPPP Preparer to properly address this source and to prevent the discharge of it's pollutant through stormwater runoff.

Table 2.1-A: Potential Sources of Pollution

Source	Material or Chemical	Location*	Appropriate Control Measures
Loose soil exposed/disturbed during clearing, grubbing and grading activities	Sediment	All areas within the Limits of Disturbance	As directed by the site plans. This includes Silt Fence, sediment tubes, sediment basins, and sediment traps.
Areas where construction equipment are cleaned, a.k.a. concrete washout	Heavy Metals & pH	Located adjacent to each construction entrance	Concrete Washout Basin as shown on the site plans.
Water encountered during trenching	Nutrients & Sediment	In and around any trenching activities.	Direct water into impoundments such as basins or traps to allow for the sedimentation of the listed pollutants.
Paving Operations	Sediment & Trash	All areas to be paved.	Inlet protection.
Material Delivery and Storage Areas	Nutrients, pH, Sediment, Heavy Metals, oils and grease	All areas used as storage areas	Silt fence and/or sediment dikes.
Equipment fueling and maintenance areas	Metals, hydrocarbons, oils and greases	Areas surrounding fuel tanks	Provide secondary containments, locate in upland areas. Repair leaking and broken hoses.
Paints	Metal oxides, stoddard solvent, talc, calcium-carbonate, arsenic	Throughout site, primarily in areas of building construction	Washwater should be contained and is prohibited from being discharged
Portable Toilet	Raw Sewage and Trash	Areas around portable toilet	Portable toilets must be strapped to the ground to prevent accidental spillage

***Area where material/chemical is used on site.**

2.2. Surface Waters

Stormwater runoff from the proposed construction site discharges to Goose Creek, which lies north/northeast of the site. From Goose Creek, the stormwater runoff will enter the Cooper River.

2.3. Impairments and TMDLs

Some Waters of the State (WoS) have been identified as not meeting the State's water quality standards for recreational swimming, fish consumption, aquatic life use, and/or shellfish harvesting for one or more pollutants even after controls for point and nonpoint source pollution have been put in place. These waterbodies have been classified as "impaired." Once these waterbodies have been identified they are listed on the State's 303(d) List of Impaired Waterbodies. South Carolina lists impairments as "stations" where samples were taken along a waterbody.

After a pre-determined period of time, DHEC is obliged to develop a Total Maximum Daily Load (TMDL) for the pollutant of concern for each impaired station listed on the 303(d) List. A TMDL is the amount of a single pollutant (such as bacteria, nutrients, metals) that can enter a waterbody on daily basis and that waterbody still meet water quality standards. "TMDL" refers to both a calculation of a pollutant entering a waterbody as well as the document containing this calculation along with source assessments, watershed and land use information, reductions and allocations information, implementation and other relevant information, maps, figures, and pictures.

Once a TMDL has been developed and approved by the EPA, the impaired WoS is removed from the 303(d) list. A separate list is maintained for WoS with approved TMDLs.

Any construction site whose discharges are released into a WoS listed on the 303(d) List or for which an EPA-approved TMDL has been developed must address the specific pollutant set forth in the TMDL and/or potential pollutants for the impairment. The SWPPP must include a description of BMPs to address these pollutants.

The primary permittee and/or contractor must ensure that the construction site discharges remain in compliance with the State's water quality standards. To do so, these parties will have to ensure the function of all approved BMPs to handle the specific pollutant.

Construction Stormwater Discharges are expected to contain pollutants that contribute and/or can cause the following impairments to receiving water bodies: BIO (Macroinvertebrate Community), Turbidity, TP (Total Phosphorus), TN (Total Nitrogen), CHLA (Chlorophyll-a), and Fecal Coliform in waters classified for Shellfish Harvesting in the coastal zone.

The presence of any of these impairments in receiving waters will require approval control of the site's construction stormwater discharges. Information on each of these impairments and how to treat stormwater runoff for these impairments has been provided below.

A. Impairments Affected by Construction Site Discharges and Methods to Control Potential Pollutants Causing or Contributing to the Impairments

1. **BIO (Macroinvertebrate Community):** A balanced and varied group of Macroinvertebrate organisms is an indicator of a healthy stream that supports aquatic life. A balanced community can be defined as a natural, diverse group of organisms (including Macroinvertebrate) characterized by the ability to sustain itself through season changes, presence of food chain species and a lack of domination by pollutant tolerant or invasive species. If these conditions do not exist, then the site may be considered impaired due to the presence of an undesirable or non-existent Macroinvertebrate community. Sediment from construction sites may further threaten the propagation of these organisms.

Address by: Examples include limiting the amount of disturbed area, designing sediment control BMPs to remove the maximum amount of sediment possible, immediate stabilization of disturbed areas, and other practices may be utilized to control the discharge of sediment from construction sites.

2. **Turbidity:** Turbidity can be generally defined as the "cloudiness" of a waterbody and may be caused by the growth of aquatic phytoplankton and the presence of suspended solids in the water column. In SC, a water quality standard for turbidity is applicable to all waters of the State (see R. 61-68 D. 11. for numeric targets by waterbody classification). Turbidity levels that exceed the water quality standard may reduce light penetration, thereby inhibiting aquatic flora growth, and may reduce the ability of fauna, such as fish, to absorb oxygen across their gills.

   Address by: Examples include limiting the amount of disturbed area, designing sediment control BMPs to remove the maximum amount of sediment possible, immediate stabilization of disturbed areas, and other practices may be utilized to control the discharge of sediment from construction sites.

3. **TP (Total Phosphorus):** Similar to total nitrogen, TP is an essential nutrient for the propagation of aquatic life. In SC, a water quality standard for TP is applicable to lakes greater than 40 acres (see R. 61-68 D. 11. for numeric and narrative targets). At acceptable levels, TP is assimilated by aquatic flora ensures the propagation of an overall balanced, indigenous aquatic community. TP levels that exceed the water quality standard are considered impaired and may cause negative impacts to the overall heath of the aquatic community by promoting excessive algal growth in lakes. Phosphorous may enter a site's stormwater when excess amounts of the nutrient are applied to the site during temporary or final stabilization.

   Address by: To prevent this soil should be tested to determine the quantity of the nutrient present in the soil and the correct amount that needs to be added so that it is absorbed by the vegetation.

4. **TN (Total Nitrogen):** Similar to total phosphorus, TN is an essential nutrient for the propagation of aquatic life. In SC, a water quality standard for TN is applicable to lakes greater than 40 acres (see R. 61-68 D. 11. for numeric and narrative targets). At acceptable levels, TN is assimilated by aquatic flora and ensures the propagation of an overall balanced, indigenous aquatic community. TN levels that exceed the water quality standard are considered impaired and may cause negative impacts to the overall heath of the aquatic community by promoting excessive algal growth in lakes. Nitrogen may enter a site's stormwater when excess amounts of the nutrient are applied to the site during temporary or final stabilization

   Address by: Examples include that the soil should be tested to determine the quantity of the nutrient present in the soil and the correct amount that needs to be added so that it is absorbed by the vegetation.

5. **Chlorophyll-a (CHLA):** CHLA is a pigment present in the cells of photosynthetic flora and some algal species. The presence of CHLA in an aquatic environment is a water quality indicator of the overall productivity in the aquatic system. CHLA is linked to the levels of TP, TN and light penetration in the water column. In SC, a water quality standard for CHLA is applicable to lakes greater than 40 acres (see R. 61-68 D. 11. for numeric and narrative targets). CHLA levels that exceed the water quality standard may suggest that other undesirable water quality impacts are present as the aquatic system may be too productive to support the propagation of an overall balanced, indigenous aquatic community. Excess

nutrients may discharge from a construction site during temporary and final stabilization. Limiting the amount of phosphorus and nitrogen applied while establishing vegetation will prevent excessive levels of CHLA in receiving waters.

Address by: Examples include that the soil should be tested to determine the quantity of the nutrients present in the soil and the correct amount that needs to be added so that it is absorbed by the vegetation.

6. **Fecal Coliform (FC) in Shellfish Harvesting waters:** Fecal Coliform is an indicator bacteria for other pathogens which may be present in a waterbody. Shellfish Harvesting Waters are tidal salt waters protected for shellfish harvesting and must be protected to a higher standard than other waters because of the risk to human health posed by ingesting shellfish from areas with high levels of bacteria. Bacteria levels increase following rain events. Potential sources of bacteria on construction sites include improperly located porta-johns and litter that may attract rodents and other animals.

   Address by: Porta-johns should be placed away from WoS and not placed on catch basins and other drainage structures. Litter and construction debris should be placed in identified areas and emptied on a routine basis.

B. Impairment Sources and Prevention

Construction sites can contribute to these impairments directly through the release of excess soil and/or nutrients within stormwater runoff. For this reason, proper sediment and erosion control BMPs should be implemented and the design of the stormwater management systems, during both construction and post-construction, should address the control of stormwater runoff. A reduction in the volume released or the rate at which this volume is released can significantly improve the quality of stormwater runoff and limit the amount of the pollutants that contribute to the above listed impairments.

As an example, sediment basins and/or traps should be used during construction to allow for sedimentation of soils/nutrients, and to control the release of stormwater into the impaired water body. Vegetated detention and infiltration structures should be implemented as post-construction BMPs to control stormwater volumes. Caution is advised when using fertilizers to reach Final Stabilization; excess fertilizer can contribute to each of the above listed impairments.

C. Site-Specific Requirements

For construction sites that discharges into WoS that are either impaired or have an established TMDL for the following impairment(s): BIO (macroinvertebrate), turbidity, Total Phosphorus, Total Nitrogen, Chlorophyll-a, and Fecal Coliform. Due to the possibility of pollutants in construction stormwater discharges from this site that may contribute to any of these impairments, the following must be conducted throughout the lifespan of all land-disturbing activities at this site:

- Monthly monitoring of the construction site's outfalls;
- Biweekly inspections of all the primary sediment control BMPs;
- Employee training/acknowledgement during the Pre-Construction Meeting;
- Installation of additional BMPs to meet the water quality standards (as directed by the SWPPP preparer and as approved by the regulating agency); and
- All sediment control BMPs have been designed to meet or exceed an 80% trapping efficiency.

Additionally post-construction BMPs may be required to be installed, once final stabilization is reached, to address any established TMDL or impairment once construction operations have been completed.

2.4. Critical Areas (CZC only)

Not applicable.

SECTION 3 – COMPLIANCE REQUIREMENTS

3.1. SWPPP Availability

A copy of the OS-SWPPP must be retained at the construction site or a nearby location easily accessible during normal business hours, from the date of commencement of construction activities to the date that final stabilization is reached.

If a location within the construction site is unavailable to store the OS-SWPPP when no personnel are present, notice of the plan's location, along with any updated contact information, must be posted near the main entrance at the construction site.

Contractors, who have day-to-day operational control over OS-SWPPP implementation, must have a copy of this SWPPP available at a central location within the construction site for the use by all those identified as having responsibilities under the OS-SWPPP.

OS-SWPPPs must be made available upon request and at the time of a construction site inspection by EPA, DHEC, local government officials, and the Operator of a Municipal Separate Storm Sewer System (MS4).

3.2. Pre-Construction Conferences

Prior to any construction activity, the Contractor shall schedule and organize an on-site Stormwater Pre-Construction Conference. Each contractor or subcontractor, who will work at the site, must attend this conference in person.

The Contractor shall invite the Owner, Engineer, Contracting Officer (if applicable) and agencies listed below to the Stormwater Pre-Construction Conference. The Contractor must invite the noted agencies to the meeting at least 7 days prior to conducting the meeting.

SC DHEC – Environmental Affairs Office	MS4 – Berkeley County
Lowcountry EA Charleston - McMillan 1362 McMillan Ave., Suite 400 Charleston, SC 29405 Tel: 843-953-0150	Public Works / Stormwater 1003 US Highway 52 Moncks Corner, SC 29461 Tel: 843-719-2359

3.3. Inspection Requirements

The General Contractor shall be responsible for all SWPPP inspections. Inspections shall include the following:

1. All areas of the site disturbed by construction activity and areas used for storage of materials that are exposed to precipitation;
2. All stormwater conveyance systems for any evidence of, or the potential for, pollutants entering these systems;
3. All BMPs identified in the OS-SWPPP;
4. All discharge locations to ascertain whether the implemented BMPs are effective in preventing the discharge of sediment from the site. Where discharge locations are inaccessible, nearby downstream locations must be inspected to the extent that such inspections are practicable; and
5. Locations where vehicles enter or exit the site must be inspected for evidence of off-site sediment tracking.

Inspection Frequency

After construction activities begin, inspections must be conducted at a minimum of at least once every calendar week and must be conducted until final stabilization is reached on all areas of the construction site. An inspection is recommended within 24 hours of the end of a storm event of 0.5 inches or greater.

Inspector Qualifications

Inspections must be conducted by qualified personnel (provided by the General Contractor). "Qualified Personnel" means a person knowledgeable in the principles and practice of erosion and sediment controls who possesses the skills to assess conditions at the construction site that could impact stormwater quality and to assess the effectiveness of any BMPs selected to control the quality of stormwater discharges from the construction site. This person must be an individual who has been certified through a Construction Site Inspector Certification Course that has been approved by DHEC. Inspections may also be conducted by a person with a registration equivalent to the registration of the preparer of the C-SWPPP (professional engineer).

3.4. Maintenance Requirements

Proper maintenance of post-construction water quality BMP's and drainage systems is required to ensure they continue to function as designed and permitted. Maintenance activities shall be performed as follows:

System	Maintenance Requirements	Maintenance Frequency
A. Vegetated Areas	1. Mow Grass	1. Monthly
	2. Remove all litter and debris	2. Monthly
	3. Remove and replace dead or diseased vegetation	3. Semi-Annually
	4. Replace / Replenish mulch.	4. Semi-Annually
	5. Remove weeds.	5. Semi-Annually
	6. Prune vegetation to maintain appearance	6. Semi-Annually
B. Storm Drainage System	1. Remove all litter and debris from pipes.	1. Annually
	2. Remove sediment from drainage structure sumps	2. Annually, or when sump volume has been reduced by 50%.
C. Pre-Fabricated Water Quality Devices	1. Remove all litter and debris.	1. Monthly
	2. Perform maintenance specified by the manufacturer.	2. Annually, or sooner if recommended by the manufacturer
D. Energy Dissipaters	1. Remove all litter and debris	1. Monthly
	2. Repair erosion or damaged dissipaters.	2. Annually
E. Vegetated Filter Strips	1. Mow grass	1. Monthly
	2. Remove all litter and debris	2. Monthly
	3. Repair erosion and rills	3. Annually
	4. Repair sparse vegetation	4. Annually
F. Permeable Pavement	1. Remove all litter and debris	1. Monthly
	2. Verify pavement is draining properly.	2. Annually
	3. Vacuum and perform high pressure hosing to free pores from clogging	3. Annually

3.5. Record Keeping

Any logs necessary to track the progress, compliance, modifications and those associated with the construction site. These logs may include, but are not limited to, a pre-construction conference log, an inspection log, a stabilization log, a rain log, a contractor log and/or any additional record keeping as deemed necessary by the Permittee, Contractor, DHEC, MS4, or an entity delegated under Regulation 72-300.

3.6. Final Stabilization

Final site stabilization is achieved when perennial vegetative cover provides permanent stabilization with a density greater than 70 percent over the entire area to be stabilized by vegetative cover. This area is exclusive of areas that are covered with rock (crushed granite, gravel, etc.) or landscape mulch, paved or have a building or other permanent structure on them.

SECTION 321613 - SITE WORK CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. This section covers all materials, labor and equipment for portland cement concrete used in structures, sidewalks, curb and gutter.

1.2 LUMP SUM PRICE

A. The items listed in the proposal shall be considered as sufficient to complete the work in accordance with the plans and specifications. Any portion of the work not specifically listed in the bid form shall be deemed a part of the item with which it is associated and shall be included in the lump sum price. The price shall be full compensation for the material, compaction, shaping, finishing, dressing, disposal of surplus material, testing construction supervision and all other work required for satisfactory completion of site work concrete.

1.3 UNIT PRICES

A. None this Section.

1.4 SUBMITTALS

A. Mix Designs: The Contractor shall submit for review a design mix for each class of concrete proposed for use. The mix shall be prepared by an approved testing laboratory. Compressive strength of at least four test specimens of the design mix shall indicate 15% higher than 28 days strength specified.

B. Field Testing: Compressive strength tests.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver and store materials in a manner to prevent contamination or segregation. Do not stockpile materials in a manner or location that will cause excessive wetting or transporting of materials off-site or into storm drainage collection systems.

1.6 REGULATORY REQUIREMENTS

A. Comply with all federal, state and local regulatory requirements.

1.7 QUALITY ASSURANCE

A. Materials: All material submittals shall be submitted by the contractor and reviewed and accepted in writing by the Engineer prior to ordering of any materials.

B. Manufacturer: Material and equipment shall be the standard products of a manufacturer who has manufactured them for a minimum of 2 years and who provides published data on the quality and performance of the projects.

C. Subcontractor: A subcontractor for any part of the work must have experience on similar work. At the option of the Owner and/or Engineer, a list of projects and the Owners or Engineers who are familiar with their competence may be required to be submitted to verify experience.

D. Design: Devices, equipment, structures, and systems not designed by the Engineer that the Contractor wishes to furnish shall be designed by either a registered professional engineer or by someone the Engineer accepts as qualified. Complete design calculations and assumptions shall be furnished to the Engineer or Owner before acceptance.

E. Environmental Conditions: Concrete shall be mixed and placed only when temperature is at least 40°F and rising.

F. Equipment: Shall be well maintained, suited for the intended work and capable of delivering the finished product to the standards shown on drawings and as specified herein.

PART 2 - PRODUCTS

2.1 CONCRETE

A. Design Mix in accordance with ACI 211.1.

Class	Compressive Strength (28 day)	Application
AA	4,000 psi	Pavements and driveways
A	3,000 psi	Curb and gutters, sidewalks, structures
B	2,500 psi	Thrust blocks

1. Cement: ATM C150, Type I.
2. Water: Shall be clean, fresh and potable.
3. Aggregates: ASTM C33.
4. Admixtures: Where not shown or specified, the use of admixtures is subject to the written approval of the Engineer.

    a. Air Entraining: ASTM C260. Use in all portland cement concrete.
    b. Retarding: ASTM C494.
    c. Accelerating: ASTM D98.
    d. Water Reducing: ASTM C494.
    e. Fly Ash and Pozzolans: ASTM C618, Types N, F, or C.
    f. Maximum water/cement ratio: 0.50.
    g. Range in Slump: 2 to 5 inches.
    h. Ground Iron Blast Furnace Slag: ASTM C989, Grade 120.

2.2 FORMS

A. Shall be wood, plywood, metal, or other qualified material and shall be of the grade or type suitable to obtain the finish specified. Forms shall be constructed to the shape, for line, and grade required, and shall be maintained sufficiently rigid to prevent deformation under load. Form work and details construction shall conform to Chapter 6 of ACI 318.

2.3 REINFORCEMENT:

A. Reinforcing Steel: Conform to ASTM A615, Grade 60.

B. Mesh Reinforcement: Conform to ASTM A1064, flat sheets.

2.4 JOINT MATERIALS

A. Blocking Media: Compressible, non-shrinkable, non-reactive with joint sealant and non-absorption type such as plastic rod, free of oils or bitumens. Blocking media shall have a water absorption of not more than 5% by weight when tested in accordance with ASTM C509. Blocking media shall be consistent with the joint sealant manufacturers installation instructions and be at least 25% larger in diameter than the width of the joint being sealed.

B. Liquid Joint Sealant: Silicone joint sealant such as Dow Corning 890SL or approved equal.

2.5 CURING MATERIALS

A. Impervious Sheeting: ASTM C171 with minimum sheet thickness of 10 mils. Non-reactive with other materials such as curing compound.

B. Liquid Membrane-Forming Compound: ASTM C309, white pigmented, Type 2, Class A or B, free of paraffin or petroleum.

2.6 ANCHORAGE ITEMS

A. Slots, inserts, clips, and other devices for anchoring masonry, wood, steel, and mechanical items to concrete shall be of standard manufacture, and of qualified types as required to engage and anchor the work specified under other sections.

PART 3 - EXECUTION

3.1 PREPARATION BEFORE PLACING

A. Water shall be removed from excavations before concrete is deposited. Hardened concrete debris, and other foreign materials shall be removed from the interior of forms and from the inside of mixing and conveying equipment. The reinforcement shall be made secure in position and shall be subject to examination and approval.

B. Prepare surface to receive concrete in accordance with Section “EARTH MOVING”.

3.2 FORMS

A. Construct forms to be removable without damaging the concrete.

B. Coating: Before placing the concrete, coat the contact surfaces of forms, (except existing pavement sections where bonding is required) with a non-staining mineral oil, non-staining form coating compound, or two coats of nitro-cellulose lacquer. When using existing pavement as a form, clean existing concrete and then coat with an asphalt emulsion bondbreaker before concrete is placed.

C. Grade and Alignment: Check and correct grade elevations and alignment of the forms immediately before placing the concrete.

3.3 REINFORCEMENT

A. Metal reinforcement shall be free from rust, scale or other coatings, and shall be accurately placed and properly secured in position by concrete blocks or metal chairs and by spacers. Bars shall be bent cold. Exposed bars intended for bonding with fixture extensions shall be protected from corrosion by an accepted covering. Bar chairs shall be hot dipped galvanized where in contact with forms for concrete that is exposed to view.

B. Concrete Protection over Steel Reinforcement:

1. Concrete deposited against ground: 3 inches.
2. Formed surfaces exposed to weather or ground – Bars #6 and Larger: 2 inches.
3. Formed surfaces exposed to weather or ground – Bars less than #6: 1.5 inches.
4. Interior surfaces, beams, girders, and columns: 1.5 inches.
5. Slabs, walls, and joists – Bars #11 and smaller: 0.75 inches.

3.4 MEASURING, MIXING, AND CONVEYING CONCRETE

A. Measuring, mixing and conveying: ASTM C94.

B. Concrete mixed at the job site shall be mixed in a batch mixer in accordance with ACI 318, and in a similar manner subject to approval. Mixing time for stationary mixers over 1 CY in capacity shall be increased 15 seconds for each additional 0.5 CY or fraction thereof of material mixed.

3.5 PLACING CONCRETE

A. Placing of concrete shall conform to Chapter 5 of ACI 318.

B. Concrete having attained initial set or having contained water for one more than 90 minutes shall not be used in the work. Concrete shall not be dropped freely more than 5 feet on unexposed work, or more than 3 feet in exposed work. Concrete shall be mixed and placed only when temperature is at least 40°F and rising. Concrete footings shall be placed only upon surfaces that are free from frost, ice, mud, or other detrimental circumstances. When placed on dry soil or pervious material, waterproof paper or polyethylene sheeting shall be laid over the surfaces that are to receive the concrete.

3.6 FINISHES

A. Concrete shall be deposited to the required thickness, compacted, screed to grade, and finished monolithically to a smooth broom finish. Where drains, or sumps occur, the concrete shall be sloped to drain. Slight honeycomb and minor defects shall be patched with cement mortar made with one part cement and two parts fine aggregate and then rubbed smooth with carborundum brick. Patching shall be accomplished immediately after forms are removed. Immediately after removing forms, other exposed surfaces shall be dampened, brush-coated with grout, and rubbed with a wood float. Floating devices shall be rubbed with burlap and kept damp by fog spraying.

3.7 CURING

A. Immediately after placing or finishing, concrete surfaces not covered by forms shall be protected against moisture loss for not less than 7 days by use of impervious sheeting or curing compound. Curing compound shall be applied in strict accordance with the manufacturer's recommendations.

3.8 BONDING AND GROUTING

A. Before depositing new concrete on concrete that has set, the surface of the set concrete shall be thoroughly cleaned of laitance, foreign matter, and loose particles leaving a rough surface with clean and sound exposed aggregate. Forms shall be re-tightened, and the surfaces of the set concrete shall be slushed with a grout coat of neat cement and water. Where an epoxy bonding agent is called for on the drawings, the epoxy bonding agent shall be polysulfide liquid polymer and an epoxy resin combined at the job site, in equal volumes and thoroughly mixed. The mixed agent shall be applied on a clean concrete surface by brushing or spraying. A 10 mil coating shall be spread evenly to cover all bonding surfaces. When a bonding agent has been applied, and while the surface is still sticky, new concrete to be bonded shall be put in place.

3.9 PROTECTION

A. Protect new concrete from damage for the duration of this contract.

B. Existing Pavement: Protect existing pavements to remain from damage. Movement of construction machinery and equipment over existing pavements during construction shall be at the Contractor's risk. Existing pavements damaged by the contractor's operations shall be repaired or replaced to their original condition at the contractor's expense.

C. Erosion Control: Protect existing streams, ditches, and storm drain inlets from water-borne soil by the means indicated on the contract drawings.

D. Existing Utilities: Location of the existing utilities indicated is approximate. The Contractor shall physically verify the location and elevation of the existing utilities indicated prior to starting construction. The Contractor shall contact the local utility location company or each applicable utility company as required for assistance in locating existing utilities.

E. Structures and surfaces: Protect newly backfilled areas and adjacent structures, slopes, or grades from traffic, erosion settlement, or any other damage. Repair and reestablish damaged or eroded grades and slopes and restore surface construction prior to acceptance.

3.10 INSPECTIONS AND TESTING

A. Inspections

1. Notify the Owner, Project Representative and Engineer a minimum of 72 hours prior to all required observations, inspections or tests.
2. All work conducted and materials furnished shall be subject to review by the Engineer or the Project Representative. The Engineer will also have the right to require that any portion of the work be conducted in his presence.

    a. If the work is covered after such instruction, it shall be exposed by the Contractor for observation.
    b. However, if the Engineer is notified that such work is scheduled and the Engineer fails to appear within 72 hours, the Contractor may proceed without him.

3. All improper work shall be reconstructed and all materials which do not conform to the requirements of the specifications shall be removed from the work upon written notice.

    a. The Engineer shall have the right to mark materials as rejected to distinguish them as such.

B. Testing

1. All testing shall be made at the Owner's expense. The Engineer shall approve test locations.

2. Notify the testing laboratory, Engineer and Owner a minimum of 72 hours prior to all tests.
3. Test results shall be furnished to the Contractor, Engineer and Owner within 72 hours after field tests are taken.

4. Laboratory Testing

   a. Independent Testing Laboratory shall operate in accordance with ASTM E-329 (latest revision) and shall be approved by the Engineer prior to engagement.
   b. Mill certificates of tests on materials made by the manufacturers will be accepted provided the manufacturer maintains an adequate testing laboratory, makes regularly scheduled tests that are spot checked by an outside laboratory, and furnishes satisfactory certificates with the name of the one making the test.

5. Field Testing

   a. Independent Testing Laboratory shall prepare test reports that indicate test location, elevation data, and test results.
   b. If any test performed fails to meet these specifications, Independent Testing Laboratory shall immediately notify the Owner, Engineer and Contractor.
   c. The Owner reserves the right to employ an Independent Testing Laboratory and to direct any testing that it may deem necessary. The Contractor shall provide free access to the site for testing activities.

   d. Field Tests

      1) Compressive strength test: ASTM C39
      2) Grade

   e. Frequency of field testing

      1) Compressive Strength: 3 test cylinders per each 50 CY of concrete placed or for each structure requiring more than 10 CY of concrete. One cylinder shall be tested at 7 days and two at 28 days in accordance with ASTM C39.
      2) Grade: Check each structure, sidewalk or other feature for proper grade, slope and cross slope.

3.11 ACCEPTANCE

A. If a tested material does not meet or exceed the specified requirements, the Contractor shall perform additional testing as directed by the Engineer to adequately define the limits of the material not meeting the specifications. Materials shall be re-tested to the satisfaction of the Engineer until specified requirements are met.

B. All additional testing and work that is the result of a failed inspection and/or test shall be performed by the Contractor at no additional cost to the Owner.

END OF SECTION 321613

SECTION 321723 - PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish all labor, equipment and services for pavement markings of types, patterns, sizes and colors as shown on the plans and as specified herein:

1.2 LUMP SUM PRICE

A. The items listed in the proposal shall be considered sufficient to complete the work in accordance with the plans and specifications. Any portion of the work not specifically listed in the bid form shall be deemed a part of the item with which it is associated and shall be included in the lump sum price. The price shall be full compensation for all material, equipment, labor, testing, construction supervision and all other work required for satisfactory completion of pavement marking.

1.3 UNIT PRICES

A. None this Section.

1.4 SUBMITTALS

A. Certifications: Provide manufacturer or supplier certification of compliance indicating conformance to this specification or the referenced standard(s) for the following:

1. Paints
2. Reflective Media
3. Thermoplastic Material

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver paints and paint materials in original sealed containers that plainly show the designated name, specification number, batch number, color, date of manufacture, manufacturer's directions, and name of manufacturer. Provide storage facilities at the job site for maintaining materials at temperatures recommended by the manufacturer.

1.6 REGULATORY REQUIREMENTS

A. Comply with federal, state, and local regulations.

1.7 QUALITY ASSURANCE

A. Materials: All material submittals shall be submitted by the contractor and reviewed and accepted in writing by the Engineer prior to ordering of any materials.

B. Manufacturer: Material and equipment shall be the standard products of a manufacturer who has manufactured them for a minimum of 2 years and who provides published data on the quality and performance of the projects.

C. Subcontractor: A subcontractor for any part of the work must have experience on similar work. At the option of the Engineer, a list of projects and the Owners or Engineers who are familiar with his competence may be required to be submitted to verify experience.

D. Environmental Conditions: Unless otherwise approved by the manufacturer's written instructions, apply paint to clean, dry surfaces, and unless otherwise approved, only when air and pavement temperatures are above 40°F for oil-based materials, 50°F for water-based materials, and less than 95°F. Maintain paint temperature within these same limits.

E. Equipment: Shall be well maintained, suited for the intended work and capable of delivering the finished product to the standards shown on drawings and as specified herein.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Paints: Federal Specification TT-P-1952, color as indicated.

B. Reflective Media: Federal Specification TT-B-1325, Type I, Gradation A.

C. Thermoplastic Materials: In accordance with South Carolina Department of Transportation Standard Specifications for Highway Construction (SCDOT SSHC).

PART 3 - EXECUTION

3.1 PREPARATION OF SURFACE

A. Prepare surface in accordance with manufacturer's written instructions.

B. Allow new pavement surfaces to cure as recommended by the manufacturer's written instructions or 30 days if not specified by the manufacturer.

C. Except as otherwise specified by the manufacturer's written instructions:

D. Thoroughly clean surfaces to be marked before application of the paint. Remove dust, dirt, residual curing compounds and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water, waterblasting or a combination of these methods as required. Scrub affected areas, where oil or grease is present on old pavements to be marked, with several applications of trisodium phosphate solution or other approved detergent or degreaser and rinse thoroughly after each application. After cleaning oil-soaked areas, seal with shellac or primer recommended by the manufacturer to prevent bleeding through the new paint. Do not commence painting in any area until pavement surfaces are dry and clean.

3.2 APPPLICATION

A. Rate of Application

1. Paint: Apply paint evenly to the pavement area to be coated at a rate of 105 SF/GAL plus or minus 5 SF/GAL.
2. Reflective media: Apply glass spheres uniformly to the wet paint on road and street pavement at a rate of 6 lbs./GAL plus or minus 0.5 lbs./GAL.
3. Thermoplastic material: Apply in accordance with SCDOT SSHC.

B. Painting: Provide guidelines and templates as necessary to control paint application. Take special precautions in marking numbers, letters, and symbols. Manually paint numbers, letters, and symbols. Sharply outline all edges of markings. The maximum drying time requirements of the paint specifications will be strictly enforced, to prevent undue softening of bitumen, and pickup, displacement, or discoloration by tires of traffic. Discontinue painting operations if there is a deficiency in drying of the markings until cause of the slow drying is determined and corrected.

C. Reflective Media: Application of reflective media shall immediately follow the application of paint. Accomplish drop-on application of the glass spheres to ensure even distribution at the specified rate of coverage. Should there be a malfunction of either paint applicator or reflective media dispenser, discontinue operations until deficiency is corrected.

D. Curing: Allow markings to cure in accordance with manufacturer's written instructions.

3.3 PROTECTION

A. Protect new markings from adverse weather and traffic as recommended by the manufacturer's written instructions.

B. As required, place warning signs near the beginning of the work site and well ahead of the work site for alerting approaching traffic from both directions. Place small markers along newly painted lines to control traffic and prevent damage to newly painted surfaces. Mark painting equipment with large warning signs indicating slow-moving painting equipment in operation.

3.4 INSPECTIONS

A. Notify the Owner, Project Representative and Engineer a minimum of 72 hours prior to all required observations, inspections or tests.

B. All work conducted and materials furnished shall be subject to review by the Engineer or the Project Representative. The Engineer will also have the right to require that any portion of the work be conducted in his presence.

1. If the work is covered after such instruction, it shall be exposed by the Contractor for observation.
2. However, if the Engineer is notified that such work is scheduled and the Engineer fails to appear within 72 hours, the Contractor may proceed without him.

C. All improper work shall be reconstructed and all materials which do not conform to the requirements of the specifications shall be removed from the work upon written notice.

1. The Engineer shall have the right to mark materials as rejected to distinguish them as such.

3.5 ACCEPTANCE

A. Final acceptance will be based on satisfactory construction of markings as approved by the Owner and/or Engineer. Markings shall be re-worked to the satisfaction of the Engineer until specified requirements are met.

B. All additional work that is the result of failed inspection shall be performed by the Contractor at no additional cost to the Owner.

END OF SECTION 321723

SECTION 323300 - SITE FURNISHINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Seating - Benches.
2. Tables and Chairs.
3. Picnic Tables.
4. Bicycle racks.
5. Litter receptacles.
6. Bollards.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Verification: For each type of exposed finish, not less than 6-inch-long linear components and 4-inch-square sheet components.

1. Include full-size Samples of bench, tables, bicycle rack, trash receptacle and bollard. Approved samples may be incorporated into the Work.

C. Product Schedule: For site furnishings. Use same designations indicated on Drawings.

1.3 INFORMATIONAL SUBMITTALS

A. Material Certificates: For site furnishings manufactured with preservative-treated wood.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For site furnishings to include in maintenance manuals.

1.5 WARRANTY

A. Provide manufacturer's warranty for each type of product.

PART 2 - PRODUCTS

2.1 SEATING - BENCHES (Sheet L302)

A. Basis-of-Design Product: Subject to compliance with requirements, provide Landscape Forms "Lakeside" Bench or an approved comparable product.

B. Installation Method: Surface mount.

C. Finish: Powder coating.

1. Color: As selected by Architect from manufacturer's full range.

2.2 TABLES AND CHAIRS (Sheet L302)

A. Basis-of-Design Product: Subject to compliance with requirements, provide Landscape Forms. “Mingle Table” or an approved comparable product.

B. Seating:

1. Material: Cast Backed Seats: Profile and front castings are Aluminum 319 ASTM B26. Extrusions are 6005A-T5 or 6105 T5 ASTM B221.
2. Height: 17 inches.
3. Style: Backed – Perforated metal seats.
4. Number of seats: 4.

C. Table Top

1. Material: Sheet steel with a rolled edge and reinforced with steel channels beneath top. Stainless steel, Type 304, 16 gauge.
2. Height: 29.25 inches.
3. Style: Catena.
4. Size: 42 inch diameter.
5. Umbrella Hole: 2 inch diameter hole with grommet installed for use with 1.5 inch diameter pole. Stainless steel hardware for securing the umbrella to the table is included.

D. Mounting: Surface Mounted.

E. Finish: Powder coating.

1. Color: As selected by Architect from manufacturer's full range.

2.3 PICNIC TABLES

A. Basis-of-Design Product: Subject to compliance with requirements, provide Belson Outdoors. LLC “Precast Concrete Picnic Table, Model #CRT6H” or an approved comparable product.

B. Style:

1. Material: Precast concrete.
2. Size: 72 by 60 inches.
3. Color: As selected by Architect from manufacturer's full range.

2.4 BICYCLE RACKS (Sheet L302

A. Basis-of-Design Product: Subject to compliance with requirements, provide Landscape Forms “Loop” Bicycle Rack or an approved comparable product.

B. Installation Method: Surface mount.

C. Finish: Powder coating.

1. Color: As selected by Architect from manufacturer's full range.

2.5 TRASH RECEPTACLES (Sheet L302)

A. Basis-of-Design Product: Subject to compliance with requirements, provide Landscape Forms. “Lakeside” Litter Receptacles or an approved comparable product.

B. Installation Method: Surface mount.

C. Finish: Powder coating.

1. Color: As selected by Architect from manufacturer's full range.

2.6 BOLLARDS (Sheet L301)

A. Basis-of-Design Product: Subject to compliance with requirements, provide Victor Stanley “Street Sentry - Lens” Bollards or an approved comparable product.

B. Bollard Construction:

1. Tubular Steel: Not less than 4.5 inch diameter.
2. Style: As indicated.
3. Overall Height: 36 inches.
4. Installation Method: Standard in-ground.

C. Finish: Powder coating.

1. Color: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance of the Work.

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

3.2 INSTALLATION

A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.

B. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed.

C. Install site furnishings level, plumb, true, and securely anchored and positioned at locations indicated on Drawings.

D. Post Setting: Set cast-in support posts in concrete footing with smooth top, shaped to shed water. Protect portion of posts above footing from concrete splatter. Verify that posts are set plumb or at correct angle and are aligned and at correct height and spacing. Hold posts in position during placement and finishing operations until concrete is sufficiently cured.

E. Posts Set into Voids in Concrete: Form or core-drill holes for installing posts in concrete to depth recommended in writing by manufacturer of site furnishings and 3/4 inch larger than OD of post. Clean holes of loose material, insert posts, and fill annular space between post and concrete with non-shrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions, with top smoothed and shaped to shed water.

F. Pipe Sleeves: Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with non-shrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions, with top smoothed and shaped to shed water.

END OF SECTION 323300

SECTION 328400 – IRRIGATION SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes piping, valves, sprinklers, controls, and wiring for automatic control irrigation systems.

B. Extent of the underground irrigation system is shown in the plans, schedules and notes.

C. Provide all labor. Materials and equipment required or inferred from the Drawings and Specifications to complete the Work of this Section.

D. Provide a complete and operable system for the irrigation of all landscapes areas on the project site, unless indicated otherwise. The Drawings and specifications are intended to include all items obviously necessary and requisite for the proper irrigation of the project.

E. The Contractor shall be responsible for adjusting head locations, nozzle type and size, and any other system components so that the irrigation system layout is coordinated with actual field conditions. Such adjustments shall be made at no cost to the Owner except, when authorized in writing, such adjustments which will be compensated for at an agreed upon cost.

1.3 DEFINITIONS

A. Lateral Piping: Downstream from control valves to sprinklers, specialties, and drain valves. Piping is under pressure during flow.

B. Drain Piping: Downstream from circuit-piping drain valves. Piping is not under pressure.

C. Mainline Piping: Downstream from point of connection to water distribution piping to, and including, control valves. Piping is under water-distribution-system pressure.

D. The following are industry abbreviations for plastic materials:

1. ABS: Acrylonitrile-butadiene-styrene plastic.
2. FRP: Fiberglass-reinforced plastic.
3. PA: Polyamide (nylon) plastic.
4. PE: Polyethylene plastic.
5. PP: Polypropylene plastic.
6. PTFE: Polytetrafluoroethylene plastic.
7. PVC: Polyvinyl chloride plastic.
8. TFE: Tetrafluoroethylene plastic.
9. HDPE: High Density Polyethylene plastic.

1.4 PERFORMANCE REQUIREMENTS

A. Head-to-head coverage irrigation system for lawns and exterior plants as shown or indicated on associated plans.

B. Drawings are diagrammatic and generally indicate the Work to be installed. The Drawing do not indicate all off-set fittings that may be necessary. The Contractor shall furnish such items as may be required to complete the work.

C. Location of Sprinklers and Specialties: Design location is approximate. Make minor adjustments necessary to avoid plantings and obstructions such as signs and light standards. Maintain a minimum of head-to-head coverage and dripline row spacing for turf and planting areas unless otherwise indicated.

D. Minimum Working Pressures: The following are minimum pressure requirements for piping, valves, and specialties, unless otherwise indicated:

1. Irrigation Main Piping: 200 psi.
2. Lateral Piping: 200 psi.

1.5 SUBMITTALS

A. Approval: Obtain approval from Landscape Architect for all submittals prior to the beginning of Work, unless otherwise approved.

B. Product Data: Individual copies for product data shall be submitted Include pressure ratings, rated capacities, and settings of selected models for the following:

1. Contractor Qualifications as per Section 1.06.A.
2. Sprinklers and nozzles.
3. Electrical Control Valves.
4. Drip Control Valves.
5. Quick Coupler Valves.
6. Isolation Valves.
7. Valve boxes.
8. Drip Tubing and fittings.
9. Drip Indicator.
10. Controllers and associated communication equipment.
11. Control cables. Include splice kits.
12. Decoders.
13. Grounding equipment.
14. Rain Sensor
15. PVC fittings.
16. PVC Primer and Cement.
17. Mainline, Lateral and Sleeve piping.
18. Mainline, Lateral pipe fittings.

C. As-Built Drawings: Any changes in the layout and or arrangements of the proposed irrigation system, or any other differences between the proposed system and actual installed conditions are to be recorded by the Irrigation Contractor in the form of an “As-Built” Drawing. As-Built Drawing to be produced in an electronic format using AutoCAD. Provide the Owner and the Landscape Architect an AutoCAD and PDF file along with five (5) hard copies of the As-Built Drawings before Work under this Contract will be considered for Acceptance. All automatic and manual valves, hose bibs or quick couplers, wire splice, and pressurized mainline locations shall be shown with actual field dimensions in feet and inches from two permanent reference points so they may be located easily in the field. Submittals of approved As-Built Drawing will precede any Application for Final Payment by the Contractor.

D. Operation and Maintenance Data: For irrigation systems, to include in emergency, operation, and maintenance manuals, including data for the following:

1. Automatic-control valves.
2. Isolation valves.
3. Sprinklers.
4. Control systems.

E. Test Reports: Field test results of the irrigation supply well to include flow rates and recovery rates.

F. Shop Drawings: Submit certified shop drawings showing complete information for fabrication and installation of pump station. Shop drawings shall include a complete electrical wiring diagram.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Installing Contractor must be licensed in the state that the work is being conducted. In the absence of a license requirement the Contractor must be an Irrigation Association Certified Contractor, in good standing. Engage a firm or firms specializing in irrigation system installation. Installer shall have successfully completed five projects similar in material, size, scope and complexity to that indicated for this Project that have resulted in construction with a record of successful in-service performance. Provide listing of the five similar project showing number of zones, water source, mainline sizes, control system and project contact phone number and e-mail address. Contractor to be an Irrigation Association CID. Contractor must have manufacturers' 2-wire installation and programming training certificates.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Codes and Standards: Perform the work in compliance with applicable requirements of governing authorities having jurisdiction. Local regulations supersede these specifications. Notify Landscape Architect in writing of all discrepancies immediately.

D. Approval and Selection of Materials and Work: The selection of all materials and the execution of all operations required under the Drawings and Specifications is subject to the approval of the Owner and Landscape Architect. The have the right to reject any and all materials and any and all work which, in their opinion, does not meet the requirements of the Contract Documents at any state of the operations. Remove rejected Work and or materials from the project site and replace promptly.

E. Do Not Make Substitutions: If the Contractor desires to make substitutions of materials, sufficient descriptive literature and material samples must be furnished to establish the material as an equal substitute. In addition, the Contractor must state his reasons for desiring substitute materials and any potential cost savings. Submit this request and information to the Landscape Architect.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.8 PROJECT CONDITIONS

A. The site irrigation system is comprised of two major components: sprinkler system and the control system.

B. The irrigation system is designed to operate under the following conditions. A minimum of 75 PSI water pressure, and at least a 35 GPM available water supply at the pump station discharge outlet.

C. Insurance on irrigation materials or equipment stored or installed is the responsibility of the Contractor. Such insurance shall cover fire, theft and vandalism. Should the Contractor elect not to provide for such insurance, he will in no way hold the Owner responsible for any losses incurred by the aforementioned acts. The Contractor is responsible for all costs incurred in replacing damaged or stolen materials or equipment prior to Substantial Completion of the Work.

D. Obtain all required permits and pay all required fees, at no additional cost to the Owner. Any penalties imposed due to the failure to obtain permits or pay fees are the responsibility of the Contractor.

E. Provide and maintain all passageways, guard fences, warning lights and other protective devices required by the local authorities.

F. Existing grades: Existing grades will be within 0.2 feet of grades shown on the Civil Engineering Drawings at the time of work. Determine conditions of existing grades prior to beginning the Work. When irregular or incomplete grading conditions are encountered, notify the Owner in writing before beginning the Work. Determine location of existing drainage patterns and maintain patterns in completed Work. Perform Work in a manner which will avoid damage to finished grading and drainage patterns. All damage to finished grading and drainage resulting from Work covered in these Contract Documents shall be repaired at the Contractor's expense.

G. Existing Utilities: Determine location of underground utilities. Perform Work in a manner which will avoid possible damage. Excavate as required. Maintain grade stakes set by other unless removal is mutually agreed upon by parties concerned. All damage to utilities resulting from Work covered in these Contract Documents shall be repaired at the Contractor's expense.

H. Existing Conditions: Perform irrigation Work in Tree Protection zones and in existing or previously completed landscape areas to avoid damage and disturbance to these areas. Limit work in these areas to only that necessary to perform work specified herein and shown on the Drawings. Return and repair any areas damaged or disturbed while performing the Work to the existing conditions encountered prior to the Work.

I. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:

1. Notify Owner's Representative no fewer than two (2) days in advance of proposed interruption of water service.
2. Do not proceed with interruption of water service without Owner's Representative written permission.

J. Removal of Hardscape: Do not remove hardscape surface unless permitted under the following conditions:

1. Coordinate with Owner's Representative no fewer than two (2) days in advance of proposed hardscape removal.
2. Hardscape removal must not interrupt normal traffic flow on hardscape area.
3. Area of removal must be useable prior to close of workday and completely repaired within two (2) days of removal.

1.9 COORDINATION

A. Coordinate installation of irrigation system with Owner's Representative and/or all other trades on site to ensure irrigation system or other work on site will not be damaged. Should Contractor fail to coordinate, and damages occur, it will be the Contractor's responsibility to repair damages at his own costs.

1.10 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Sprinkler Units: Equal to 2% of amount installed for each type and size indicated, but no fewer than ten (10) units of each type.
2. Spray Sprinkler Units: Equal to 2% of amount installed for each type and size indicated, but no fewer than ten (10) units.
3. Electric Control Valve Units: Equal to 5% of amount installed for each type indicated, but no fewer than five (5) units of each size and type.
4. Isolation Valves: Equal to 5% of amount installed for each type indicated, but no fewer than two (2) units of each type.
5. Decoders: A minimum of two (2) units of each type.

1.11 PRE-INSTALLATION MEETING

A. Conduct a virtual conference/meeting. Review methods and procedures related to the site landscape irrigation system including, but not limited to the following.

B. The General Contractor is to contact the Irrigation Consultant/Landscape Architect and Owner Representative a minimum of 60 days prior to the scheduled date of commencement of the irrigation installation.

C. Meet with Owner Representative and Irrigation Consultant/Landscape Architect to review Contract documents.

D. Verify current drawing release date with contract documents.

E. Review submittal procedure including codes, substitutions, product data, qualifications, and As-Built procedures and formats.

F. Review project conditions including tap and meter size, permits, utility locations and water conditions.

G. Review methods and procedures related to irrigation installation.

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

I. Review warranty guidelines.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
2. Manufacturers: Subject to compliance with requirements, provide and warrantee products by one of the manufacturers specified.

2.2 PIPES, TUBES, AND FITTINGS

A. Steel Pipe: ASTM A 53/A 53M, Schedule 40, Type S or E, Grade A or B, galvanized with threaded ends.

1. Steel Pipe Nipples: ASTM A 733 made of ASTMA 53A 53M or ASTM A 106, Schedule 40, galvanized, seamless steel pipe with threaded ends.
2. Malleable-Iron Unions: ASME B16.39, Class 150, hexagonal-stock body with ball-and-socket, metal-to-metal, bronze seating surface and female threaded ends.
3. Gray-Iron Threaded Fittings: ASME B16.4, Class 125, galvanized, standard pattern.
4. Cast-Iron Flanges: ASME B16.1, Class 125.
5. Cast-Iron Flanged Fittings: ASME B16.1, Class 125, galvanized.

B. Soft Copper Tube: ASTM B 88, Type L, water tube, annealed temper.

1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end.
3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.

C. Hard Copper Tube: ASTM B 88, Type L, water tube, drawn temper.

1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought- copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end.
3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.

D. PVC Pipe: ASTM D 1785, PVC 1120 compound, Class 200.

1. Pipe 3 inches and larger to have gasket joint connections. Pipe 2-1/2 inches and smaller to be bell end.
2. PVC Socket Fittings, Schedule 40: ASTM D 2466, 2-1/2 inches and smaller
3. Ductile Iron Gasket Joint Fittings: ASTM A536 for pipe sizes 3 inches and larger, all ductile iron fittings to have joint restraints as per manufacturer's recommendations.

E. PVC Pipe: ASTM D 1785, PVC 1120 compound, Schedule 80.

1. PVC Socket Fittings, Schedule 80: ASTM D 2467.
2. PVC Threaded Fittings: ASTM D 2464.

2.3 GENERAL-DUTY VALVES

A. AWWA, Cast-Iron Gate Valves: AWWA C509, resilient-wedge nonrising-stem, gray- or ductile-iron body and bonnet gate valve, epoxy coated; with steel stem and 2 inch operating nut.

1. Minimum: Working Pressure: 200 psig.
2. End Connections: Mechanical join flanged or ring-tite.
3. Interior Coating: Complying with AWWA C550.
4. Manufacturers:

   a. Matco.
   b. Leemco.
   c. Approved Equal.

B. Isolation Valve Boxes: Ten-inch circular valve box with 6 inch SDR 21 PVC pipe riser from top of valve to center line of valve box. Pipe to be centered on operating nut to allow easy access.

1. Operating Wrenches: Furnish total of two (2) steel, tee-handle operating wrenches with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut.

C. Bronze Gate Valves: MSS SP-80, Class 125, Type 1, non-rising-stem, bronze body with solid wedge, threaded ends, and malleable-iron hand wheel.

1. Manufacturers:

a. NIBCO INC.
b. Approved Equal.

2.4 SPECIALTY VALVES

A. Quick-Couplers: Factory-fabricated, bronze or brass, two-piece assembly. Include coupler water-seal valve; removable upper body with spring-loaded or weighted, rubber-covered cap; hose swivel with ASME B1.20.7, 3/4-11.5NH threads for garden hose on outlet; and operating key.

1. Locking-Top Option: Vandal-resistant, locking feature. Include four matching keys with hose swivel for each key.
2. Manufacturers:

a. Hunter Industries.
b. Approved Equal

2.5 CONTROL-VALVE BOXES

A. Plastic Control-Valve Boxes: Box and cover, with open bottom and openings for piping; designed for installing flush with grade. Size for all valves to be standard 14 inch rectangular.

1. Shape: Rectangular.
2. Sidewall Material: ABS or HDPE.
3. Cover Material: ABS or HDPE.

a. Lettering: IRRIGATION.
b. Green in Color.
c. Lockable with hex key mechanism or similar.

4. Manufacturers:

a. Rain Bird.
b. Approved Equal.

2.6 SPRINKLERS

A. Plastic housing and corrosion-resistant interior parts designed for uniform coverage over entire spray area indicated, at available water pressure.

1. Manufacturers:

    a. Hunter Industries.
    b. Or Approved Equal

2. Pop-up Spray Sprinklers: Fixed or adjustable pattern with screw-type flow adjustment, stainless-steel retraction spring, drain check valve, pressure regulation, co-molded riser seal that seals cap to body and pop-up heights of 4, 6 or 12 inches.
3. Pop-up, Rotary Sprinklers: Gear drive, full-circle and adjustable part-circle types with screw-type flow adjustment, stainless-steel retraction spring, stainless steel riser, drain check valve, flow stop valve, minimum of 8 nozzles available, integral rubber cover, adjustable from the top of the sprinkler and pop-up heights of 4, 6 or 12 inches.

2.7 DRIP COMPONENTS

A. Inline Drip Tubing with pressure compensating and check valve emitters. Use manufacturers fittings specifically for specified tubing.

1. Manufacturers:

    a. Rain Bird.
    b. Or Approved Equal

B. Drip Control Zone Kit with pressure regulation, disc filtration, filter cleaning indicator, 220 psi control valve and a pre-assembled package.

1. Manufacturers:

    a. Rain Bird.
    b. Or Approved Equal

C. Drip Indicator. 6 inch pop-up sprinkler body with yellow indicator on sprinkler pop-up stem.

1. Manufacturers:

    a. Hunter Industries.
    b. Or Approved Equal

D. Flush Valve. 0.5 inch plastic ball valve with barbed inlet and outlet.

1. Manufacturers:

    a. Hunter Industries.
    b. Or Approved Equal

2.8 ELECTRIC CONTROL VALVES

A. Electrically controlled hydraulically actuated control valves.

1. Manufacturers:

    a. Rain Bird.
    b. Or Approved Equal

B. Features:

1. 24vac solenoid with 410mA inrush current and 280mA holding current.
2. Pressure rating of 220 psi.
3. Fabric reinforced diaphragm.
4. Internal and external bleed.
5. Flow control handle.
6. Contamination Resistant.

2.9 AUTOMATIC-CONTROL SYSTEM

A. Manufacturers:

1. Rain Bird
2. Or Approved Equal

B. Exterior Control Enclosures: NEMA 250, Type 4, weatherproof, with locking cover and two matching keys; include provision for grounding.

1. Material: Enameled-steel or stainless steel.
2. Mounting: Surface type for wall mounting, concrete mounting base for pedestal.

C. Control Transformer/Decoder Output: 24VAC 4A secondary, with overload protection and or primary fuse.

1. Decoder Line Output: 32 VAC RMS over 2-wire path
2. Solenoid Capacity: 2 standard 24VAC solenoids per output, maximum output of 14 simultaneously.

D. Controller Stations for Automatic Control Valves: Each station is variable from approximately 1 minute to 23.9 hours. Include switch for manual or automatic operation of each station.

E. Timing Device: Adjustable, 24-hour, 365-day clock, with automatic operations to skip operation any day in timer period, to operate every other day, odd-even days, interval days, to operate eight or more times daily.

1. Manual or Semi-automatic Operation: Allows this mode without disturbing preset automatic operation.
2. Minimum 30-day internal power storage: Automatically powers timing device during power outages.
3. Eight (8) start times.
4. Simultaneous program operation.
5. Test program.
6. One button manual start.
7. Seasonal adjust 25% to 200%.
8. Twenty (20) independent programs.
9. Surge Protection: Metal-oxide-varistor type on each station and primary power.
10. Rain Sensor compatible with over-ride capabilities.
11. Remote control capabilities.
12. Five (5) Master Valve and Flow Meter input.
13. Flow monitoring by station.
14. Remote access from internet enabled device.
15. ET based irrigation scheduling.

F. Wiring:

1. Manufacturers:

a. Paige Electric.
b. Or Approved Equal.

2. Feeder-Circuit Cables: No. 14 AWG minimum, between building and controllers.
3. Decoder Output Cable: No. 14 Paige #P7072D “Maxi Cable”.
4. Splicing Materials: 3M DBY-6 as required by manufacturer.

PART 3 - EXECUTION

3.1 GENERAL

A. Observation of Work in Progress: During the installation, the Landscape Architect\Irrigation Consultant will make regular site visits and reject any work and materials which do not meet the requirements called for in the Contract Documents.

B. Inspect project site prior to start of Work to determine that all site conditions are acceptable for Work to begin. Inform Landscape Architect\Irrigation Consultant of unsuitable conditions. Do not proceed with installation of the irrigation system until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

C. Locate all existing underground utilities prior to trenching and\or boring operations and protect them against damage during the Work. Obtain utility location from Owner and\or General Contractor and utilize utility locating services when necessary.

3.2 EXAMINATION

A. Investigate and determine available water supply, water pressure and flow characteristics.

B. When unanticipated utilities that conflict with the intended function or design are encountered, investigate, and measure the nature and extent of the conflict. Promptly submit a written report to the Owner for action.

3.3 EARTHWORK

A. Install warning tape directly above pressure piping, 12 inches below finished grades, except 6 inches below subgrade under pavement and slabs.

B. Install piping and wiring in sleeves under sidewalks, roadways, parking lots, and railroads.

1. Install piping sleeves prior to hardscape sub-base being installed if possible.
2. Sleeving installed in open trench to be completely backfilled crushed limestone, approved by owner’s representative and compacted to insure no future settling.
3. Pipe sleeves are to be a minimum of two times the diameter of the pipe in the sleeve.

C. Provide minimum cover over top of underground piping according to the following:

1. Irrigation Main Piping: Minimum depth of 18 inches from top of pipe to finished grade.
2. Circuit Piping: Twelve (12) inches within general landscape areas, piping to be a minimum of 3 inches laterally\vertically from any other pipe or conduit at all times.
3. Drain Piping: Twelve (12) inches.
4. Sleeves: Eighteen (18) inches from top of pipe for mainlines and 12 inches from top of pipe for laterals.

3.4 EXCAVATION PREPARATION

A. Set stakes to identify locations of proposed irrigation system. Obtain Owner's Representative's approval before excavation.

B. Excavate area for pipe installation 4 inches wider than diameter of pipe.

1. Level trench base to insure consistent contact of pipe to trench bottom.
2. Remove all rocks and other sharp objects.
3. Place pipe in trench snaking from side to side if possible.
4. Backfill to the top of pipe compacting the sides.
5. Backfill in 8 inch lifts compacting to 90% between lifts until complete.
6. All trenches greater than 4 inches in width to be restored to grade, +/- 0.25 inch, with sod as approved by Owner's representative.
7. All trenches 4 inches or smaller in width to be restored to grade, +/- 0.25 inch with a minimum of 3 inches of topsoil as approved by Owner's representative.
8. Whenever possible trenching should be outside of a tree dripline. If trenching is done within the dripline, it should be at least 10 feet from existing tree. If 10 feet is not possible, the trenching must be done by hand and all tree roots greater than 1 inch to be left in place. All tree roots 1 inch or less may be removed by saw cutting root on either side of the excavation and root removal.

3.5 PIPING APPLICATIONS

A. Install components having pressure rating as shown on the plan.

B. Piping in above ground may be joined with flanges instead of joints indicated.

C. Aboveground Irrigation Main Piping: Use the following piping materials for each size range:

1. NPS 3 and Larger: Steel pipe; malleable-, gray-, or cast-iron fittings; and threaded joints.
2. NPS 25 and Smaller: hard copper tube, wrought- or cast-copper fittings, and soldered joints.

D. Underground Irrigation Main Piping: Use the following piping materials for each size range:

1. NPS 25 and Smaller: Class 200, PVC, pressure-rated pipe; Schedule 40, PVC socket fittings; and solvent-cemented joints.
2. NPS 3 and larger: Class 200 PVC, pressure rated pipe with gasket joint ends, Ductile Iron gasket joint fittings with manufacturer's recommended joint restraint.

E. Circuit Piping: Use the following piping materials for each size range:

1. NPS 4 and Smaller: Class 200, PVC, pressure-rated pipe; Schedule 40, PVC socket fittings; and solvent-cemented joints.

F. Underground Branches and Offsets at Sprinklers and Devices: Schedule 80, PVC pipe; acme threaded o-ring sealed PVC fittings.

1. Option: Plastic piping manufactured for this application may be used on sprinkler inlets of 0.5 inch or smaller instead of pipe and fittings specified, "swing" pipe and spiral barbed elbows). If this is to be used the offset must be more than 12 inches and less than 18 inches as per detail.

G. Risers to Aboveground Sprinklers and Specialties: Type L hard copper tube, wrought-copper fittings, and soldered joints.

H. Sleeves: SCH 40 PVC pipe and socket fittings; and solvent-cemented joints.

I. Transition Fittings: Use transition fittings for plastic-to-metal pipe connections according to the following:

1. Couplings:

a. Underground Piping NPS 2-1/2 and Smaller: Manufactured fitting or coupling.
b. Underground Piping NPS 3 and Larger: PVC Flange with stainless steel bolts and rubber gasket.

2. Fittings:

a. Aboveground Piping: Plastic-to-metal transition fittings.
b. Underground Piping: Union with plastic end of same material as plastic piping.

J. Dielectric Fittings: Use dielectric fittings for dissimilar-metal pipe connections according to the following:

1. Underground Piping:

a. NPS 2 and Smaller: Dielectric couplings or dielectric nipples.
b. NPS 2-1/2 and Larger: Prohibited except in valve box.

2. Aboveground Piping:

a. NPS 2 and Smaller: Dielectric unions.
b. NPS 2-1/2 to NPS 4: Dielectric flanges.

3. Piping in Valve Boxes or Vaults:

a. NPS 2 and Smaller: Dielectric unions.
b. NPS 2-1/2 to NPS 4: Dielectric flanges.

3.6 VALVE APPLICATIONS

A. Aboveground, Shutoff-Duty Valves:

1. NPS 2 and Smaller: Bronze gate valve.
2. NPS 2-1/2 and Larger: Cast-iron, non-rising-stem gate valve.

B. Isolation Valves:

1. NPS 2 and Smaller: Bronze non-rising-stem gate valve.
2. NPS 2-1/2 and Larger: Cast-iron, non-rising-stem gate valve with 2 inch operating nut.

3.7 PIPING INSTALLATION

A. Location and Arrangement: Drawings indicate suggested location and arrangement of piping systems. Install piping as indicated unless deviations are approved by Owner's Representative.

B. Install piping free of sags and bends.

C. Install groups of pipes parallel to each other with a space between minimum of 4 inches, spaced to permit single valve removal and or servicing.

D. Install fittings for changes in direction and branch connections.

E. Install dielectric fittings to connect piping of dissimilar metals.

F. Install underground thermoplastic piping according to ASTM D 2774 and ASTM F 690.

G. Lay piping on solid subbase, uniformly sloped without humps or depressions.

H. Install PVC piping in dry weather when temperature is above 32 deg F (5 deg C). Allow joints to cure at least 24 hours at temperatures above 32 deg F (5 deg C) before testing unless otherwise recommended by manufacturer.

I. Install water regulators with shutoff valve and strainer on inlet and pressure gage on outlet. Flush the line prior to installation to remove debris. Install the valve so that the flow arrow marked on the valve body tag corresponds to the flow through the line. Install shutoff valve on outlet.

3.8 VALVE INSTALLATION

A. Electrical Control Valves: Install in valve box with top flush with and perpendicular to grade.

1. All electrical control valve boxes to be 14 inch rectangular valve box.
2. From bottom of valve to a depth of 6 inches install washed stone or gravel sized between 0.75 and 1.0 inch in diameter to create sump and stabilize valve box.
3. Install valve box extensions as necessary to bring lid level with finished landscape grade.
4. Control Valves to be installed with center line of valve 12 inches below finished grade.

B. Underground, Manual Control Valves: Install with 6 inch SDR 21 PVC riser from top of pipe to center line of valve box finishing with 10 inch round valve box level with finished landscape grade.

1. Install valves and PVC pipe with restrained, gasketed joints as necessary at the same depth as the mainline pipe.

3.9 SPRINKLER INSTALLATION

A. Flush circuit piping with full head of water prior to installing sprinklers.

B. Install sprinklers at manufacturer's recommended heights perpendicular to grade.

C. Locate part-circle sprinklers to maintain a minimum distance of 4 inches from walls and 2 inches from other boundaries, unless otherwise indicated.

D. Adjust all sprinklers to irrigated plant material indicated for the station.

3.10 DRIP COMPONENT INSTALLATION

A. All dripline to be installed on FG. Flush all dripline tubing prior to covering with mulch. Install dripline in grid fashion as per plan details and manufacturers recommendations.

B. Install drip control zone kit as per valve installation specification 3.09.A and plan detail.

C. Install Drip Indicator as per specification 3.10.B and plan detail.

D. Install Drip Flush Valves in a 10 inch valve box as per plan detail.

3.11 AUTOMATIC-CONTROL SYSTEM INSTALLATION

A. Obtain approval of controller location from owner's representative prior to installation. Install wall mount controller level and at eye level. Securely fasten controller to wall with metallic fasteners appropriate for wall type or install pedestal controller on concrete pad with all necessary conduit installed through the pad to accommodate all wire to controller. All irrigation control wire between controller and finished grade to be in PVC electrical conduit.

B. Install control wire conduit in same trench as mainline piping and at least 4 inches to the side of the piping. Provide conductors of size not smaller than recommended by controller manufacturer. Install wire in separate sleeve under paved areas if irrigation piping is installed in sleeve. All wire splices to be in minimum 10 inch round valve box.

3.12 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Ground equipment according to ASIC Grounding Guidelines www.aisc.org. Resistance readings to ground to be as recommended by the manufacturer. If there are no manufactures requirements, then the controller should have a resistance of 10 ohms or less.

C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.13 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, operate controllers and automatic control valves to confirm proper system operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
4. Remove and replace units and retest and re-inspect as specified above.

3.14 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service of control system.

B. Verify that controllers are installed and connected according to the Contract Documents.

C. Verify that electrical wiring installation complies with manufacturer's submittal and installation requirements in Division 26 Sections.

D. Complete startup checks according to manufacturer's written instructions.

3.15 ADJUSTING

A. Program controller(s) to ensure adequate moisture is available for the root zone of the plant. Ensure there is no run-off, over watering or deep percolation. Ensure controller operates within irrigation window as defined by Owner's Representative or local governing authorities. See additional controller programming notes on plans provided.

B. Adjust automatic control valves to provide flow rate at rated operating pressure required for each sprinkler circuit. Use pressure regulation for each control valve if pressure is higher than recommended for the sprinklers in the circuit.

C. Adjust sprinklers so they will be 1/8 inch above finish grade in sodded lawns and 1/2 inch above grade in seeded lawns. In shrub beds adjust sprinklers to insure top of sprinkler is at finished mulch levels.

D. Adjust sprinklers arc and radius to ensure no water is sprayed outside of the irrigated area.

3.16 CLEANING

A. Flush dirt and debris from piping before installing sprinklers and other devices.

3.17 DEMONSTRATION

A. It is Contractors' responsibility to train Owner's maintenance personnel to adjust, operate, and maintain sprinklers, isolation valves, controllers, and automatic control valves.

3.18 OBSERVATION AND ACCEPTANCE

A. Periodic site visits will be made by the Landscape Architect\Irrigation Consultant to review the quality and progress of the work. Work found to be unacceptable must be corrected within five (5) calendar days. Remove rejected materials promptly from the project.

B. Upon completion of the Work, the Contractor shall notify the Landscape Architect and Owner at least ten (10) days prior to requested date of the site visit for Substantial Completion of all portions of the Work. Landscape Architect\Irrigation Consultant will issue a punch list for all work to be corrected. All work on the punch list must be complete within five (5) working days from the date of the site visit. Where Irrigation Work does not comply with the requirements, replace rejected Work. If such replacements are not completed within the time specified, the Irrigation Contractor may be considered to be in default of the Contract, and the Owner may use the Contract Retainage to hire other Contractors to finish the work.

C. It will be the responsibility of the Irrigation Contractor to provide a reliable communication system (remote control or two-way radios) for Substantial Completion and all periodic site visits.

D. If a site visit to verify Substantial Completion has been scheduled and the Landscape Architect\Irrigation Consultant arrives at the site and determines that the irrigation system is not substantially complete (all system components in place, operational and checked) the Contractor will be responsible for all expenses included but are not limited to the following: mileage, airfare, consultant's time, parking fees, meals, car rental, etc. All incurred expenses will be deducted from the final contract amount.

END OF SECTION

SECTION 329115 - SOIL PREPARATION (PERFORMANCE)

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes planting soils and layered soil assemblies specified according to performance requirements of the mixes.

B. Related Requirements:

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

1.2 DEFINITIONS

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

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

C. CEC: Cation exchange capacity.

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

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

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

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

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

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

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

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

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

M. SSSA: Soil Science Society of America.

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

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

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

Q. USCC: U.S. Composting Council.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include recommendations for application and use.
2. Include test data substantiating that products comply with requirements.
3. Include sieve analyses for aggregate materials.
4. Material Certificates: For each type of imported soil and soil amendment and fertilizer before delivery to the site, according to the following:

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

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

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For each testing agency.

B. Preconstruction Test Reports: For preconstruction soil analyses specified in "Preconstruction Testing" Article.

C. Field quality-control reports.

1.6 QUALITY ASSURANCE

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

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

1.7 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Contractor will engage a qualified testing agency to perform preconstruction soil analyses on existing, on-site soil and imported soil.

1. Notify Architect seven days in advance of the dates and times when laboratory samples will be taken.

B. Preconstruction Soil Analyses: For each unamended soil type, perform testing on soil samples and furnish soil analysis and a written report containing soil-amendment and fertilizer recommendations by a qualified testing agency performing the testing according to "Soil-Sampling Requirements" and "Testing Requirements" articles.

1. Have testing agency identify and label samples and test reports according to sample collection and labeling requirements.

1.8 SOIL-SAMPLING REQUIREMENTS

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

B. Sample Collection and Labeling: Have samples taken and labeled by Contractor in presence of soil scientist (CPSS) certified by SSSA, soil classifier (CPSC) certified by SSSA, soil scientist (RPSS) registered by the National Society of Consulting Soil Scientists, or state-certified, -licensed, or -registered soil scientist under the direction of the testing agency.

1. Number and Location of Samples: Minimum of three representative soil samples from varied locations for each soil to be used or amended for landscaping purposes.
2. Procedures and Depth of Samples: According to USDA-NRCS's "Field Book for Describing and Sampling Soils."
3. Division of Samples: Split each sample into two, equal parts. Send half to the testing agency and half to Owner for its records.
4. Labeling: Label each sample with the date, location keyed to a site plan or other location system, visible soil condition, and sampling depth.
5. Topsoil Composition Analysis (for lawns and plant beds): Commercial test from an independent testing laboratory including basic soil groups (moisture and saturation percentages, Nitrogen-Phosphorus-Potassium (N-P-K) ratio, pH (ASTM D4972), soil salinity, secondary nutrient groups.
(calcium, magnesium, sodium, Sodium Absorption Ratio (SAR)), micronutrients
(zinc, manganese, iron, copper), toxic soil elements (boron, chloride, sulfate), cation exchange and base saturation percentages, and soil amendment and fertilizer recommendations with quantities for plant material being transplanted.

    a. Soil required for each test shall include a maximum depth of 18 inches of approximately 1 quart volume for each test. Areas sampled should not be larger than 1 acre and should contain at least 6-8 cores for each sample area and be thoroughly mixed.
    b. Problem areas should be sampled separately and compared with samples taken from adjacent non-problem areas.
    c. The location of the sample areas should be noted and marked on a parcel or planting map for future reference.
    d. Surface soil that has been stripped and stockpiled shall be screened and mixed prior to having the topsoil analysis completed.

1.9 DELIVERY, STORAGE, AND HANDLING

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

B. Bulk Materials:

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

PART 2 - PRODUCTS

2.1 MATERIALS

A. Regional Materials: Imported soil manufactured planting soil and soil amendments and fertilizers shall be manufactured within 500 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.

2.2 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:

1. Class: T, with a minimum of 99 percent passing through a No. 8 sieve and a minimum of 75 percent passing through a No. 60 sieve.
2. Class: O, with a minimum of 95 percent passing through No. 8 sieve and a minimum of 55 percent passing through a No. 60 sieve.
3. Form: Provide lime in form of ground dolomitic limestone.

B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent elemental sulfur, with a minimum of 99 percent passing through a No. 6 sieve and a maximum of 10 percent passing through a No. 40 sieve.

2.3 ORGANIC SOIL AMENDMENTS

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

1. Feedstock: Limited to leaves May include animal waste.
2. Reaction: pH of 5.5 to 8.
3. Soluble-Salt Concentration: Less than 4 dS/m.
4. Moisture Content: 35 to 55 percent by weight.
5. Organic-Matter Content: 30 to 40 percent of dry weight.
6. Particle Size: Minimum of 98 percent passing through a 1/2-inch sieve.

B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture with 100 percent passing through a 1/2-inch sieve, a pH of 3.4 to 4.8, and a soluble-salt content measured by electrical conductivity of maximum 5 dS/m.

C. Wood Derivatives: Shredded and composted, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials.

1. Partially Decomposed Wood Derivatives: In lieu of shredded and composted wood derivatives, mix shredded and partially decomposed wood derivatives with ammonium nitrate at a minimum rate of 0.15 lb/cu. ft. of loose sawdust or ground bark, or with ammonium sulfate at a minimum rate of 0.25 lb/cu. ft. of loose sawdust or ground bark.

D. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.

2.4 FERTILIZERS

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

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

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

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

C. Chelated Iron: Commercial-grade FeEDDHA for dicots and woody plants, and commercial-grade FeDTPA for ornamental grasses and monocots.

PART 3 - EXECUTION

3.1 GENERAL

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

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

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

3.2 PREPARATION OF UNAMENDED, ON-SITE SOIL BEFORE AMENDING

A. Excavation: Excavate soil from designated area(s) to a depth of 6 inches and stockpile until amended.

B. Unacceptable Materials: Clean soil of concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.

C. Unsuitable Materials: Clean soil to contain a combined maximum of 8 percent by dry weight of stones, roots, plants, sod, clay lumps, and pockets of coarse sand.

D. Screening: Pass unamended soil through a 1-inch (25 mm) dimension sieve to remove large materials.

E. Prior to stockpiling topsoil, eradicate on site undesirable growing vegetation. Clear and grub existing vegetation three to four weeks prior to stockpiling existing vegetation.

3.3 PLACING AND MIXING PLANTING SOIL OVER EXPOSED SUBGRADE

A. General: Apply and mix unamended soil with amendments on-site to produce required planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.

B. Subgrade Preparation: Till subgrade to a minimum depth of 6 inches. Remove stones larger than 1-1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

1. Apply, add soil amendments, and mix approximately half the thickness of unamended soil over prepared, loosened subgrade according to "Mixing" Paragraph below. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil.

C. Mixing: Spread unamended soil to total depth of 6 inches, but not less than required to meet finish grades after mixing with amendments and natural settlement. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.

1. Amendments: Apply soil amendments, except compost, and fertilizer, if required, evenly on surface, and thoroughly blend them with unamended soil to produce planting soil.

a. Mix lime and sulfur with dry soil before mixing fertilizer.
b. Mix fertilizer with planting soil no more than seven days before planting.

2. Lifts: Apply and mix unamended soil and amendments in lifts not exceeding 8 inches in loose depth for material compacted by compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

D. Compaction: Compact each blended lift of planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D 698.

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

3.4 PLACING MANUFACTURED PLANTING SOIL OVER EXPOSED SUBGRADE

A. General: Apply manufactured soil on-site in its final, blended condition. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.

B. Subgrade Preparation: Till subgrade to a minimum depth of 6 inches. Remove stones larger than 1-1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

1. Apply approximately half the thickness of planting soil over prepared, loosened subgrade. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil.

C. Application: Spread planting soil to total depth of 6 inches, but not less than required to meet finish grades after natural settlement. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.

1. Lifts: Apply planting soil in lifts not exceeding 8 inches in loose depth for material compacted by compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

D. Compaction: Compact each lift of planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D 698.

3.5 BLENDING PLANTING SOIL IN PLACE

A. General: Mix amendments with in-place, unamended soil to produce required planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.

B. Preparation: Till unamended, existing soil in planting areas to a minimum depth of 6 inches. Remove stones larger than 1-1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

3.6 APPLYING COMPOST TO SURFACE OF PLANTING SOIL

A. Application: Apply compost component of planting-soil mix 4 inches of compost to surface of in-place planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.

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

3.7 FIELD QUALITY CONTROL

A. Testing Agency: Contractor will engage a qualified testing agency to perform tests and inspections.

B. Perform the following tests and inspections:

1. Compaction: Test planting-soil compaction after placing each lift and at completion using a densitometer or soil-compaction meter calibrated to a reference test value based on laboratory testing according to ASTM D 698. Space tests at no less than one for each 1000 sq. ft. of in-place soil or part thereof.
2. Performance Testing: For each amended planting-soil type, demonstrating compliance with specified performance requirements. Perform testing according to "Soil-Sampling Requirements" and "Testing Requirements" articles.

C. Soil will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

E. Label each sample and test report with the date, location keyed to a site plan or other location system, visible conditions when and where sample was taken, and sampling depth.

3.8 PROTECTION

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

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

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Vehicle traffic.
4. Foot traffic.

5. Erection of sheds or structures.
6. Impoundment of water.
7. Excavation or other digging unless otherwise indicated.

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

3.9 CLEANING

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

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

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

END OF SECTION 329115

SECTION 329200 - TURF AND GRASSES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sodding.
2. Turf renovation.

B. Related Requirements:

1. Section 329300 "Plants" for trees, shrubs, ground covers, and other plants as well as border edgings and mow strips.

1.2 DEFINITIONS

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

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

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

D. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 329115 "Soil Preparation (Performance Specification)" and drawing designations for planting soils.

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

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For landscape Installer.

B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture, stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

1. Certification of each seed mixture for turfgrass sod. Include identification of source and name and telephone number of supplier.

C. Product Certificates: For fertilizers, from manufacturer.

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

1.5 CLOSEOUT SUBMITTALS

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

1.6 QUALITY ASSURANCE

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

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

    a. Landscape Industry Certified Technician - Exterior.
    b. Landscape Industry Certified Lawn Care Manager.
    c. Landscape Industry Certified Lawn Care Technician.

5. Pesticide Applicator: State licensed, commercial.

1.7 DELIVERY, STORAGE, AND HANDLING

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

B. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" sections in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod within 24 hours of harvesting and in time for planting promptly. Protect sod from breakage and drying.

C. Bulk Materials:

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

1.8 FIELD CONDITIONS

A. Planting Restrictions: Planting may occur year round. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of Substantial Completion.

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

PART 2 - PRODUCTS

2.1 TURFGRASS SOD

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

B. Turfgrass Species, Warm-Season Grass: Bermudagrass (Cynodon dactylon) 'TifTuf'.

2.2 FERTILIZERS

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

1. Composition:

a. Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

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

1. Composition:

a. Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

2.3 MULCHES

A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

B. Sphagnum Peat Mulch: Partially decomposed sphagnum peat moss, finely divided or of granular texture, and with a pH range of 3.4 to 4.8.

C. Muck Peat Mulch: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent, and containing no sand.

D. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content of 2 to 5 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50 to 60 percent of dry weight.
2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

2.4 PESTICIDES

A. General: Pesticide, registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

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

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

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to be planted for compliance with requirements and other conditions affecting installation and performance of the Work.

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

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

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

3.2 PREPARATION

A. Protect structures; utilities; sidewalks; pavements; and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

1. Protect grade stakes set by others until directed to remove them.

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

3.3 TURF AREA PREPARATION

A. General: Prepare planting area for soil placement and mix planting soil according to Section 329115 "Soil Preparation (Performance Specification)."

B. Placing Planting Soil: Blend planting soil in place.

1. Reduce elevation of planting soil to allow for soil thickness of sod.

C. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

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

3.4 SODDING

A. Lay sod within 24 hours of harvesting unless a suitable preservation method is accepted by Architect prior to delivery time. Do not lay sod if dormant or if ground is frozen or muddy.

B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to soil or sod during installation. Tamp and roll lightly to ensure contact with soil, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.

1. Lay sod across slopes exceeding 1:3.
2. Anchor sod on slopes exceeding 1:6 with wood pegs or steel staples spaced as recommended by sod manufacturer but not less than two anchors per sod strip to prevent slippage.

C. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches below sod.

3.5 TURF RENOVATION

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

1. Reestablish turf where settlement or washouts occur or where minor regrading is required.
2. Install new planting soil as required.

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

C. Remove topsoil containing foreign materials, such as oil drippings, fuel spills, stones, gravel, and other construction materials resulting from Contractor's operations, and replace with new planting soil.

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

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

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

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

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

1. Soil Amendment(s): According to requirements of Section 329115 "Soil Preparation (Performance Specification).
2. Initial Fertilizer: Fertilizer applied according to manufacturer's recommendations.

I. Apply sod as required for new turf.

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

3.6 TURF MAINTENANCE

A. General: Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.

1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.

B. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches.

1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
2. Water turf with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.

C. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than one-third of grass height. Remove no more than one-third of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:

1. Mow bermudagrass to a height of 1/2 to 1 inch.

D. Turf Postfertilization: Apply fertilizer after initial mowing and when grass is dry.

1. Use fertilizer that provides actual nitrogen of at least 1 lb/1000 sq. ft. to turf area.

3.7 SATISFACTORY TURF

A. Turf installations shall meet the following criteria as determined by Architect:

1. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.

B. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

3.8 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents according to requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Post-Emergent Herbicides (Selective and Nonselective): Apply only as necessary to treat already-germinated weeds and according to manufacturer's written recommendations.

3.9 CLEANUP AND PROTECTION

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

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

C. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

3.10 MAINTENANCE SERVICE

A. Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in "Turf Maintenance" Article. Begin maintenance immediately after each area is planted and continue until acceptable turf is established, but for not less than the following periods:

1. Sodded Turf: 30 days from date of Substantial Completion.

END OF SECTION 329200

SECTION 329300 - PLANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plants.
2. Tree stabilization.
3. Tree-watering devices.
4. Landscape edgings.

B. Related Requirements:

1. Section 015639 "Temporary Tree and Plant Protection" for protecting, trimming, pruning, repairing, and replacing existing trees to remain that interfere with, or are affected by, execution of the Work.
2. Section 329200 "Turf and Grasses" for turf (lawn)..

1.2 DEFINITIONS

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

B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with a ball size not less than sizes indicated; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.

C. Balled and Potted Stock: Plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than sizes indicated.

D. Bare-Root Stock: Plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than the minimum root spread according to ANSI Z60.1 for type and size of plant required.

E. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.

F. Fabric Bag-Grown Stock: Healthy, vigorous, well-rooted plants established and grown in-ground in a porous fabric bag with well-established root system reaching sides of fabric bag. Fabric bag size is not less than diameter, depth, and volume required by ANSI Z60.1 for type and size of plant.

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

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

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

J. Planting Area: Areas to be planted.

K. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 329115 "Soil Preparation (Performance Specification)" for drawing designations for planting soils.

L. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.

M. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.

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

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

1.3 COORDINATION

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

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

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
2. Plant Photographs: Include color photographs in digital format of each required species and size of plant material as it will be furnished to Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For species where more than 20 plants are required, include a minimum of 3 photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

B. Samples for Verification: For each of the following:

1. Trees and Shrubs: Three Samples of each variety and size delivered to site for review. Maintain approved Samples on-site as a standard for comparison.
2. Mulch: 1-pint volume of each organic mulch required; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup.

3. Slow-Release, Tree-Watering Device: One unit of each size required.
4. Edging Materials and Accessories: Manufacturer's standard size, to verify color selected.

1.6 INFORMATIONAL SUBMITTALS

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

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

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

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

D. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

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

1.8 QUALITY ASSURANCE

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

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

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

5. Pesticide Applicator: State licensed, commercial.

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

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

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

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

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

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

1.9 DELIVERY, STORAGE, AND HANDLING

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

B. Bulk Materials:

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

C. Deliver bare-root stock plants within 36 hours of digging. Immediately after digging up bare-root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting. Transport in covered, temperature-controlled vehicles, and keep plants cool and protected from sun and wind at all times.

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

E. Handle planting stock by root ball.

F. Store bulbs, corms, and tubers in a dry place at 60 to 65 deg F until planting.

G. Apply antidesiccant to trees and shrubs using power spray to provide an adequate film over trunks (before wrapping), branches, stems, twigs, and foliage to protect during digging, handling, and transportation.

1. If deciduous trees or shrubs are moved in full leaf, spray with antidesiccant at nursery before moving and again two weeks after planting.

H. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.

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

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

1.10 FIELD CONDITIONS

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

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

1. Planting may occur year round.

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

1.11 WARRANTY

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

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

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

2. Warranty Periods: From date of Substantial Completion.

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

3. Include the following remedial actions as a minimum:

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

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

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

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

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

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

D. Labeling: Label at least one plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant.

E. If formal arrangements or consecutive order of plants is indicated on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

F. Annuals and Biennials: Provide healthy, disease-free plants of species and variety shown or listed, with well-established root systems reaching to sides of the container to maintain a firm ball, but not with excessive root growth encircling the container. Provide only plants that are acclimated to outdoor conditions before delivery and that are in bud but not yet in bloom.

2.2 FERTILIZERS

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

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

2.3 MULCHES

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

1. Type: Shredded hardwood, Ground or shredded bark, Wood and bark chips, or Pine straw.
2. Color: Natural.

B. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through a 1-inch sieve; soluble-salt content of 2 to 5 dS/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50 to 60 percent of dry weight.
2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

2.4 PESTICIDES

A. General: Pesticide registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

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

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

2.5 TREE-STABILIZATION MATERIALS

A. Trunk-Stabilization Materials:

1. Upright and Guy Stakes: Rough-sawn, sound, new softwood with specified wood pressure-preservative treatment, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal by length indicated, pointed at one end.
2. Wood Deadmen: Timbers measuring 8 inches in diameter and 48 inches long, treated with specified wood pressure-preservative treatment.
3. Flexible Ties: Wide rubber or elastic bands or straps of length required to reach stakes or turnbuckles.
4. Guys and Tie Wires: ASTM A641/A641M, Class 1, galvanized-steel wire, two-strand, twisted, 0.106 inch in diameter.
5. Tree-Tie Webbing: UV-resistant polypropylene or nylon webbing with brass grommets.
6. Guy Cables: Five-strand, 3/16-inch-diameter, galvanized-steel cable, with zinc-coated turnbuckles, a minimum of 3 inches long, with two 3/8-inch galvanized eyebolts.
7. Flags: Standard surveyor's plastic flagging tape, white, 6 inches long.

B. Palm Bracing: Battens or blocks, struts, straps, and protective padding.

1. Battens or Blocks and Struts: Rough-sawn, sound, new hardwood or softwood, free of knots, holes, cross grain, and other defects, 2-by-4-inch nominal by lengths indicated.
2. Straps: Adjustable steel or plastic package banding.
3. Padding: Burlap.

2.6 LANDSCAPE EDGINGS

A. Steel Edging for Plantation Mix Pathways: Standard commercial-steel edging, fabricated in sections of standard lengths, with loops stamped from or welded to face of sections to receive stakes.

1. Edging Size: 1/8 inch thick by 6 inches deep.
2. Stakes: Tapered steel, a minimum of 15 inches long.
3. Accessories: Standard tapered ends, corners, and splicers.

4. Finish: Manufacturer's standard paint.

a. Paint Color: Black.

2.7 TREE-WATERING DEVICES

A. Watering Pipe: PVC pipe 4 inches in diameter, site-cut to length as required, and with snug-fitting removable cap.

B. Slow-Release Watering Device: Standard product manufactured for drip irrigation of plants and emptying its water contents over an extended time period; manufactured from UV-light-stabilized nylon-reinforced polyethylene sheet, PVC, or HDPE plastic.

1. Color: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

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

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

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

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

3.2 PREPARATION

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

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

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

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

3.3 PLANTING AREA ESTABLISHMENT

A. General: Prepare planting area for soil placement and mix planting soil according to Section 329115 "Soil Preparation (Performance Specification)."

B. Placing Planting Soil: Blend planting soil in place.

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

3.4 EXCAVATION FOR TREES AND SHRUBS

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

1. Excavate planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are unacceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
2. Excavate approximately three times as wide as ball diameter for balled and burlapped and container-grown stock.
3. Excavate at least 12 inches wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
4. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
5. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
6. Maintain angles of repose of adjacent materials to ensure stability. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
7. Maintain supervision of excavations during working hours.
8. Keep excavations covered or otherwise protected when unattended by Installer's personnel.

B. Backfill Soil: Subsoil and topsoil removed from excavations may be used as backfill soil unless otherwise indicated.

C. Obstructions: Notify Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

1. Hardpan Layer: Drill 6-inch-diameter holes, 24 inches apart, into free-draining strata or to a depth of 10 feet, whichever is less, and backfill with free-draining material.

D. Drainage: Notify Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

E. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

3.5 TREE, SHRUB, AND VINE PLANTING

A. Inspection: At time of planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

B. Roots: Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.

C. Balled and Burlapped Stock: Set each plant plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.

1. Backfill: Planting soil. For trees, use excavated soil for backfill.
2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
4. Place planting tablets equally distributed around each planting pit when pit is approximately one-half filled. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
5. Continue backfilling process. Water again after placing and tamping final layer of soil.

D. Container-Grown Stock: Set each plant plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.

1. Backfill: Planting soil. For trees, use excavated soil for backfill.
2. Carefully remove root ball from container without damaging root ball or plant.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
4. Place planting tablets equally distributed around each planting pit when pit is approximately one-half filled. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
5. Continue backfilling process. Water again after placing and tamping final layer of soil.

E. Bare-Root Stock: Set and support each plant in center of planting pit or trench with root flare 1 inch above adjacent finish grade.

1. Backfill: Planting soil. For trees, use excavated soil for backfill.
2. Spread roots without tangling or turning toward surface. Plumb before backfilling and maintain plumb while working.
3. Carefully work backfill in layers around roots by hand. Bring roots into close contact with the soil.
4. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
5. Place planting tablets equally distributed around each planting pit when pit is approximately one-half filled. Place tablets beside soil-covered roots about 1 inch from root tips; do not place tablets in bottom of the hole or touching the roots.
6. Continue backfilling process. Water again after placing and tamping final layer of soil.

F. Slopes: When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.6 TREE, SHRUB, AND VINE PRUNING

A. Remove only dead, dying, or broken branches. Do not prune for shape.

B. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.

C. Do not apply pruning paint to wounds.

3.7 TREE STABILIZATION

A. Trunk Stabilization by Upright Staking and Tying: Install trunk stabilization as follows unless otherwise indicated:

1. Upright Staking and Tying:

   a. Stake trees of 2- through 5-inch caliper. Stake trees of less than 2-inch caliper only as required to prevent wind tip out. Use a minimum of two stakes of length required to penetrate at least 18 inches below bottom of backfilled excavation and to extend to the dimension indicated on Drawings above grade. Set vertical stakes and space to avoid penetrating root balls or root masses.
   b. Stake trees with two stakes for trees up to 12 feet high and 2-1/2 inches or less in caliper; three stakes for trees less than 14 feet high and up to 4 inches in caliper. Space stakes equally around trees.

2. Support trees with bands of flexible ties at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.
3. Support trees with two strands of tie wire, connected to the brass grommets of tree-tie webbing at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.

B. Trunk Stabilization by Staking and Guying: Install trunk stabilization as follows unless otherwise indicated on Drawings. Stake and guy trees more than 14 feet in height and more than 3 inches in caliper unless otherwise indicated.

1. Site-Fabricated, Staking-and-Guying Method: Install no fewer than three guys spaced equally around tree.

   a. Securely attach guys to stakes 30 inches long, driven to grade. Adjust spacing to avoid penetrating root balls or root masses. Provide turnbuckle for each guy wire and tighten securely.
   b. For trees more than 6 inches in caliper, anchor guys to wood deadmen buried at least 36 inches below grade. Provide turnbuckle for each guy wire and tighten securely.
   c. Support trees with bands of flexible ties at contact points with tree trunk and reaching to turnbuckle. Allow enough slack to avoid rigid restraint of tree.
   d. Support trees with guy cable, connected to the brass grommets of tree-tie webbing at contact points with tree trunk and reaching to turnbuckle. Allow enough slack to avoid rigid restraint of tree.
   e. Attach flags to each guy wire, 30 inches above finish grade.
   f. Paint turnbuckles with luminescent white paint.

C. Palm Bracing: Install bracing system at three or more places equally spaced around perimeter of trunk to secure each palm until established unless otherwise indicated.

1. Site-Fabricated Palm-Bracing Method:

   a. Place battens over padding and secure battens in place around trunk perimeter with at least two straps, tightened to prevent displacement. Ensure that straps do not contact trunk.
   b. Place diagonal braces and cut to length. Secure upper ends of diagonal braces with galvanized nails into battens or into nail-attached blocks on battens. Do not drive nails, screws, or other securing devices into palm trunk; do not penetrate palm trunk in any fashion. Secure lower ends of diagonal braces with stakes driven into ground to prevent outward slippage of braces.

3.8 GROUND COVER AND PLANT PLANTING

A. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated on Drawings in even rows with triangular spacing.

B. Use planting soil for backfill.

C. Dig holes large enough to allow spreading of roots.

D. For rooted cutting plants supplied in flats, plant each in a manner that minimally disturbs the root system but to a depth not less than two nodes.

E. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.

F. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

G. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.9 PLANTING AREA MULCHING

A. Mulch backfilled surfaces of planting areas and other areas indicated.

1. Trees and Treelike Shrubs in Turf Areas: Apply organic mulch ring of 3-inch average thickness, with 36-inch radius around trunks or stems. Do not place mulch within 3 inches of trunks or stems.
2. Organic Mulch in Planting Areas: Apply 3-inch average thickness of organic mulch over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 3 inches of trunks or stems.

3.10 INSTALLATION OF EDGING

A. Steel Edging: Install steel edging where indicated according to manufacturer's written instructions. Anchor with steel stakes spaced approximately 30 inches apart, driven below top elevation of edging.

B. Shovel-Cut Edging: Separate mulched areas from turf areas, curbs, and paving with a 45-degree, 4- to 6-inch-deep, shovel-cut edge as indicated on Drawings.

3.11 NSTALLATION OF SLOW-RELEASE WATERING DEVICE

A. Provide one device for each tree.

B. Place device on top of the mulch at base of tree stem and fill with water according to manufacturer's written instructions.

3.12 PLANT MAINTENANCE

A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings.

B. Fill in, as necessary, soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.

C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices when possible to minimize use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.13 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents according to authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Pre-Emergent Herbicides (Selective and Nonselective): Apply to tree, shrub, and ground-cover areas according to manufacturer's written recommendations. Do not apply to seeded areas.

C. Post-Emergent Herbicides (Selective and Nonselective): Apply only as necessary to treat already-germinated weeds and according to manufacturer's written recommendations.

3.14 REPAIR AND REPLACEMENT

A. General: Repair or replace existing or new trees and other plants that are damaged by construction operations, in a manner approved by Architect.

1. Submit details of proposed pruning and repairs.
2. Perform repairs of damaged trunks, branches, and roots within 24 hours, if approved.
3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Architect.

B. Remove and replace trees that are more than 25 percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.

1. Provide new trees of same size as those being replaced for each tree of 6 inches or smaller in caliper size.
2. Provide one new tree(s) of similar caliper size for each tree being replaced that measures more than 6 inches in caliper size.
3. Species of Replacement Trees: Same species being replaced.

3.15 CLEANING AND PROTECTION

A. During planting, keep adjacent paving and construction clean and work area in an orderly condition. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

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

C. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

D. After installation and before Substantial Completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

E. At time of Substantial Completion, verify that tree-watering devices are in good working order and leave them in place. Replace improperly functioning devices.

3.16 MAINTENANCE SERVICE

A. Maintenance Service for Trees and Shrubs: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:

1. Maintenance Period: 30 days from date of Substantial Completion.

B. Maintenance Service for Ground Cover and Other Plants: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:

1. Maintenance Period: 30 days from date of Substantial Completion.

END OF SECTION 329300

SECTION 331113 - PUBLIC POTABLE WATER UTILITIES

PART 1 - GENERAL

1.1 SUMMARY

A. This section covers work associated with the furnishing and installation of water distribution piping and related components outside the building for water service to include backflow preventers and valves.

1.2 PUBLIC UTILITY

A. The work shall be performed, installed, constructed, tested and approved in accordance with published specifications, standards, details and criteria of the Public Utility.

B. Public Utility that shall approve, operate and maintain the water supply system is:

1. Charleston Water System (CWS)

C. The Public Utility Specifications are hereby incorporated as part of this specification and may be available from the Utility's website.

D. The Contractor selected to install the potable water system must be on the Public Utility's approved Contractor List, if applicable.

1.3 DEFINITION

A. Water distribution includes underground water-service piping and associated components outside the building.

B. Water-service piping conveys potable water to the building for domestic water distribution inside the building.

C. Fire-service-main piping conveys water to the building for fire suppression.

1.4 LUMP SUM PRICE

A. The items listed in the Bid shall be considered sufficient to complete the work in accordance with the drawings and specifications. Any portion of the work not specifically listed in the bid form shall be deemed a part of the item with which it is associated and shall be included in the lump sum price. The price shall be full compensation for the excavating, filling, transporting of material, compaction, shaping, finishing, dressing, disposal of surplus material, inspection, testing, staking, construction supervision and all other work required for satisfactory installation of the potable water system.

1.5 UNIT PRICES

A. None this Section.

1.6 SUBMITTALS

A. Certifications: Provide manufacturer or supplier certification of compliance indicating conformance to this specification or the referenced standard(s) for each of the following to be used in this project:

1. Water Service Piping;
2. Valves, backflow preventers, valve boxes and other appurtenances

B. Laboratory Testing: Submit testing data as required by the Public Utility and SCDHEC:

1. Bacteriological Testing

C. Field Testing: Perform field testing data as required by the Public Utility and SCDHEC:

1. Hydrostatic and Leakage Testing

D. Operational Closeout Documentation: Provide documentation required by the Public Utility and SCDHEC to place the system into operation. Items include but are not limited to:

1. Record Drawings
2. Valve Cards
3. Easement Plats with Legal Descriptions
4. Utility System Cost Summaries
5. Guarantee / Warranty Documentation

1.7 REGULATORY REQUIREMENTS

A. Comply with Federal, State, and local regulations.

B. Comply with the requirements of the land disturbance permit and stamped approved drawings issued for this project by South Carolina Department of Health and Environmental Control (SCDHEC) and/or the MS4.

C. Comply with the requirements of the Water Supply Construction Permit issued by South Carolina Department of Health and Environmental Control (SCDHEC), Encroachment Permit issued by South Carolina Department of Transportation (SCDOT, installation approval issued by the Public Utility, and the approved drawings and specifications for this project.

1.8 SPECIAL WARRANTY / GUARANTEE

A. Contractor guarantees to repair or replace components of water system that fail in materials or workmanship for a period of two years from the date of commissioning the water system.

1.9 PRECONSTRUCTION CONFERENCE

A. The Contractor shall be responsible for coordinating his construction with the Public Utility. A Pre-Installation Meeting shall be held with the Public Utility prior to construction. The Contractor shall notify the Public Utility and Engineer a minimum of 72 hours in advance of the meeting.

PART 2 - PRODUCTS

2.1 PUBLIC UTILITY

A. All products shall be furnished, installed, tested and approved in accordance with published specifications, standards, details and criteria of the Public Utility.

PART 3 - EXECUTION

3.1 PUBLIC UTILITY

A. The work shall be performed, installed, constructed, tested and approved in accordance with published specifications, standards, details and criteria of the Public Utility.

3.2 RECORD DATA

A. The Contractor shall keep accurate, legible records of the location of all piping, valve, hydrants and backflow preventors. These records will be made available to the Engineer before his final review for incorporation into the Record Drawings. Final payment to the Contractor will be withheld until all such information is received and accepted.

3.3 INSPECTIONS

A. Notify the Owner, Project Representative, Engineer and Authority Having Jurisdiction (AHJ) a minimum of 72 hours prior to all required observations, inspections or tests.

B. The Engineer will have the right to require that any portion of the work be done in his presence and if the work is covered up after such instruction, it shall be exposed by the Contractor for observation.

   1. However, if the Contractor notifies the Engineer that such work is scheduled, and the Engineer fails to appear within 72 hours, the Contractor may proceed without him.

C. All work completed and materials furnished shall be subject to review by the Engineer or the Project Representative.

D. All improper work shall be reconstructed and all materials which do not conform to the requirements of the specifications shall be removed from the work upon written notice.

   1. The Engineer shall have the right to mark materials as rejected to distinguish them as such.

3.4 TESTING

A. All testing shall be made at the Contractor's expense.

   1. Test locations shall be approved by the Engineer.

B. The Testing Laboratory, Engineer and Owner shall be given a 72 hour notice, minimum, prior to all required tests.

C. Test results shall be furnished to the Contractor, Engineer and Owner within 72 hours after tests are taken.

D. Hydrostatic and Leakage Tests

1. The Engineer ***must*** witness and approve these tests.
2. The pipe shall be tested at 1.5 times the working pressure in accordance with AWWA C600, Section 4 - Hydrostatic Testing. However, in no case will test pressure be less than 150 psi.
3. The test shall be conducted for at least two hours and a pressure of 150 psi shall be maintained during the test.
4. Should any test of the pipe laid disclose leakage greater than the above specified, the Contractor shall at his own expense, locate and repair the defective joints until leakage is within the specified allowance.

E. Bacteriological Testing (Disinfection)

1. After the hydrostatic and leakage tests have been completed, disinfect water pipes in accordance with AWWA C651 and the regulations of SCDHEC and the Public Utility.
2. Collect a minimum of two (2) samples from each sampling site for total coliform analysis. The number of sites depends on the amount of new construction, but must include all dead-end lines, be representative of the water in the newly constructed mains, and shall be collected a minimum of every 1,200 linear feet.
3. Prior to sampling, the chlorine residual must be reduced to normal system residual levels or be non-detectable in those systems not chlorinating.

    a. The chlorine residual must also be measured and reported.

4. If the membrane filter method of analysis is used for the coliform analysis, non-coliform growth must also be reported.
5. If the non-coliform growth is greater than eighty (80) colonies per one hundred (100) milliliters, the sample result is invalid and must be repeated.
6. All samples must be analyzed by a State certified laboratory.
7. The Owner and Engineer shall be provided copies of each report within 72 hours of the time the test was performed.
8. NOTE: SCDHEC only considers these tests valid for a 30-day period.

    a. The Contractor is responsible for coordinating testing schedules with the Engineer and Public Utility in a manner to ensure that all associated closeout documentation (as-built drawings, easement plats, waiver of liens, etc.) can be finalized within 30 days of the tests.
    b. The Engineer shall be given a minimum of one week for review of the tests.
    c. All additional work, which is the result of expired tests, shall be performed by the Contractor at no additional cost to the Owner.

3.5 OPERATIONAL CLOSEOUT DOCUMENTATION

A. As-Built (Record) Drawings and Valve Cards

1. Upon completion of installation of the potable water system, a Land Surveyor registered in the State of South Carolina shall prepare and provide Preliminary Record Drawings and Valve Cards to the Engineer for review.

    a. As a minimum, these drawings shall show all pipe sizes, materials, valves, fittings, fire hydrants, and pertinent data input as attributes as required by the Public Utility and SCDHEC, and ***tied to State Plane Coordinates***.
    b. Record drawings shall accommodate both the Surveyor's and the Engineer's certifications, seals, and signature.

2. After review by the Engineer and Public Utility, the Surveyor shall make all required changes and/or revisions and submit to the Engineer signed and sealed sets along with electronic media.
3. Contractor shall include in his project schedule 30 calendar days for the approval of the as-built drawings by the Public Utility and/or SCDHEC after incorporation of Engineer's comments.

B. Easement Plat

1. Upon completion of installation of the potable water system, a Land Surveyor registered in the State of South Carolina shall prepare and provide Preliminary Easement Plats and Legal Description(s) as required by the Public Utility and for recording at the appropriate County RMC Office.

    a. Easement Plats shall be tied to State Plane Coordinates.

2. After review by the Engineer and Public Utility, the surveyor shall make all required changes and/or revisions.
3. The surveyor shall be responsible for recording the plat(s) at the appropriate County RMC Office, unless instructed otherwise.
4. The Surveyor is required to provide to the Engineer signed and sealed sets with recording information, along with electronic media.
5. Contractor shall include in his project schedule 30 calendar days for the approval of the easement plat by the Public Utility after incorporation of Engineer's comments.

3.6 ACCEPTANCE

A. Final acceptance will be based on satisfactory materials, installation and construction of the specified work as approved by the Engineer. All construction shall be re-worked to the satisfaction of the Public Utility, Owner and/or Engineer until specified requirements are met.

B. All additional work that is the result of a failed inspection or test shall be performed by the Contractor at no additional cost to the Owner.

END OF SECTION 331113

SECTION 333113 - PUBLIC SANITARY SEWER UTILITIES

PART 1 - GENERAL

1.1 SUMMARY

A. This section covers work associated with the furnishing and installation of a sanitary sewer service and their associated appurtenances.

B. Related Sections:

1. Section 312000 – Earth Moving for excavating, backfilling, site grading, and controlling surface-water runoff and ponding.

1.2 PUBLIC UTILITY

A. The work shall be performed, installed, constructed, tested and approved in accordance with published specifications, standards, details and criteria of the Public Utility.

B. Public Utility that shall approve, operate and maintain the wastewater collection system is:

1. Berkeley County Water & Sanitation Department (BCWS)

C. The Public Utility Specifications are hereby incorporated as part of this specification and may be available from the Public Utility's website.

D. The Contractor selected to install the sanitary sewer system must be on the Public Utility's approved Contractor List, if applicable.

1.3 DEFINITIONS:

A. Sewer: Gravity sewer line or force main.

B. Sewer Main: The sanitary sewer system beginning at the point where two or more individual service lines connect together.

C. Service Connection: An individual gravity sewer line, typically less than 1,000 LF, or an individual force main, serving only one building or one residential lot with strictly domestic wastewater connecting to a gravity sewer system.

D. Gravity Sewer: A pipeline carrying wastewater or treated effluent which flows exclusively under the influence of gravity.

1.4 LUMP SUM PRICE

A. The items listed in the Bid shall be considered sufficient to complete the work in accordance with the drawings and specifications. Any portion of the work not specifically listed in the bid form shall be deemed a part of the item with which it is associated and shall be included in the lump sum price. The price shall be full compensation for the excavating, filling, transporting of material, compaction, shaping, finishing, dressing, disposal of surplus material, inspection, testing, staking, construction supervision and all other work required for satisfactory installation of the sanitary sewer system.

1.5 UNIT PRICES

A. None this Section.

1.6 SUBMITTALS:

A. Certifications: Provide manufacturer or supplier certification of compliance indicating conformance to this specification or the referenced standard(s) for each of the following to be used in this project:

1. Sewer Pipe
2. Manholes Frames and Covers
3. Cleanout Materials

B. Field Testing: Submit field testing data as identified in the paragraph titled “Field Testing” for the following:

1. Deflection Testing (Mandrel Pull and Lamping)
2. Pressure Testing
3. Closed Circuit Television (CCTV) Inspection
4. Dye Test

C. Operational Closeout Documentation: Provide documentation required by the Utility and SCDHEC prior to placing the system into operation. Items include but are not limited to:

1. Record Drawings
2. Easement Plats with Legal Descriptions
3. Utility System Cost Summaries
4. Guarantee / Warranty Documentation

1.7 REGULATORY REQUIREMENTS

A. Comply with Federal, State, and local regulations.

B. Comply with the requirements of the land disturbance permit and stamped approved drawings issued for this project by South Carolina Department of Health and Environmental Control (SCDHEC) and/or the MS4.

C. Comply with the requirements of the installation approval issued by the Public Utility, and the approved drawings and specifications for this project.

1.8 SPECIAL WARRANTY / GUARANTEE

A. Contractor guarantees to repair or replace components of wastewater system that fail in materials or workmanship for a period of two years from the date of commissioning the wastewater system.

1.9 PRECONSTRUCTION CONFERENCE

A. The Contractor shall be responsible for coordinating his construction with the Public Utility. A Pre-Installation Meeting shall be held with the Public Utility prior to construction. The Contractor shall notify the Public Utility and Engineer a minimum of 72 hours in advance of the meeting.

PART 2 - PRODUCTS

2.1 PUBLIC UTILITY

A. All products shall be furnished, installed, tested and approved in accordance with published specifications, standards, details and criteria of the Public Utility.

PART 3 - EXECUTION

3.1 PUBLIC UTILITY

A. The work shall be performed, installed, constructed, tested and approved in accordance with published specifications, standards, details and criteria of the Public Utility.

3.2 RECORD DATA

A. The Contractor shall keep accurate, legible records of the location of all piping, manholes, force mains, tees, and laterals. These records will be made available to the Engineer before his final review for incorporation into the Engineer's Record Drawings. Final payment to the Contractor will be withheld until all such information is received and accepted.

3.3 INSPECTIONS

A. Notify the Owner, Project Representative, Engineer and Authority Having Jurisdiction (AHJ) a minimum of 72 hours prior to all required observations, inspections or tests.

B. The Engineer will conduct field inspections and witness field tests specified in this section. The Contractor shall perform field tests and provide labor, equipment, and incidentals required for testing. Be able to produce evidence, when required, that each item of work has been constructed properly in accordance with the drawings and specifications.

C. The Engineer will have the right to require that any portion of the work be done in his presence and if the work is covered up after such instruction, it shall be exposed by the Contractor for observation.

   1. However, if the Contractor notifies the Engineer that such work is scheduled, and the Engineer fails to appear within 72 hours, the Contractor may proceed without him.

D. All work completed and materials furnished shall be subject to review by the Engineer or the Project Representative.

E. All improper work shall be reconstructed and all materials which do not conform to the requirements of the specifications shall be removed from the work upon written notice.

   1. The Engineer shall have the right to mark materials as rejected to distinguish them as such.

F. Closed Circuit Television (CCTV) Inspection will be made at the Contractor's expense. The procedures, equipment, inspector qualifications, submittal data and other requirements shall be in accordance with ASTM C1840.

3.4 TESTING

A. All testing shall be made at the Contractor's expense.

1. Test locations shall be approved by the Engineer.

B. Notify the Owner, Testing Laboratory, Engineer and Authority Having Jurisdiction (AHJ) a minimum of 72 hours prior to all required observations, inspections or tests.

C. Test results shall be furnished to the Contractor, Engineer and Owner within 72 hours after tests are taken.

D. The Engineer will conduct field inspections and must witness field tests specified in this section. The Contractor shall perform field tests and provide labor, equipment, and incidentals required for testing. Be able to produce evidence, when required, that each item of work has been constructed properly in accordance with the drawings and specifications.

E. Sanitary Sewer System Testing

1. Deflection Test (Mandrel Pull and Lamping)

a. After final backfill has been placed for at least 30 days, PVC sewer pipe shall be tested for initial diametric deflections by the use of a 5% mandrel.
b. The initial diametric deflection shall not exceed 5%.
c. The Contractor shall not use any mechanical device in the Mandrel pull.
d. Upon completion of a successful Mandrel pull, the Engineer will visually lamp inspect all lines.

2. Low Pressure Air Test for Gravity Lines

a. Conduct low pressure air test on all completed sections of gravity sewer.
b. The pressure test results will be used to evaluate materials and construction methods on the sewer line sections.
c. The Contractor shall furnish all equipment and materials necessary to conduct the tests.

3. Dye Test

a. A dye test must be performed by a licensed plumber for sanitary sewer connections to validate the connections are properly routed into the sanitary sewer system and not the storm sewer system.
b. Contractor is responsible for coordination and notification. A representative from the AHJ and Engineer shall be present for all testing and must be notified 72 hours prior to any testing.
c. Test results must be completed and submitted to the Engineer a minimum of 30 days prior to substantial completion.

3.5 OPERATIONAL CLOSEOUT DOCUMENTATION

A. As-Built (Record) Drawings

1. Upon completion of installation of the Wastewater system, a Land Surveyor registered in the State of South Carolina shall prepare and provide Preliminary Record Drawings and Valve Cards to the Engineer for review.

a. As a minimum, these drawings shall show all manhole rim and invert elevations, pipe invert elevations, pipe slopes, pipe sizes, materials and pertinent data inputs as required by the Utility, SCDHEC, and ***tied to State Plane Coordinates***.
b. Record drawings shall accommodate the Engineer's seal, signature, and certification.

2. After review by the Engineer, the Surveyor shall make all required changes and/or revisions and submit to the Engineer signed and sealed sets along with electronic media.

3. Contractor shall include in his project schedule 30 calendar days for the approval of the as-built drawings by the Utility and/or SCDHEC after incorporation of Engineer's comments.

B. Easement Plats

1. Upon completion of installation of the sanitary sewer system, a Land Surveyor registered in the State of South Carolina shall prepare and provide Preliminary Easement Plats and Legal Description(s) as required by the Public Utility and for recording at the appropriate County RMC Office.

   a. Easement Plats shall be tied to State Plane Coordinates.

2. After review by the Engineer and Public Utility, the surveyor shall make all required changes and/or revisions.
3. The Surveyor shall be responsible for recording the plat(s) at the appropriate County RMC Office, unless instructed otherwise.
4. The Surveyor is required to provide to the Engineer signed and sealed sets with the recording information, along with electronic media.
5. Contractor shall include in his project schedule 30 calendar days for the approval of the as-built drawings by the Public Utility and/or SCDHEC after incorporation of Engineer's comments.

3.6 ACCEPTANCE

A. Final acceptance will be based on satisfactory materials, installation and construction of the specified work as approved by the Engineer. All construction shall be re-worked to the satisfaction of the Public Utility, Owner and/or Engineer until specified requirements are met.

B. All additional work that is the result of a failed inspection or test shall be performed by the Contractor at no additional cost to the Owner.

C. The Contractor shall provide a warranty for materials and workmanship to the Owner for the length of time as required by the Public Utility.

END OF SECTION 333113

SECTION 334100 - SITE STORM DRAINAGE UTILITIES

PART 1 - GENERAL

1.1 SUMMARY

A. This section covers all work associated with the excavation, installation and construction, backfilling and testing for storm drainage piping and structures as indicated on the drawings and as specified herein.

1.2 DEFINITIONS

A. Subgrade: Existing, in-situ soil or other material that is remaining after stripping or excavation. The subgrade is always existing material on which fill or new structures are to be placed.

B. Excavation: The removal of soil or material to obtain a specified depth or elevation.

C. Borrow: Material that must be transported to the site. A material that must be developed by others and transported to the site. Not available on site.

D. Backfill: Fill material used in refilling a cut, trench or other excavation.

E. Lift: A layer or course of material placed on top of a previously prepared or placed material.

F. Unsuitable Material: Existing, in situ soil or other material which can be identified as having insufficient strength characteristics or stability to carry intended loads in fill or embankment without excessive consolidation or loss of stability. Materials classified as PT, OH, or OL by ASTM D 2487 are unsuitable. Unsuitable materials also include man-made fills, refuse, frozen material, uncompacted backfills from previous construction, unsound rock or soil lenses, or other deleterious or objectionable material.

G. Granular Material: Soils classified as GW, GP, SW or SP by ASTM D 2487. Materials classified as GM and SM will be identified as granular only when fines have a plasticity index of zero.

H. Compaction: The process of mechanically stabilizing a material by increasing its density at a controlled moisture condition. "*Degree of Compaction*" is expressed as a percentage of the maximum density obtained by the test procedure described in ASTM D1557 for general soil types or ASTM D 4253 or ASTM D 4254 for isolated cohesionless materials, abbreviated in this specification as "___ *percent maximum density*".

I. Drainage Structure: Any structure constructed as part of the storm drainage collection or removal system. This includes catch basins, curb inlets, control structures, headwalls, flared end sections, junction boxes and manholes.

J. Bedding: The subgrade or fill material that directly supports the load of a pipe.

1.3 LUMP SUM PRICE

A. The items listed in the proposal shall be considered as sufficient to complete the work in accordance with the drawings and specifications. Any portion of the work not specifically listed in the bid form shall be deemed a part of the item with which it is associated and shall be included in the lump sum price. The price shall be full compensation for the excavating, filling, transporting of material, compaction, shaping, finishing, dressing, disposal of surplus material, testing, staking, construction supervision and all other work required for satisfactory completion of the storm drainage operations.

B. Base bids on the following criteria:

1. Surface elevations as indicated.
2. No pipes or other man-made structures other those indicated will be encountered. The utility locations shown are based on available information and are approximate and shall be field verified prior to beginning any work.
3. The character of the material to be excavated or used for subgrade is as indicated.
4. Ground water elevations indicated are those existing at the time of subsurface investigations and do not necessarily represent ground water elevation at the time of construction.
5. Borrow material in the quantities required are not available on site and must be developed and obtained by the Contractor.

1.4 UNIT PRICES

A. None this Section.

B. Payment for the unit shown on the bid form shall be considered complete to cover the cost of all labor, material, equipment, testing and performing all operations necessary to complete the work in place. Payment shall be made based upon the actual quantity multiplied by the unit prices. Measurement will be made by means acceptable to the Owner and the Engineer. Direction to perform work must be given by the Owner and the Engineer.

C. Material is to be paid for in its final position after placement or compaction by means acceptable to the Owner or Engineer.

1. Removal of Unsuitable Materials and Replacement with Granular Bedding (per CY).

a. Base Bid Quantity: **50 CY**. The Contractor shall include in the Base Bid this assumed quantity of removal of unsuitable materials and replacement with granular bedding based on in-place volumes.
b. The Contractor shall provide a unit price ($/CY) for removal of unsuitable materials and replacement with granular bedding.

D. Options

1. Where not specifically indicated in these specifications or on the drawings, the Contractor will have the option of using the pipe materials identified for the appropriate use.

1.5 SUBMITTALS

A. Shop Drawings

1. Pre-Cast Structures and accessories

B. Certifications: Provide manufacturer or supplier certification of compliance indicating conformance to this specification or the referenced standard(s) for the following:

1. Piping

a. Reinforced concrete pipe (RCP), including fittings and joint materials.
b. High density polyethylene pipe (HDPE), including fittings and joint materials.
c. Polyvinyl chloride pipe (PVC), including fittings and joint materials.

2. Perforated Drain Piping

   a. HDPE less than 12 inch diameter.
   b. HDPE equal to or greater than 12 inch diameter.
   c. PVC 4 inch and 6 inch only.

3. Pre-cast structures.
4. Cast iron frames, covers and gratings.
5. Cleanout materials.

C. Field Testing: Submit field testing data as identified in the paragraph titled “Field Testing” for the following:

1. Compaction and density tests for subgrade, excavation and fill/backfill.
2. Leakage tests
3. Dye test

D. Inspection Reports

1. Pipeline Post Installation Inspection Report

1.6 DELIVERY, STORAGE AND HANDLING

A. Delivery and Storage

1. Piping: Inspect materials delivered to site for damage; store with minimum of handling. Store plastic piping, jointing materials, and rubber gaskets under cover out of direct sunlight. Do not store materials directly on the ground. Keep inside of pipes and fittings free of dirt and debris.

2. Metal Items: Check upon arrival; identify and segregate as to types, functions, and sizes. Store off the ground in a manner affording easy accessibility and not causing excessive rusting or coating with grease or other objectionable materials.

B. Handling

1. Handle pipe, fittings, and other accessories in a manner to ensure delivery to the trench in sound undamaged condition. Take special care not to damage coatings and linings on pipe and fittings; if damaged, make repairs. Carry pipe to trench - do not drag.

1.7 REGULATORY REQUIREMENTS

A. Comply with federal, state, and local regulations.

B. Comply with the requirements of the land disturbance permit and stamped approved drawings issued for this project by the South Carolina Department of Health and Environmental Control (SCDHEC) and/or the MS4.

1.8 QUALITY ASSURANCE

A. Materials: The Contractor will furnish the Engineer and Owner all submittals identified in the paragraph “Submittals” before ordering. The Engineer will review the Contractor’s submittals and provide in writing an acceptance or rejection of material.

B. Manufacturer: Material and equipment shall be the standard products of a manufacturer who has manufactured them for a minimum of two years and who provides published data on the quality and performance of the projects.

C. Subcontractor: A subcontractor for any part of the work must have experience on similar work. At the option of the Engineer, a list of projects and the contacts who are familiar with his competence may be required to be submitted to verify experience.

D. Design: Devices, equipment, structures, and systems not designed by the Engineer that the Contractor wishes to furnish shall be designed by either a registered professional engineer or by someone the Engineer accepts as qualified. Complete design calculations and assumptions shall be furnished to the Engineer or Owner before acceptance.

E. Testing Agencies: Mill certificates of tests on materials made by the manufacturers will be accepted provided the manufacturer maintains an adequate testing laboratory, makes regularly scheduled tests that are spot checked by an outside laboratory, and furnishes satisfactory certificates with the name of the one making the test. Agencies to be used shall be submitted to the Engineer for review prior to engagement.

PART 2 - PRODUCTS

2.1 CONCRETE PIPE

A. Circular concrete pipe shall be reinforced concrete pipe (RCP) conforming to ASTM C76, Class III. Provide Class IV where indicated on the drawings.

B. Horizontal elliptical concrete pipe shall be RCP conforming to ASTM C507, Class HE-III. Provide Class IV where indicated on the drawings.

C. Joints, including pipe and gasket material, shall meet ASTM C990 for tongue & groove with mastic sealant and ASTM C443 for bell & spigot or modified tongue & groove with O-ring rubber gasket.

D. Joint Sealants

1. O-Ring or Profile Gasket

   a. ASTM C443 and the manufacturer's recommendations.
   b. Installed at all locations.

2. Mastic/Butyl gaskets shall not be used.

2.2 HIGH DENSITY POLYETHYLENE (HDPE) PIPE

A. Less than 12 inch diameter

1. ASTM F2648 or AASHTO M252, Type S.
2. Fittings and joints shall be at least the strength and capacity of the pipe and meet the requirements of ASTM F2306 or AASHTO M252, Type S.
3. Joints shall be soil-tight using an engaging dimple connection.

B. Equal to or greater than 12 inch diameter

1. ASTM F2648 or AASHTO M294, Type S.

2. Fittings and joints shall be at least the strength and capacity of the pipe and meet the requirements of ASTM F2306 or AASHTO M294, Type S.
3. Joints shall be soil-tight in accordance with ASTM F477.

C. The use of single wall, Type C pipe, is prohibited.

D. Pipe and fitting shall be manufactured by one manufacturer.

2.3 POLYVINYL CHLORIDE (PVC) PIPE

A. Pipe shall meet ASTM D3034, SDR 26, having ends adaptable for elastomeric gasket joints.

B. Joints shall conform to ASTM D3212.

C. Gaskets shall conform to ASTM F477.

2.4 PERFORATED DRAIN PIPE

A. Perforated HDPE Piping

1. Less than 12 inch diameter: AASHTO M252, Type SP.
2. Greater than or equal to 12 inch diameter: AASHTO M294, Type SP.
3. HDPE perforated pipe shall be wrapped with subsurface drainage filter fabric in accordance with AASHTO M288-92, Class A.

B. Perforated PVC Piping (4 and 6 inch diameter only)

1. ASTM D2729.

2.5 DRAINAGE STRUCTURES

A. Construct of pre-cast concrete. Structures may be constructed of solid concrete masonry or cast-in-place concrete, in lieu of pre-cast concrete. Catch basins, headwalls, gutters, top of curb inlets, and bases shall be cast-in-place concrete.

1. Pipe-to-wall connections shall be mortared to produce smooth transitions and watertight joints or provided with ASTM C923 resilient connectors.
2. Bases shall have smooth inverts accurately shaped to a semicircular bottom conforming to the inside contour of the adjacent sewer sections.
3. Changes in direction of the sewer and entering branches into the manhole shall have a circular curve in the manhole invert of as large a radius as the size of the manhole will permit.

B. Concrete

1. Cast in place concrete shall be in accordance with SECTION “SITE WORK CONCRETE”.
2. Pre-cast concrete manholes shall be in accordance with ASTM C478. Provide a minimum wall thickness of 5 inches.
3. Pre-cast concrete catch basins, curb inlets and junction boxes shall be in accordance with ASTM C913. Provide a minimum wall thickness of 6 inches.
4. Reinforcing bars shall be in accordance with ASTM A615 and welded wire fabric shall be in accordance with ASTM A497.

5. Gaskets for joint connections shall be in accordance with ASTM C443 for O-rings and AASHTO M198, Type B for mastic sealants.

C. Masonry

1. Mortar: ASTM C270, Type M.
2. Brick: ASTM C32, Grade MS, or ASTM C62, Grade SW.
3. Concrete Masonry Units (CMU): ASTM C139.
4. Water for masonry mortar shall be fresh, clean, potable.
5. Grout: ASTM C476.

D. Frames, Covers and Grates

1. Castings shall be of uniform quality, free from blowholes, shrinkage, distortion and other defects. Metal used shall conform to ASTM A48-83, Class 35B for gray iron or ASTM A536-80, Grade 65-45-12 for ductile iron.
2. Frames and covers shall have continuously machined bearing surfaces to prevent rocking.
3. Dimensions shall be as indicated on the drawings, as a minimum. Variations in dimensions will be accepted provided that hydraulic capacity and load capacity are equal to or greater than that shown.
4. The Contractor is responsible for all coordination due to varying dimensions for frames and grates.

E. Flared end sections shall be same material as pipe material unless indicated otherwise. Flared ends are included in the lengths of pipe indicated.

2.6 SOIL MATERIALS

A. Provide rip rap in accordance with SECTION “RIP RAP”.

B. Provide soil materials as specified below free of debris, roots, wood, scrap material, vegetable matter, refuse, soft unsound particles, ice, or other deleterious and objectionable materials.

C. Bring trenches to grade indicated on the drawings using material excavated on the site of this project provided that the material is Class I, II, or III as defined in SECTION “EARTH MOVING”. In the event that material available on site does not meet Class I, II, or III, import material as required at no additional cost to the Owner.

D. Backfill trenches under roads, structures, and paved areas with controlled fill as specified in SECTION “EARTH MOVING”.

PART 3 - EXECUTION

3.1 GENERAL

A. Cutting Pavements, Curbs and Gutters

1. Saw cut with neat, parallel, straight lines 1 foot wider than trench width on each side of trenches and 1 foot beyond each edge of pits. When the saw cut is within 3 feet of an existing joint, remove pavement to the existing joint.

B. Location: Storm drainage piping and structures shall be at the locations, grades, inverts, and slopes indicated.

3.2 EARTHWORK

A. Topsoil: Strip, stockpile and place topsoil in accordance with SECTION “EARTH MOVING”.

B. Excavation

1. Keep excavations free from water while construction is in progress.
2. Immediately notify the Engineer, in writing, if it becomes necessary to remove rock or hard or unsuitable material to a depth greater than indicated.
3. Make trench sides as nearly vertical as practicable except where sloping of sides is allowed. Sides of trenches shall not be sloped from the bottom of the trench up to the elevation of the top of the pipe.
4. Excavate ledge rock, boulders, and other unyielding material to an overdepth at least 6 inches below the bottom of the pipe and appurtenances unless otherwise indicated or specified. Overexcavate unsuitable material as indicated.
5. Use granular fill placed in 6 inch maximum layers to refill overdepths to the proper grade. At the Contractor's option, the excavations may be cut to an overdepth of not less than 4 inches and refilled to required grade as specified.
6. Grade bottom of trenches accurately to provide uniform bearing and support for each section of pipe or structure on undisturbed soil, or bedding material as indicated or specified at every point along its entire length except for portions where it is necessary to excavate for bell holes and for making proper joints. Dig bell holes and depressions for joints after trench has been graded. Dimension of bell holes shall be as required for properly making the particular type of joint to ensure that the bell does not bear on the bottom of the excavation. Trench dimensions shall be as indicated.

C. Bedding

1. Bedding shall be of materials and depths as indicated or specified for storm drainage piping and structures.
2. Place bedding in 6 inch maximum loose lifts.
3. Provide uniform and continuous support for each section of structure except at bell holes or depressions necessary for making proper joints.

D. Backfilling

1. Construct backfill in two operations (initial and final) as indicated and specified in this section.
2. Place initial backfill in 6 inch maximum loose lifts to 1 foot above pipe unless otherwise specified. Ensure that initially placed material is tamped firmly under pipe haunches. Bring up evenly on each side and along the full length of the pipe or structure. Ensure that no damage is done to the utility or its protective coating.
3. Place the remainder of the backfill (final backfill) in 9 inch maximum loose lifts unless otherwise specified. Compact each loose lift as specified in the paragraph entitled "Compaction" before placing the next lift.
4. Do not backfill in freezing weather or where the material in the trench is already frozen or is muddy, except as authorized. Provide a minimum cover from final grade of 2 feet for storm drains.
5. Where settlements greater than the tolerance allowed herein for grading occur in trenches and pits due to improper compaction, excavate to the depth necessary to rectify the problem, then backfill and compact the excavation as specified herein and restore the surface to the required elevation.
6. Coordinate backfilling with testing of storm drain pipes and structures. Testing for the storm drainage pipe and structures shall be complete before final backfilling.

E. Compaction

1. Use hand-operated, plate-type, vibratory, or other suitable hand tampers in areas not accessible to larger rollers or compactors. Avoid damaging pipes and protective pipe coatings. Compact material in accordance with the following unless otherwise specified. If necessary, alter, change, or modify selected equipment or compaction methods to meet specified compaction requirements.

2. Compaction of Bedding Material

a. In soft, weak, or wet soils, tamp refill material to consolidate to density of adjacent material in trench wall. In stable soils, compact to 90% of maximum density.

3. Compaction of Backfill

a. Compact initial backfill material surrounding pipes to 90% of maximum density except where bedding and backfill are the same material. Where bedding and backfill are the same material, compact initial backfill to the density of the bedding.
b. Under areas to be seeded or sodded, compact succeeding layers of final backfill to 85% of maximum density.
c. For utilities under railroad or highway right-of-way, structures and pavements compact succeeding layers of final backfill as specified under SECTION "EARTH MOVING".

F. Structures

1. Provide at least 12 inches clear from outer surfaces to the embankment or shoring. Remove unsuitable material that is incapable of supporting the structure to an overdepth of 1 foot and refill with gravel or sand to the proper elevation. Refill overdepths with gravel, sand or concrete to the required grade and compact as specified.

G. Subsurface Drains

1. Excavation and Backfill

a. Excavate to dimensions indicated. Provide a bedding surface of no more than 1 inch of sand, gravel or granular material and place on compacted material as indicated. Backfill around and over the pipes after pipe installation has been approved. Place granular material in 6 inch lifts and compact with mechanical, vibrating plate tampers or rammers until no further consolidation can be achieved. Compact backfill overlying the granular material as specified for adjacent or overlying work.

2. Filter Fabric

a. Wrap one layer of filter fabric around pipe in such a manner that longitudinal overlaps are in unperforated or unslotted quadrants of the pipe. Overlap fabric a minimum of 2 inches.
b. Secure fabric to pipe so that backfill material does not infiltrate through overlaps.
c. Place granular material and extend it for one pipe diameter, minimum of 6 inches on each side, and 18 inches above top of pipe or as indicated.
d. Place a layer of filter fabric on top of granular material before continuing with backfill.

3.3 PIPE LAYING AND JOINTING

A. General Requirements

1. Inspect each pipe and fitting before and after installation. Remove those found defective from site and replace with new.
2. Provide proper facilities for lowering sections of pipe into trenches. Lay pipe with the bell or groove ends in the upgrade direction.
3. Adjust spigots in bells and tongues in grooves to produce a uniform space. Blocking or wedging between bells and spigots or tongues and grooves will not be permitted.
4. Replace by one of the proper dimensions any pipe or fitting that does not allow sufficient space for proper caulking or installation of joint material.
5. At the end of each workday, close open ends of pipe temporarily with wood blocks or bulkheads.
6. Provide batterboards not more than 25 feet apart in trenches for checking and ensuring that pipe invert elevations are as indicated. Laser beam method may be used in lieu of batterboards for the same purpose.

B. Connections to Existing Lines or Structures

1. Notify the Engineer in writing at least 7 days prior to date that connections are to be made.
2. Obtain approval of the appropriate Authority Having Jurisdiction (AHJ) before interrupting service.
3. Conduct work so that there is minimum interruption of service on existing line.

C. Concrete Pipe

1. Install pipe and fittings in accordance with the provisions for rubber gasket jointing and jointing procedures of ACPA 01-103 or of ACPA 01-102, Chapter 9.
2. Make joints with the gaskets previously specified for joints with this piping. Clean and dry surfaces receiving lubricants, cements, or adhesives. Affix gaskets to pipe not more than 24 hours prior to the installation of the pipe.
3. Protect gaskets from sun, blowing dust, and other deleterious agents at all times. Before installation of the pipe, inspect gaskets and remove and replace loose or improperly affixed gaskets.
4. Align each pipe section with the previously installed pipe section and pull the joint together.
5. If, while pulling the joint, the gasket becomes loose and can be seen through the exterior joint recess when the pipe is pulled up to within 1 inch of closure, remove the pipe and remake the joint.

D. HDPE Pipe

1. Install in accordance with ASTM D2321 and the requirements of the HDPE pipe manufacturer.

E. PVC Pipe

1. Install pipe and fittings in accordance with the paragraph entitled "General Requirements" of this Article and with the requirements of ASTM D2321 for laying and joining pipe and fittings.
2. Make joints with the gaskets specified for joints with this piping; assemble in accordance with the requirements of ASTM D2321 for assembly of joints. Make joints to other pipe materials in accordance with the recommendations of the plastic pipe manufacturer

F. Perforated Drain Pipe

1. The laying of pipe and tile shall proceed upgrade from the lower end of the line and shall have a uniform pitch to the outlets.
2. Perforated pipe shall have joints made with standard coupling bands in a manner approved by the Engineer.

3.4 DRAINAGE STRUCTURES

A. Concrete Work

1. Perform cast-in-place concrete work in accordance with SECTION “SITE WORK CONCRETE”.

B. Manhole, Curb Inlet and Catch Basin Construction

1. Construct base slab of cast-in-place concrete or use pre-cast concrete base sections.
2. Provide sumps in structures in accordance with the drawings.
3. For cast-in-place concrete construction, either pour bottom slabs and walls integrally or key and bond walls to bottom slab.
4. For pre-cast concrete construction, make joints between sections with the gaskets specified for this purpose; install in the manner specified for installing joints in concrete piping. Give a smooth finish to inside joints of pre-cast concrete structures.
5. Parging will not be required for pre-cast concrete manholes.
6. Cast-in-place concrete work shall be in accordance with the paragraph entitled, "Concrete Work."

7. Make joints between concrete structures and pipes entering structures with the resilient connectors specified for this purpose or mortared to produce a watertight joint; install in accordance with the recommendations of the connector manufacturer.
8. Where a new structure is constructed on an existing line, remove existing pipe as required to construct the structure. Cut existing pipe so that pipe ends are approximately flush with the interior face of structure wall, but not protruding beyond into the structure.

C. Metal Work

1. Perform metal work so that workmanship and finish will be equal to the best practice in modern structural shops and foundries. Form iron and steel to shape and size with sharp lines and angles. Do shearing and punching so that clean true lines and surfaces are produced. Make castings sound and free from warp, cold shuts, and blow holes that may impair their strength or appearance. Give exposed surfaces a smooth finish with sharp well-defined lines and arises. Provide rabbets, lugs, and brackets wherever necessary for fitting and support.

3.5 PROTECTION

A. Shoring and Sheeting

1. The Contractor is responsible for the design of all shoring and sheeting systems. Provide shoring, bracing or sheeting where required. In addition to the requirements of Section 25 A and B of COE EM-385-1-1, and other requirements of this contract meet the following:

   a. Prevent the undermining of pavements, foundations and slabs.
   b. Slope banks where space permits.
   c. Where shoring and sheeting materials remain in place in completed work to prevent settlements or damage to adjacent structures as directed, backfill the excavation to 3 feet below the finished grade and remove the remaining portion of the shoring before completing the backfill.

B. Drainage and Dewatering

1. Plan for and provide structures, equipment and construction for the collection and disposal of surface and subsurface water encountered during construction.
2. Drainage: Dispose of surface water which may accumulate in open excavations, unfinished fills, or other low areas. Remove water by trenching where approved, pumping, or other methods to prevent softening of exposed surfaces. Surface dewatering plan shall include rerouting of any storm water runoff or natural drainage if necessary. Collect and dispose of surface and subsurface water encountered in the course of construction.

3. Dewatering

   a. Groundwater flowing toward or into excavations shall be controlled to prevent sloughing or excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. French drains, sumps, ditches or trenches will not be permitted within 3 feet of the foundation of any structure, except with specific written approval, and after specific contractual provisions for restoration of the foundation area have been made. Control measures shall be taken by the time the excavation reaches the water level in order to maintain the integrity of the in situ material. While the excavation is open, the water level shall be maintained continuously, at least 1 foot below the working level.
   b. Operate the dewatering system continuously, 24 hours per day, 7 days per week until construction work below existing water levels is complete. Have a back-up pump and system available for immediate use.

C. Erosion Control: Protect existing streams, ditches, and storm drain inlets from water-borne soil by the means indicated on the drawings.

D. Existing Utilities

1. All known utility facilities are shown schematically on the drawings and are not necessarily accurate in location as to plan or elevation. Utilities such as service lines or unknown facilities not shown on drawings will not relieve the Contractor of his responsibility under this requirement. “Existing Utilities Facilities” means any utility that exists on the project in its original, relocated or newly installed position. The Contractor will be held responsible for the cost of repairs to damaged underground facilities; even when such facilities are not shown on the drawings.
2. The Contractor shall contact all utility companies prior to beginning work and request accurate field location of their respective utility lines.
3. Movement of construction machinery and equipment over pipes during construction shall be at the Contractor’s risk. Repair or remove and provide new pipe for existing or newly installed pipe that has been displaced or damaged.

E. Structures and Surfaces

1. Graded areas shall be protected from traffic, erosion, settlement, or any washing away that may occur from any cause prior to acceptance.
2. Any repair or reestablishment of final grades shall be made prior to final acceptance.

F. Disposal of Excavated Materials

1. Dispose of excavated material so that it will not obstruct the flow of runoff, streams, endanger a partly finished structure, impair the efficiency or appearance of any facilities, or be detrimental to the completed work.

3.6 INSPECTIONS

A. Notify the Owner, Project Representative, Engineer and Authority Having Jurisdiction (AHJ) a minimum of 72 hours prior to all required observations, inspections or tests.

B. The Engineer will have the right to require that any portion of the work be done in his presence and if the work is covered up after such instruction, it shall be exposed by the Contractor for observation.

1. However, if the Contractor notifies the Engineer that such work is scheduled, and the Engineer fails to appear within 72 hours, the Contractor may proceed without him.

C. All work completed and materials furnished shall be subject to review by the Engineer or the Project Representative.

D. All improper work shall be reconstructed and all materials which do not conform to the requirements of the specifications shall be removed from the work upon written notice.

1. The Engineer shall have the right to mark materials as rejected to distinguish them as such.

3.7 PIPELINE POST-INSTALLATION INSPECTION (PII)

A. General

1. Post-Installation inspection (PII) shall be performed on 100% of all pipelines no sooner than 30 calendar days after completion of the pipe installation and final backfill, which includes the embankment and all non-

asphalt bases and/or subgrades. Conditions including joint gaps, tears, misalignment, cracks and deformation shall be noted and reviewed by the Engineer. Engineer shall evaluate for the various conditions noted in PII report as outlined in "Guide for Drainage Pipe Evaluation Repair".

2. In cases where paving operations will be conducted in less than 30 calendar days after pipe installation, a preliminary inspection of the pipe prior to paving shall be performed to ensure the pipe in areas to be paved meets all evaluation criteria prior to paving operations. Performing a preliminary inspection does not relieve the Contractor from the requirement of completing the post-installation inspection for all pipe, including pipe that is inspected during preliminary inspection, after the prescribed 30 calendar day period.
3. Submit to the Engineer a PII Report as described herein.
4. All necessary remediation or replacement of pipe as required or determined to be necessary by the Engineer in conformance with this specification shall be the responsibility of the contractor at no additional expense to the owner. All supplemental work items that are affected by the remediation or replacement of pipe shall be the responsibility of the contractor at no additional expense to the owner. The Engineer shall approve all corrective actions before the work is performed and work shall be completed to the Engineers satisfaction. If any pipe requires remediation or replacement it shall be re-inspected after remediation or replacement has been completed. The Post Installation Inspection Report shall include all notes and data from the initial Post Installation Inspection and all subsequent Post Installation Inspections necessary to fulfill the requirements of this specification.
5. The Contractor is responsible for ensuring that all post installation requirements are performed in accordance with this section and paragraph "Post Installation Inspection Methods, Tools, and Report". It is the contractor's responsibility before post installation inspection to dewater and remove all debris and sediment from the installed pipe. The Engineer shall be provided an inspection schedule at least seven days in advance of beginning inspection.

B. Post Installation Inspection Methods, Tools and Report

1. The inspection equipment utilized for all post installation inspection of all pipe types shall be capable of delivering accurate, repeatable measurements of all items of interest as described in paragraph "Pipeline Evaluation Criteria". The owner reserves the right to confirm any and all inspection data and defect measurement accuracy to insure the PII report and information included there in meets the requirements outlined in this specification. If the PII report and/or data is found to be in non-conformance the owner shall require the inspections and the report to be corrected as needed. Any re-inspection required by owner or required due to remediation or replacement shall be the responsibility of and at the expense of the contractor.

C. Remote Inspection

1. Perform remote inspection for all pipe types. Remote inspection shall be performed by using a crawler mounted camera. The camera shall incorporate a lens with low barrel distortion and capable of recording video. Remote inspections may also be accomplished with digital side scan technology equipment.
2. A check for deflection shall be performed on all flexible pipe types by either laser profiling or by use of a mandrel. Deflection testing is not required for rigid pipe.
3. The camera technology utilized shall be able to deliver a high quality MPEG2 format video with a standard resolution of 720 X 480 or other format acceptable to the Engineer. A camera with lighting suitable to allow a clear picture of the entire periphery of the pipe shall be used. The camera shall be centered in the pipe both vertically and horizontally and be able to pan and tilt to a 90 degree angle with the axis of the pipe and rotating 360 degrees. Digital 360 Degree side scanning data collection equipment that will allow an image of the entire pipe surface and joint circumferences to be clearly visualized and evaluated is also an approved inspection tool. Equipment to move the camera through the pipe that will not obstruct the camera's view or interfere with proper documentation of the pipe's condition shall be used. The video image shall be clear, focused, and relatively free from roll, static, or other image distortion qualities that would prevent the reviewer from evaluating the condition of the pipe.
4. Furnish a video recording of 100% of all pipe with information at the beginning of the video which clearly identifies the pipe being inspected. The identification shall include the project number, the structure number corresponding to the structure number from project documents, size of pipe, the date and time of inspection, direction of travel from a given landmark, distance from given landmark for all noted deficiencies, and any

other identifying factors needed to locate the pipe in the field at a future date. Provide a source of light that allows all areas of concern to be readily observed on the video recording. Furnish the video recording in a digital, reproducible format approved by the Engineer.

5. Move the camera through the pipe at a speed not greater than 30 feet per minute (If Digital 360 side scan technology is used the speed may be increased but should never exceed inspection equipment manufactures recommendations). Mark the video with the distance down the pipe. The distance shall have an accuracy of 1 foot per 100 feet. Stop the camera and pan every joint. If digital scanner technology is used, every joint shall be evaluated.

D. Post Installation Inspection (PII) Report Criteria

1. A written PII Report shall be provided to the Engineer along with corresponding video, laser profiler data on a digital media storage device with pictures. The PII Report shall include a written description of any noted deficiency as outlined in paragraph "Pipeline Evaluation Criteria" for each pipe. The report shall include a still image of these areas along with all field inspection information that indicates why this area is noted. Each still image and description of condition shall also have information that will allow the Engineer to locate and view this issue in the video recording if the inspection was a remote inspection.
2. If a condition continuously occurs along the pipe wall, the report should note the entire area where this condition was found, include at least one still image that best documents the condition and the information necessary to locate the entire condition in the video recording. If the Manual Inspection Method is utilized for flexible pipe products, the PII Report shall include the actual field measurements taken for the measurement of all decencies of note.
3. The Report shall include type of equipment utilized for the inspection and clearly provides data to prove the equipment used meets this specification. The inspection contractor shall provide a statement of field accuracy achieved for all measurements including plus/minus tolerances. The report shall also include a narrative about required field/measurement calibration and provide proof that all calibration procedures were followed when collecting data within the report.
4. The PII Report and corresponding electronic media and data as discussed in this specification shall be made part of the permanent project public records.
5. In order to ensure proper installation of pipe, 100% of all pipelines should be inspected in a safe and effective method using tools that give accurate measurements to provide the Engineer with reports written by trained and competent professionals.

E. Pipeline Evaluation Criteria

1. The following criteria will be applied to all pipe material types and will be utilized to determine the course of action, if any, to be taken when there are cracks, deflections, bulges, creases, tears, spalls, or delaminations in the pipe. The final decision on course of action and acceptability will be determined by the Engineer.

a. Cracks in Rigid Pipe

1) Cracks less than 0.01 inches typically do not require repair or remediation.
2) Cracks greater than 0.01 inches and less than 0.05 inches are acceptable. However, multiple cracks of this size in an 8 foot section may require minor repair.
3) Cracks greater than 0.05 inches but less than 0.10 inches are acceptable unless the following additional conditions exist:

a) Minor repair is required if the pipe is located in a corrosive environment.
b) When vertical offset is less than 0.10 inches, provide minor repair.
c) For vertical offset greater than 0.10 inches, a determination will be made by the Department on the repair method or acceptability of the pipe.

4) Cracks greater than 0.10 inches will be given consideration by the Owner to replace the pipe or allow a site specific repair.

b. Cracks or Tears in Flexible Pipe

1) For HDPE, PVC or CMP exhibiting any crack/tear, consideration will be given to replace the pipe or allow a site specific repair for any tear that is through the liner of HPDE or for any tear in the wall of CMP or PVC.

c. Deflection in Flexible Pipe

1) Base all deflection measurements on the certified-actual inside pipe diameter supplied by the manufacturer or actual measurements obtained on the project.
2) Deflections greater than 0% but less than 5.0% typically do not require repair or remediation.
3) Deflections greater than 5.0% but less than 7.5% will be evaluated and a determination made as to acceptability or replacement.
4) Deflections greater than 7.5% require replacement.

d. Joint Separation - All Pipe Types

1) For joints that are soil tight, if infiltration of soil is observed and the joint gap is less than AASHTO guidelines and the manufacturer's requirements, provide minor repair. If not able to repair, replace as needed.
2) If infiltration of soil is evident and the joint gap is greater than AASHTO guidelines and greater than manufacturer's recommendations, provide site specific major repair or replace as needed.

e. Slabbing in Rigid Pipe: Provide a site specific repair or replace pipe.

f. Spalling in Rigid Pipe: For pipe with spalling that does not have exposed reinforcement, evaluate to determine if a minor repair is necessary. For pipe with spalling that has exposed reinforcement, evaluate to determine if site specific major repair will be appropriate. If not, replace the pipe.

g. Minor Repairs - All Pipe Types: Minor repairs can be made with approved materials or methods and do not require a site specific analysis. Examples of minor repairs can be found in ASTM C990 14.1 and the ACPA "Post Installation Evaluation and Repair of Installed Reinforced Concrete Pipe" Manual.

1) Other repair resources can be found by visiting http://www.dot.state.fl.us/construction/ContractorIssues/PipeMatrix/MatrixMain.shtm and choosing the type of pipe under evaluation.

h. Site Specific Repairs: Shall be designed by a Professional Engineer, sealed and submitted by the contractor for evaluation and approval. Examples of minor repairs can be found in ASTM C990 14.1 and the ACPA "Post Installation Evaluation and Repair of Installed Reinforced Concrete Pipe" Manual.

1) Any repairs made to the installed pipe must be certified by the contractor and the repair contractor. This certification will state that all repairs will have the same service life as newly installed pipe.

3.8 TESTING

A. All testing shall be made at the **Owner's** expense. **Owner will engage a qualified testing agency to perform tests and inspections.**

1. Test locations shall be approved by the Engineer.

B. The Testing Laboratory, Engineer and Owner shall be given a 72 hour notice, minimum, prior to all required tests.

C. Test results shall be furnished to the Contractor, Engineer and Owner within 72 hours after tests are taken.

D. Independent Testing Laboratory

1. Independent Testing laboratory shall operate in accordance with ASTM E329 and shall be submitted to the Engineer for approval.
2. Independent Testing Laboratory shall prepare test reports that indicate test location, elevation data, and test results.
3. If any test performed fails to meet these specifications, Independent Testing Laboratory shall immediately notify the Owner, Engineer and Contractor.
4. The Owner reserves the right to employ an Independent Testing Laboratory and to direct any testing that it may deem necessary.

    a. The Contractor shall provide free access to the site for testing activities.

E. Laboratory Testing

1. Laboratory testing for maximum density and optimum moisture content for subgrade and backfill shall be performed in accordance with ASTM D1557 for general soil types or ASTM D4253 or ASTM D4254 for isolated cohesionless materials.
2. Laboratory testing for mechanical analysis of subgrade and backfill shall be performed in accordance with ASTM D2487.
3. Laboratory testing for plasticity index of subgrade and backfill shall be performed in accordance with ASTM D4318

4. Frequency of Laboratory Testing

    a. Native soil subgrade: One maximum density, optimum moisture content, mechanical analysis and plasticity index test for each material encountered that will serve as subgrade.
    b. Fill/Backfill: One maximum density, optimum moisture content, mechanical analysis and plasticity index for each source <u>and</u> type of material to be used as backfill.

F. Field Testing

1. Earthwork

    a. Field density tests for in-place materials shall be performed in accordance with one of the following:

        1) Sand Cone Method: ASTM D1556
        2) Balloon Method: ASTM D2167
        3) Nuclear Method: ASTM D2922

2. Frequency of Field Testing

    a. Subgrade for structure or pipe bedding

        1) One test per 250 LF of piping outside of pavement areas; minimum of 1 per run between drainage structures.
        2) One test per 100 LF of piping within pavement areas; minimum of 1 per run between drainage structures.
        3) One test per drainage structure.

    b. Backfill for drainage structure or pipe

        1) One test per 250 LF of piping per lift outside of pavement areas; minimum of 1 per run between drainage structures.

2) One test per 100 LF of piping per lift within pavement areas; minimum of 1 per run per lift between drainage structures.
3) One test per drainage structure per lift.

3.9 AS-BUILT (RECORD) DRAWINGS

A. Upon completion of installation of the storm drainage system, a land surveyor registered in the State of South Carolina shall prepare and provide Preliminary Record Drawings to the Engineer for review.

1. As a minimum, these drawings shall show all storm drainage structures, storm pipes, pond size (stage/storage table), bottom elevations, top elevations, low flow channels, details of and pond outlet control structures and pertinent data input as attributes as required by the AHJ or MS4, SCDHEC, and tied to State Plane Coordinates.
2. Record drawings shall accommodate the Engineer's seal, signature, and certification.

B. After review by the Engineer and AHJ, the Surveyor shall make all required changes and/or revisions and submit to the Engineer signed and sealed copies along with electronic media.

C. Contractor shall include in his project schedule 30 calendar days for the approval of the record drawings by the MS4 and/or SCDHEC after incorporation of Engineer's comments.

3.10 ACCEPTANCE

A. Final acceptance will be based on satisfactory materials, installation and construction of the specified work as approved by the Owner, AHJ and/or Engineer.

B. If a tested material or system does not meet or exceed the specified requirements, the Contractor shall perform additional tests as directed by the Owner, AHJ and/or Engineer to adequately define the limits of the material not meeting the specifications.

1. Materials shall be re-tested to the satisfaction of the Owner, AHJ and/or Engineer until specified requirements are met.
2. All additional testing and work that is the result of a failed inspection or test shall be performed by the Contractor at no additional cost to the Owner.

END OF SECTION 334100

SECTION 357001 - TIMBER PIER & TIMBER FRAMING

PART 1 – GENERAL

NOTES*:*

1.) ALL CROSS BRACING, PILE CAPS, STRINGERS & BLOCKING USED FOR CONSTRUCTION OF THE TIMBER FIXED PIERS SHALL COMPLY WITH THE REQUIRED PRESERVATIVE TREATMENT SPECIFICATIONS FOR CCA (CHROMATED COPPER ARSENATE) AS REFERENCED HEREIN.

2.) ALL TIMBER FIXED PIER DECKING AND HANDRAILS SHALL COMPLY WITH THE REQUIRED PRESERVATIVE TREATMENT SPECIFICATIONs CA (COPPER AZOLE) AS REFERENCED HEREIN. REFER TO THE END OF THIS SECTION FOR ADDITIONAL INFORMATION ON CA (COPPER AZOLE).

1.01 DESCRIPTION OF WORK

A. The Contractor shall furnish and install all equipment, materials and appurtenances, and furnish all tools, labor and supervision necessary to construct the work with all appurtenant construction and special equipment as indicated on the Drawings including, but not limited to, the following:

1. Installation of Timberwork including fixed piers, decking, posts, railings, bents, seats, miscellaneous framing and special fittings.

2. Installation of all hardware including fasteners, hurricane ties, nail clips, cables, and appurtenant accessories.

1.02 REFERENCE DOCUMENTS

The latest revision of publications listed below form a part of this specification, to the extent referenced. The publications are referred to in the text by the basic designation only.

A. Federal Specifications (Fed. Spec.):
   1. RR-W-410C Wire Rope and Strand
B. Military Specifications (Mil. Spec.):
   1. DOD-P-21035A Paint, High Zinc Dust Content, Galvanizing Repair
C. U.S. Department of Commerce Product Standards (PS):
   1. 56-73 Structural Glued Laminated Timber
D. American National Standard Institute (ANSI) Standards
   1. B18.2.I-81 Square and Hex Bolts and Screws
   2. 18.22.I-65 Plain Washers
E. American Society for Testing and Materials (ASTM) Publications:
   1. A 123-78 Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip
   2. A 153-82 Zinc Coating (Hot-Dip) on Iron and Steel Hardware Fasteners
   3. A 307-83 Carbon Steel Externally Threaded Standard Fasteners
   4. A 36-81a Standard Specification for Structural Steel
F. American Welding Society (AWS) Publication
   1. D1.1-83 Structural Welding Code, Steel
G. American Wood-Preservers' Association (AWPA) Publication:
   1. Standard U1:
   2. Category UC3B.
   3. Category UC4B.
   4. Category UC5A.
   5. Category UC5B.
   6. Category UC5C.
   7. AWPA Standard T1.
   8. M2-00 Standard for Inspection of Wood Products Treated with Preservatives
   9. M4-99 Care of Preservative-Treated Wood Products

H. American Wood Preservers Institute (AWPI) Publications:
1. AWPI-S1-LR Shore, Beach and Marina
2. AWPI-S3-LF Bulkheads: Design & Construction-Part II
3. AWPI-S4-LR Bulkheads: Design & Construction-Part III
4. AWPI-S5-LR Bulkheads: Hardware and Fasteners

1.03 SUBMITTALS

A. Certified Test Reports: Submit for timber and fasteners:
1. Plant Inspection: Timbers bearing the quality mark, of an approved agency (SPIB,TP) in accordance with the specified standards, will be acceptable for preservative treatment. The Owner's Representative reserves the right to conduct plant inspection of the treating process at his discretion. Notify the Owner's Representative at least 2 weeks prior to treatment, stating where preservative treatment will be done. The Owner's Representative shall have access to all parts of the plant during inspection of the treating process.

1.04 DELIVERY AND STORAGE

Close-stack treated timber and lumber material in a manner that will prevent long timbers or pre-framed material from sagging or becoming crooked. Keep ground underneath and within 5 feet of all such lumber free of weeds, rubbish, and combustible materials. Protect materials from weather using suitable coverings. Handle treated timber with ropes or chain slings without dropping, breaking outer fibers, bruising, or penetrating the surface with tools. Do not use cant dogs, peaveys, hooks, or pike poles. Protect hardware from corrosion.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Lumber and Timbers:
1. Solid Sawn: For members of thickness less than 3", moisture content shall be 19%. For members of thickness larger that 3", moisture content shall be 25%. All solid sawn lumber and timber for decking, posts, and handrails shall be No. 1, KDAT or S-dry Southern Pine, and identified by the grade mark of a recognized association or independent inspection agency using the specific grading requirements of the association recognized as covering the species used. The association or independent inspection agency shall be certified by the Board of Review, American Lumber Standards Committee, to grade the species used. Stringers, pile caps, and blocking shall be No. 2 or better, S-dry 19%.

2. Preservative Treatment: Fabricate lumber and timbers as completely as practicable before preservative treatment. Preservative treat all timberwork (pile caps, bracing) using water borne salts to provide a minimum copper chromated arsenate (CCA) protection of 2.5 lbs./cf in accordance with AWPA. Stringers, decking handrail components and roof components shall have a minimum copper azole (CA) treatment of 0.31 lbs./cf in accordance with AWPA or as outlined on the design drawings.

a. Pressure treatment shall conform to AWPA Publication (Latest Revision) for softwood lumber, timber and plywood pressure treated for Marine Saltwater Exposure.

B. Hardware shall include bolts with necessary nuts and washers, timber connectors, drift pins, dowels, nails, screws, spikes, and other metal fastenings. Bolt and nuts shall be galvanized, or stainless steel alloy type 316 as indicated on the drawings and shall conform to ASTM A307. Washers shall be stainless steel alloy type 316 plate or cut waters, or galvanized as indicated on the drawings. Provide bolts with washers under nut and head. Timber connectors and other metal fastenings shall be of the type and size shown. Nails shall

be hardend deformed, stainless steel type 316 - ring shank nails. No nailing guns shall be used; drill pilot holes 1/16 inches less than nail diameter.

1. Zinc-Coating: Coat all steel specified or indicated to be zinc-coated or galvanized by the hot-dip process in accordance with ASTM A-123 and ASTM A-153, as applicable.

PART 3 - EXECUTION

3.01 CONSTRUCTION

A. Protective Equipment: Provide personal protective equipment for all persons fabricating, field treating, or handling materials preservative treated with chlorinated copper arsenate (CCA), and/or copper azole (CA) as applicable.

B. Fabrication and Erection:

1. Framing: Cut and frame all lumber and timber so that joints will have fit over contact surface. Secure timbers and piles in alignment. No shimming will be permitted in making joints. Open joints are unacceptable. Bore holes for bolts with a bit 1/16 inch larger in diameter than the rod or bolt. Bore holes for lag screws in two parts. Lead hole for the shank shall have the same diameter as the shank. Lead hole for the threaded portion shall have a diameter equal to approximately two-thirds of the spikes with a bit of the same diameter or smallest dimensions of the spike to prevent splitting. Counterbore for countersinking wherever smooth faces are indicated or specified.

2. Framed Bents: Do not cut off tops of driven piles without authorization of the Owner's Representative. Pile cut offs shall be sealed with an approved marine sealant (Kopper's 50 or approved equal).

3. Bracing: Align bents before bracing is placed. Provide bracing of sufficient length to provide a minimum distance of 8 inches between the outside bolt and the end of the brace when possible. Bracing and girts shall bear firmly against piles or timber to which secured. Place fillers to avoid bending the bracing more than one inch out of line when bracing bolts or the fastening are drawn up tight. Built-up fillers will not be permitted. Each filler shall be a single piece of treated lumber like that in the brace with width of not less than 6 inches and a length of not less than 12 inches. Bolt ends of bracing through the pile post, or cap with a bolt of the size as indicated on the drawings. All timber used for cross bracing shall be marine grade. Open cuts on timber below decking shall be treated with Kopper's 50 Marine Sealant, or equal only as approved by the Engineer.

4. Caps: Place timber caps to secure bearing over tops or adjacent to the supporting posts or piles and to secure an even alignment of their ends. Secure caps by bolts of the size and location as indicated on the drawings.

5. Stringers: Place the better sapwood edge of deck stringers down. Tops of stringers shall not vary from a plane more than will permit bearing of the floor on all stringers. Butt-joint and splice outside stringers, but lap interior stringers to take bearing over full width of cap or floor beam at each end. Break joints if stringers cover two spans. Connect Stringers to caps/joists at all points of contact using hurricane ties as indicated on the Drawings. Between stringers, frame and nail solid-bridging at each end land at midspan with at least four nails for solid-bridging.

6. Decking: Make decking of a single thickness of 6" plank supported by stringers or joists. Unless otherwise indicated, lay plank with heart side down (bark side up) with 1/4 inch spacing. Spike each plank to each joist with not less than three nails per joist. Cut off ends of plank on a line parallel to the centerline of the pier. Grade planks as to thickness and lay so that adjacent planks

vary no more than 1/16 inch. All decking shall have a minimum copper azole (CA) treatment of 0.31 lbs./cf in accordance with AWPA.

7. Fastening: Use stainless steel alloy plate or cut washers, as indicated on the drawings of the size and type to match each bolt under all bolt heads and nuts in contact with wood. Vertical bolts shall have nuts on the lower end. Where bolts are used to fasten timber to timber or timber to steel, bolt members together when they are installed and retighten immediately prior to final acceptance of the contract. All bolts shall have sufficient additional threading to provide at least 1/2 inch for future retightening.

8. Coat all exposed bolts and hurricane ties/straps with coal tar epoxy or marine sealant.

C. Field Treatment:

1. Timber Work: Field treat all cuts and holes in treated piles or timbers, and all abrasions with Koppers 50 Marine Sealant accordance with AWPA M4 (1999 edition). Trim all cuts and abrasions before field treatment. Paint all depressions or openings around bolt holes, joints, or daps including recesses formed by counterboring timber with Koppers 50 Marine Sealant, in accordance with AWPA M4 (1999 edition) and after the bolt or screw is in place, fill with hot pitch or a bitumastic compound.

2. Galvanized Surfaces: Repair and recoat zinc coating which has been damaged to such an extent as to expose the base metal. No rethreading of galvanized bolts will be allowed. Thoroughly clean the damaged area by wire brushing and remove all traces of welding flux and loose or cracked zinc coating prior to painting. Paint cleaned area with two coats of zinc oxide-zinc dust paint conforming to Mil. Spec. DOD-P-21035. Compound paint with a suitable vehicle in the ratio of one part zinc oxide to four parts zinc dust by weight.

3.02 DESIGN LOADS

A. Framing and decking:

1. All structural framing and decking shall be designed to withstand a combined vertical dead and live load of 100 PSF applied to the full surface area of the deck. Allowable deflection shall be L/240, where L is the freespan between supports in inches.

B. Handrails:

1. Handrails shall be designed to meet the following minimum load requirements:

a. A 50 lb. load applied horizontally at the top rail and a simultaneous load of 100 PLF applied vertically downward at the top rail.

b. A 200 lb. concentrated load applied at any point in any direction at the top of the rail.

c. A 200 lb. concentrated horizontal load applied on a 1 SF area at any point in the system, including intermediate rails or other elements serving this purpose.

d. The above loads do not have to be applied simultaneously, except where specified, but should be applied to produce maximum stress in all the components.

2. Handrails shall also comply with the latest revisions and requirements of the International Building Code including horizontal and vertical loads, and minimum and maximum distances and spacing.

END OF SECTION

SECTION 357002 - TIMBER FLOATING DOCK AND ACCESSORIES

PART 1- GENERAL

1.01 WORK INCLUDED

Complete pre-engineered floating dock system with pile guides.

1.02 APPLICABLE STANDARDS

A. National Forest Products Association (NFPA) "National Design Specifications for Wood Construction"
B. West Coast Lumber Inspection Bureau: Grading and dressing rules for lumber
C. American Wood Preservers' Associations Standards U1, UC3B, UC4B, UC5A, UC5B, & UC5C.
D. American Institute of Steel Construction
E. American Society for Testing Materials:
1. -A36 Specifications for structural steel
2. -A123 Specification for zinc coatings on iron and steel products
3. -A153 Specification for zinc coatings on iron and steel hardware

1.03 SUBMITTALS

A. A general layout drawing of the proposed floating structures giving all dimensions, clearances and pile guide/anchorage locations.
B. Detailed fabrication drawings showing details of dock units to be supplied
C. Calculations and shop drawings sealed by a state of South Carolina licensed professional engineer shall be required prior to commencing fabrication.

PART 2 - PRODUCTS

2.01 DESIGN AND LOAD CONDITIONS

A. Vertical Loads:
1. Dead loads shall consist of the entire weight of the floating structure, including utilities, ramps, dock boxes and other accessories and appurtenances.

2. Floating dock deck surface and structural frame shall be designed to withstand a live load of 50PSF applied to the full surface area of the deck. Allowable deflection under dead load plus full uniform live load shall be L/240.

3. Flotation shall be designed to support the dead load plus 30 PSF live load applied to the full area of the deck surface.

4. Freeboard under dead load conditions only shall equal 19" +/- 1". Freeboard under combined dead load and 30 lbs. per square foot uniformly distributed live load shall not be no less than 9".

5. Concentrated live load: 400 lbs at any one point on the deck shall not tilt the dock more than six (6) degrees from horizontal.

6. Additional flotation shall be added to support the gangway loads without creating undue distortion in the dock or horizontal alignment.

B. Horizontal loads:
1. A uniform horizontal wind loading from any direction shall be calculated based on the design wind pressure on all surfaces, for each of the vessel occupancy scenarios described above and illustrated in the bid plans. For wind pressure loading, average vessel profile heights shall be based on upper

curves, Figure 3-15, p. 219, "Planning and Design Guidelines for Small Craft Harbors", ASCE Manuals and Reports on Engineering Practice No. 50 (2012) and the slip length indicated on the Drawings. Each shielded vessel shall be assumed to receive 20% of the unshielded wind loading. Compute wind load from all directions including outer diagonal opposite corners of docks and fingers. Do not deduct for walkways, fingers, or open areas between boats. Contractor shall also identify, determine, and state the maximum wind pressure load that the unoccupied docking system can withstand, based on the other design parameters provided within this specification.

2. A horizontal load due to impact on a finger dock shall be the result of the largest berthed craft normally using the adjacent slip striking the end of the finger dock 10 degrees (10) off center line. For purposes of calculations, the weight of the craft shall be 12 times the finger length squared ($12L^2$). The craft shall be considered moving at a speed of 3 FPS.

C. Hinged or bolted floating dock module connectors shall be able to withstand a load of 3000 pounds applied to the full connector.

D. Waves: This structure and system shall be designed to withstand storm conditions of up to 1.5 FT waves on a periodic, but not continual basis.

2.02 MATERIALS AND CONSTRUCTION

A. Wood Framing:

1. All exterior (visible) structural wood and wood fendering in the splash zone shall be Pine No. 1 (or approved equivalent) hand selected - no downgrades allowed - with a minimum CCA (Chromated Copper Arsenate) content equal to 0.6 pounds per cubic foot (pcf) - moisture content not to exceed 19% after treatment, KDAT or S-Dry. All submerged wood members shall be treated to 2.5 pcf CCA. Interior (non-visible) structural wood shall be minimum Pine No. 2 (or approved equivalent) and shall comply with the treatment and moisture requirements mentioned herein.

2. All wood shall comply with American Softwood Lumber Standards Committee, PS-20 Washington, DC, to grade the species. All lumber specified for treatment shall be treated to the requirements of American Wood Protection Association (AWPA) U1 and T1. All field cuts and holes shall be treated in accordance with AWPA M4.

3. Timber for decking and handrail components shall be No. 1 Prime Pine (or approved equivalent) hand selected - no downgrades allowed - with a minimum CA (Copper Azole) content equal to 0.31 pounds per cubic foot (pcf), (or approved equivalent), - moisture content not to exceed 19% after treatment, KDAT or S-Dry.

4. Any proposed use of exotic timber shall be accompanied by product specifications, harvest certification, and is subject to Owner and Design Criteria Professional's approval. The Owner's preference is for a sustainably sourced product, such as those that meet FSC certification requirements. Contractor shall provide certifications or similar documentation with the Bid.

B. Flotation:

1. Plastic Pontoons: Shells shall be manufactured from rotationally molded high- density polyethylene or cross-linked polyethylene material conforming to ASTM D1248. The polyethylene shall be black in color and have a nominal wall thickness of 0.15 inch. Suppliers of pontoons shall present evidence that the pontoon being supplied is free of cracks and thinning of material below 0.125 inch at the corners and upper flanges of the pontoon. Pontoons shall be attached to the dock system structure with mounting flanges so that all the edges of the flanges are bolted to structural members to minimize flexing and deformation of the pontoon. Each

pontoon shall be completely filled with "foamed-in-place" closed cell, 1.0 pcf minimum density polystyrene foam. Shells must fully encase foam.

2. Pontoon shells may also be linear low-density (or Design Criteria Professional approved equal) polyethylene and blow molded, so long as the resultant shell is seamless. The base material for all polyethylene shells shall conform to the following minimum requirements: minimum density 0.937 g/cc per ASTM D1505; minimum ultimate tensile strength of 2,560 psi per ASTM D638; and minimum flexural modulus of 96,000 psi per ASTM D790. All other thickness, color, and attachment requirements of the polyethylene shells remain unchanged.

3. Foam: The resultant expanded polystyrene foam block shall have a minimum density of 1.0 pcf. The block shall be solid with no loose beads or void areas and have a maximum water absorbency of 3 percent by volume per ASTM C-272.

4. All materials used in the fabrication of the pontoons shall be made from new material specially manufactured for the intended use. No regrind of foam materials shall be allowed and the supplier of the material shall certify that no regrind material is used in the foam for this project.

5. A description of Dock Manufacturer's warranty for flotation units shall be submitted to Owner in accordance with these specifications.

C. Flotation Performance:

1. Flotation units shall be designed to maintain the desired buoyancy and freeboard even if punctured or cracked. Flotation attachment to structural frame shall be positively attached by means of through bolt and nut. Flotation unit and frame to act as one integral section.

2. Dock supplier shall provide shop drawings and Professional Engineer's calculations on structural and floatation performance. Manufacture shall not be commenced prior to Engineer's approval.

D. Steel Components:

1. All fabrication and miscellaneous steel shall conform to ASTM A36 and shall be hot dipped galvanized after fabrication in accordance with ASTM A123. Bolts, nuts, and washers used with galvanized structural members shall be per ASTM A 325 or ASTM A 307 as applicable and hot-dip galvanized per ASTM A 153. All screws, bolts, nuts, and lock washers, except where used with other hot-dip galvanized steel components, shall be 316 Series Stainless Steel in accordance with ASTM F 593 and ASTM F 594. Flat washers shall be type ANSI B and be Type 316 stainless steel.

E. Aluminum Components

1. All aluminum construction shall be in accordance to AA "Specification for Aluminum Structures." Extrusions shall be aluminum alloy 6061-T6. The material shall be temper suitable for saltwater service in accordance with applicable ASTM Standards B209, B 211, B221, B308, B429, and B547 for various materials used. All welds shall be in accordance with AA "Specifications for Aluminum Structures" and ASTM D1.2. All fasteners shall be Aluminum or 316 Series Stainless Steel in accordance with
ASTM F593 and F594.

F. Bolts, Nuts and Washers:

1. All bolts, nuts and washers shall be fabricated according to ASTM A 307 and shall be of sufficient size, shape and length for their intended use.

G. Finish of Steel and Bolts:

1. All structural steel, all bolts, nuts and washers shall be hot dipped galvanized in accordance to ASTM A 123 with a minimum coating of 2 ounces per square foot, or shall be stainless steel alloy type 316 – as specified on the plans.

H. Deck:

1. All decking shall be Southern Yellow Pine, grade #1, KDAT, surfaced four sides and shall conform to Southern Yellow Pine Inspection Bureau rules. Decking shall be pressure treated with alkaline copper quaternary (ACQ) to 0.60 lb./cf. minimum. No opening in the deck surface shall exceed 1/4" in width.

I. Cleats:

1. Cleats shall be made of galvanized steel or non-corroding alloys (stainless steel) and appropriately sized for each berth. Almag "S" cleats are prohibited. Side tie dockage shall include cleats spaced at typically 10 feet on center unless otherwise shown on the Drawings. Cleats shall be securely bolted to the dock framework with through bolts rather than lag bolts. Cleats shall be designed to withstand a mooring line load of 1500 pounds in any direction. All cleats shall be installed in locations shown on plans or shop drawings.

J. Dock Bumper:

1. Bumper strip shall be extruded, non-marring, marine grade vinyl, with Owner approved color. Each strip shall have a minimum height of four inches, minimum thickness of 1/8 inch, and a minimum weight of 1.6 pounds per linear foot. Outside corners shall be protected with corner bumpers molded of marine grade vinyl, of same color as the bumper strip, and have minimum weight of 1 3/4 pounds each. The bumper strip and corner bumper shall be installed with stainless steel screws or aluminum ring shank nails on 4-inch centers along both flanges. Contractor's selected bumper strip and corners shall be submitted for approval with Design Submittals.

K. Pile Guides:

1. Pile guides shall be fabricated to fit below surface of dock and allow full vertical movement of the dock system without inducing binding or torsion into the system. Pile guides must be of sufficient strength to secure the system under the extreme loading conditions given in this specification. Guide pile shall include a roller made of ultra-high molecular weight (UHMW) plastic mounted on a stainless steel axle, UHMW wear pads or HDPE sleeve.

END OF SECTION

SECTION 35700 - MARINE TIMBER PILING

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. The Contractor shall furnish and install all equipment, materials, appurtenances, tools, labor, and supervision necessary to construct the work with all appurtenant construction and special equipment as indicated on the Drawings including, but not limited to, the following:
   1. Installation of new piles
   2. Connection to shore structures, gangways, or docks as applicable.

1.02 REFERENCE DOCUMENTS

The latest revision of publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

A. Federal Specifications (Fed. Spec.):
   1. RR-W-410C Wire Rope and Strand
B. Military Specifications (Mil. Spec.):
   1. DOD-P-21035A Paint, High Zinc Dust Content, Galvanizing Repair
C. U.S. Department of Commerce Product Standards (PS):
   1. 56-73 Structural Glued Laminated Timber
D. American National Standard Institute (ANSI) Standards
   1. B18.2.I-81 Square and Hex Bolts and Screws
   2. 18.22.I-65 Plain Washers
E. American Society for Testing and Materials (ASTM) Publications:
   1. A 123-78 Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip
   2. A 153-82 Zinc Coating (Hot-Dip) on Iron and Steel Hardware Fasteners
   3. A 307-83 Carbon Steel Externally Threaded Standard Fasteners
   4. A 36-81a Standard Specification for Structural Steel
F. American Welding Society (AWS) Publication
   1. D1.1-83 Structural Welding Code, Steel
F. American Wood-Preservers' Association (AWPA) Publication:
   1. Standard U1:
   2. Category UC3B.
   3. Category UC4B.
   4. Category UC5A.
   5. Category UC5B.
   6. Category UC5C.
   7. AWPA Standard T1.
   8. M2-00 Standard for Inspection of Wood Products Treated with Preservatives
   9. M4-99 Care of Preservative-Treated Wood Products
G. American Wood Preservers Institute (AWPI) Publications:
   1. AWPI-S1-LR Shore, Beach and Marina
   2. AWPI-S3-LF Bulkheads: Design & Construction-Part II
   3. AWPI-S4-LR Bulkheads: Design & Construction-Part III
   4. AWPI-S5-LR Bulkheads: Hardware and Fasteners

1.03 SUBMITTALS AND INSPECTION

A. Preservative Treatment Certificate: Prior to commencement of work submit (4) copies from an approved testing organization attesting that piles to be used in the work have been treated as required by this section.

1. Shop Drawings: Submit to the Engineer for approval six (6) sets of shop drawings, including dimensions of all treated pile, and complete descriptions of all pile driving equipment. Two sets, approved or corrected, will be returned to the Contractor. Do not start work until the shop drawings have been approved.

2. Plant Inspection: The Engineer reserves the right to perform plant inspections of the treating process at his discretion. Notify the Engineer at least 2 weeks prior to beginning the treatment, stating where preservative treatment will be done. The Engineer shall have access to all parts of the plant and shall be allowed to inspect all facets of the treating process.

3. Pile Driving Equipment: Submit to the Engineer the type of pile driving equipment to be used in accordance with paragraph 3.01-E.

4. Driving Helmets and Cushion Blocks: Submit to the Engineer the type of block to be used. Approval from the Engineer must be granted prior to driving piles.

5. Submit copies of complete pile driving record in accordance with Section 3.06.

6. Engineer reserves the right to require testing by an independent lab certified to test piles in accordance with AWPI.

1.04 DELIVERY AND STORAGE

Close-stack treated timber and lumber material in a manner that will prevent long timbers or pre-framed material from sagging or becoming crooked. Keep ground underneath and within 5 feet of all such piles free of weeds, rubbish, and combustible materials. Protect materials from weather using suitable coverings. Handle treated timber with ropes or chain slings without dropping, breaking outer fibers, bruising, or penetrating the surface with tools. Do not use cant dogs, peaveys, hooks, or pike poles. Protect hardware from corrosion. Piles and other lumber shall be unloaded in the presence of the Owner's Representative. Piles shall be unloaded with slings or other equipment. Piles or treated timber shall not be dumped or dropped.

PART 2 - PRODUCTS

2.01 MATERIALS AND REQUIREMENTS

A. Piles: Provide Southern Pine friction clean-peeled piles conforming to ASTM D25. Minimum butt and tip circumferences must be as indicated on the plans. Piles must be in one piece. Splices will not be permitted.

B. Workmanship: Cut piles above the ground swell. Saw tips square with the axis of the pile. Saw vertical pile butts square with the axis of the pile. Trim or smoothly cut all knots and limbs flush with surface of the swell surrounding the knot. No strip of inner bark wider than 1/2 inch shall remain and sapwood shall not be cut through in clean-peeled piles.

C. Preservative Treatment: As prescribed in Fed. Spec. TT-W-00571J, AWPA Standard U1, Category UC5A, UC5B, & UC5C, **(2.5 lbs./cf – CCA is required).**

D. Segregation of Materials for Treatment: Separate or space material to insure contact of treating medium with all surfaces. Whenever the quantity ordered is sufficient, treat items of different species, sizes, conditioning, and retention requirements in separate charges.

E. Incision: Incise piles that are difficult to penetrate prior to treatment, provided the incisions will not make the material unfit for the use intended.

F. Brand: Clearly and permanently brand piles in two places approximately 5 and 10 feet from the butt. The

brand shall identify species, class and length, preservative, retention, supplier, and month and year of treatment.

G. Straightness Requirement: All timber piles shall meet the following requirement: A straight line drawn from the center of the butt to the center of the tip shall not, at any point, fall further away from the center of the pile than a distance equal to 1% of the length of the pile. The surface of the pile shall not contain kinks greater than 1 inch [25 mm] in 5 feet [1.5 mm], as measured by a straightedge.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Handling: Inspect piles in the leads, and where the protective shell or treated wood is impaired, between cutoff and point not less than 10 feet below the ground, repair the piles in accordance with AWPA M4 (1999 edition), unless the pile is damaged to such extent that it is rejected. Laterally support pile during driving, but do not unduly restrain from rotation in the leads. Where pile orientation is essential, take special care to maintain the orientation during driving. Take special care in supporting battered piles to prevent excess bending stresses in the pile. When necessary, place collars around the pile head to prevent brooming. Do not use cant hooks. Cut piles with pneumatic tools, by sawing, or by other means approved by the Engineer.

B. Test Piles: Where required by the Owner/engineer, test piles of the same class and driven in the manner specified for all piling elsewhere in this section. The Engineer will use test pile data to determine the "calculated" pile tip elevation and the necessary driving resistance. Drive test piles in the locations indicated. Test piles that are suitably preservative treated, that are located properly, and that have adequate driving resistance, may be used in the finished work.

C. Driving Test Piles: Where required by the Owner/Engineer, drive test piles without interruption to the point elevation directed. Keep a record for each test pile, the number of blows required for each test pile, the number of blows required for each foot of penetration throughout the entire length of the pile, and the penetration per blow at such intervals as directed. Include type and size of the hammer used and rate of operation. Record any unusual occurrence during pile driving.

D. Driving Piles: Drive without interruption to the "calculated" tip elevation (or to the tip elevation indicated on the Drawings when applicable) to reach a driving resistance in accordance with the schedule that the Contractor will prepare and the Engineer will approve using the test-pile driving data. If a pile reaches the "calculated" pile tip elevation, notify the Engineer who will dictate the procedure to be followed.

E. Driving Equipment: Pile Hammers: Air-, steam-, or diesel-powered or a type approved by the Engineer. The hammer furnished shall have a capacity at least equal to the hammer manufacturer's recommendation for the total weight of pile and character of subsurface material to be encountered. Operate diesel-powered hammers throughout the entire driving period at the rate recommended by the manufacturers. Maintain sufficient pressure at the hammers so that:

1. For double-acting hammer, the number of blows per minute during and at the completion of driving of a pile is equal approximately to that at which the hammer is rated.
2. For single-acting hammer, there is a full upward stroke of the ram.
3. For differential-type hammer, there is a slight rise of the hammer base during each upward stroke.

F. Driving Helmets and Cushion Blocks: Use a driving helmet or cap and a cushion block or cap block approved by the Engineer to prevent impact damage to the pile. The helmet or cap and cushion-block combination shall protect the head of the pile, minimize energy absorption, and transmit hammer energy uniformly and consistently during the entire driving period. The driving helmet or cap shall fit snugly on top of the pile so that energy transmitted to the pile is uniformly
distributed over the entire surface of the pile head. The cushion block may be solid or laminated softwood block, with grain parallel to the pile axis, and enclosed in a close-fitting steel housing. Use blocks of suitable

thickness for the length of pile to be driven and the character of subsurface material. Generally, thicker blocks are required for longer piles and softer subsurface material. Replace cushion block if it has been damaged, split, highly compressed, charred, or burned, or has become spongy or deteriorated. Do not use small wood blocks, wood chips, rope or other material
as substitutes.

G. Protection of Piles: Square the heads and points of piles to the driving axis. Use driving caps or rings and followers to protect the heads of the piles, to provide uniform distribution of hammer energy, and to reduce absorption of the energy of the blow to a minimum. Driving caps may be a solid hardwood block, with grain parallel to the pile axis, enclosed in a close-fitting steel housing. Do not use wood chips, small wood blocks, rope, or other material. Pile shall be laterally supported during driving, but shall not be unduly restrained from rotation in the leads. Where pile orientation is essential, special care shall be taken to maintain orientation during driving.

3.02 TOLERANCES IN DRIVING

Drive vertical piles with a variation of not more than 0.25 inch per foot of pile length from the vertical for plumb piles. Driving batter piles shall be as shown on the drawings. Butts shall be within 4 inches of the location indicated. Piles shall not be forced into position. Redrive piles that have heaved in excess of 8". Piles shall be checked for heaving by use of a level line stretched between piles. Piles shall be marked at the end of the workday with a painted mark along the level line.

3.03 JETTING OF PILES

Jetting will be permitted only by written approval of the Engineer.

3.04 PRE-DRILLING

Pre-drilling is not anticipated to be necessary on the project. However, should the Contractor satisfactorily demonstrate to the Design Criteria Professional that piling cannot be driven in the normal manner, holes drilled shall have a diameter not more than 1-inch larger than the tip diameter of the pile and the drilling will continue only through the strata of hard material obstructing the driving. Pre-drilling, if required, shall be considered incidental to pile installation.

3.05 FITTING

Holes for bolts shall be of a size that will ensure a driving fit. Where indicated, holes shall be counter-bored for the bolt heads and washers.

3.06 SURFACE TREATMENT

After piles have been driven and cut off, all cut, bored and dapped surfaces shall be treated in accordance with AWPA M4 (1999 edition).

3.07 RECORDS

Keep a complete and accurate record of each pile incorporated into the permanent structure. The record shall indicate the pile location, diameter, original length, (ground elevation), tip elevation, cutoff elevation, penetration in blows per foot, hammer data including make and size, and any unusual pile behavior or circumstances experienced during driving such as redriving, heaving, weaving, obstructions, spudding, stops, and others which may occur. Forms for recording pile driving data will be furnished by the Contractor after prior approval by the Engineer. Upon completion, turn records over to the Engineer.

3.08 FIELD TREATMENT

A. General Field Treatment: Field treatment of timber piles shall be in accordance with AWPA M4, except as modified herein.

B. Cuts and Abrasions: All field cuts and abrasions in treated piles, including the heads of piles after cut-off, shall be brushed with three (3) coats of the preservative, each coat being allowed to soak in before application of succeeding coats.

3.09 PILES DRIVEN TO REFUSAL

Do not cut off tops of driven piles without authorization of the Owners Representative and/or Engineer.

END OF SECTION

SECTION 358003 - ALUMINUM GANGWAY AND ACCESSORIES

PART 1 - GENERAL

1.01 SCOPE

The work covered under this section shall consist of manufacturing and/or supplying of the prefabricated gangways as shown on the plans. All materials shall be manufactured or distributed by Gator Dock & Marine, Ravens Marine or equal only as approved by the Engineer.

1.02 GENERAL

The deck and frame structural components of gangways shall be designed with minimum safety factors on working stress, which conform to those set forth in the latest issue of the Aluminum Association "SPECIFICATIONS FOR ALUMINUM STRUCTURES" for buildings and similar type structures. The installing contractor shall be a qualified Marine Contractor or General Contractor licensed by the State of South Carolina. He shall secure the required local building or construction permits. The manufacturer/supplier shall have a minimum of 5 years continuous experience in commercial pier and dock fabrication and may be required to submit a list of previous experience on similar projects. If required, the previous experience record will be submitted to the Owner or designated representative 10 working days prior to the bid opening. To ensure that all specified criteria have been met when supplying other than the specified items, the Contractor may be required to submit the following with his bid: Submittal will be mandatory during shop drawing review, prior to fabrication. Engineering calculations and drawings showing compliance with the design criteria specified will be stamped with the seal of a qualified Professional Engineer licensed in the State of South Carolina.

A. Dimensional layout of gangway system to be furnished under this Contract.
B. Computations shall include as a minimum, the following:
    1. Compliance with combined live and dead load requirements considering both bending and deflection.
    2. Compliance with laterally loaded handrail requirements.
C. Typical sections or details of the following:
    1. Hinge connection.
    2. Handrail connection details.
    3. Roller/dock detail including deck plate.
    4. Gangway structural details

PART 2 - TECHNICAL REQUIREMENTS

The following requirements are a minimum and must be met by each gangway fabricator. Alternate approval must be in writing from the Engineer. Approved shop drawings, sealed by a Professional Engineer licensed in the State of South Carolina, will be required prior to fabrication.

2.01 MATERIALS

A. Metal for gangway structures shall be 6061-T6 aluminum alloy. Metal for decking and handrails shall be 6063-T6 aluminum alloy. Both 6061-T6 and 6063-T6 shall be extruded in accordance with the requirements of applicable sections of Federal Specification QQ-A-200.

B. Stainless steel bolts, nuts, washers, and screws where used shall be type 316.

C. Rollers for gangways shall be UHMW polyurethane with black ultra-violet light inhibitor added.

D. Gangway and accessories shall have a written warranty on all materials for three (3) years after installation and acceptance by the Owner.

2.02 DESIGN REQUIREMENTS – ACCESSORIES

The decking shall be designed to withstand a live load of 90 pounds per square foot. Allowable deflection shall be L/240 where "L" is the freespan between stringers or side members in inches.

2.03 DESIGN REQUIREMENTS - STRUCTURES

A. Gangway structure shall be designed to withstand a minimum uniform live load of 60 pounds per square foot applied vertically. Allowable deflection shall be a maximum of L/240 where "L" is the length of the gangway in inches.

B. An assumed loading of 100 PLF applied vertically along the entire length of the dock shall be considered for loads to be carried to the floating docks for meeting freeboard requirements.

C. The Horizontal design load shall be the wind load for the site location. The horizontal design load shall be in combination with the dead weight.

D. Minimum loads for the gangway guardrails, handrails/grabrails and toe rails shall include the following independent load cases: (1) 20 lb/ft continuous load applied to the entire length and at the centerline of the element in any direction, and (2) 250 lb point load at any location and direction.

E. Gangway lengths and overall widths shall be as shown on the design drawings and shall comply with ADA requirements. Gangway lengths shown on the design drawings do not include transition plates. Clear walkway width of any gangway shall no be less than 36 inches.

F. Gangways shall be designed to incorporate the dead load weight and any determined utilities or lighting requirements that transverse the gangway. Additional dead load weight of the gangway shall be coordinated with the dock manufacturer to ensure adequate flotation under the gangway landing area so that the landing area maintains the same freeboard as the rest of the floating dock.

G. Contractor shall provide design, materials, and installation for securely fastening the gangway to the fixed shore structure (pierhead). Shoreside connection shall be designed to withstand the design dead and live loads imparted on the gangway and shall be hinged to allow free vertical movement of the gangway.

H. All gangways denoted as “ADA Compliant” on the design drawings shall be fully compliant with ADA standards.

I. Transition plates shall not exceed a slope of 1V:3H or include gaps larger than ½ inche. Transition plates shall be the full width of the gangway and be attached to the gangway with a continuous pipe hinge. Transition plates shall include edge protection and handrails, where required by ADA Standards. Transition plates shall include a continuous UHMW polyethylene wear block, beveled as necessary to comply with accessibility requirements.

2.04 FABRICATION REQUIREMENTS - ACCESSORIES

A. Decking shall be extruded ribbed aluminum slats to provide a non-skid surface and shall not exceed 9 inches in width with not more than 1/4 inch air space between the slats. The legs of each decking slat shall be welded to the side members and to any longitudinal members with a minimum of 1 1/4 inches of weld per leg. The decking slats shall be placed transversely on the gangway.

B. Any potentially corrosive installation of dissimilar materials shall be properly insulated to minimize or eliminate corrosion in a marine environment.

2.05 FABRICATION REQUIREMENTS – STRUCTURES

A. Aluminum gangways shall have a detachable hinge mount for securing the gangway to a fixed structure. Deck plates for installation on the receiving dock will be shipped with each gangway along with the handrails and handrail mounting bolts and nuts.

B. Gangways shall be securely fastened to the fixed structures where shown on plans. Manufacturer shall specify connection details to Engineer for approval on shop drawings. The floating dock end of the gangway shall ride on 1/4 inch thick aluminum deck plates installed to provide protection to the docks during normal and extreme water level fluctuations.

C. Handrails/grabrails shall be fabricated and installed to conform to ADA Standards. Handrails/grabrails shall be aluminum alloy tube or pipe, with a 1.5 inch outer diameter and smooth gripping surface, with the top of the gripping surface located 36 inches above the deck surface.

D. The dockside end of the gangway (rollers and transition plate) shall ride on aluminum, UHMW polyethylene, or alternate approved deck plates installed to provide protection to the dock surface and silent operation during normal and extreme water level movements.

E. Appropriate dielectric materials (non-conducting insulators, bushings, or bituminous paint) shall be used to separate dissimilar metals or where metal comes in contact with concrete or treated timber. Indicate materials and locations Drawings.

END OF SECTION

EXHIBIT B - DRAWINGS

STEWARD STREET PARK

OWNER

CITY OF HANAHAN

1255 YEAMANS HALL ROAD
HANAHAN, SC 29410
Contact: David Pieper, 843-872-7413
dpieper@cityofhanahan.com

LANDSCAPE ARCHITECTURE, CIVIL ENGINEERING, & STRUCTURAL ENGINEERING

ADC ENGINEERING INC.

1226 YEAMANS HALL ROAD
HANAHAN, SC 29406
P: 843.566.0161 F: 843.566.0162

ARCHITECTURE

GJS ARCHITECTURE LLC

3251 LANDMARK DRIVE SUITE 241
NORTH CHARLESTON, SC 29418
P: 843.722.4334

MECHANICAL, ELECTRICAL, PLUMBING, AND FIRE PROTECTION

LIVE OAK CONSULTANTS, LLC

4214 FELLOWSHIP ROAD
NORTH CHARLESTON, SC 29418
P: 843.529.9428

MARINE ENGINEERING

JON GUERRY TAYLOR AND ASSOC., INC.

P. O. BOX 1082
MOUNT PLEASANT, SC 29465
P: 843.884.6415

ADDITIVE ALTERNATES (Not included in base bid)	
Number	TITLE
1	Trex (or approved equal) decking alternative versus wood deck on boardwalk and dock.
2	Masonry fireplace at pavilion.
3	Kayak launch and ramp.
4	Site Furnishings including table and chair sets, rocking chairs, picnic tables, benches, and trash containers This does not include bicycle racks and bollards which are base bid.
5	Flagpole (30' Illuminated) located at pedestrian circle plaza in center of site.
6	Wood Fence (Approx. 552.5' of 8' height wood fence) located along south and east property lines.

CIVIL ENGINEERING LIST OF DRAWINGS			
SHEET	TITLE	ISSUED	REVISED
C001	CIVIL LEGEND, ABBREVIATIONS & NOTES	5/27/2022	1, 2
C002	TOPOGRAPHIC SURVEY	9/16/2021	
C003	SITE ADA PLAN	5/27/2022	
C004	FIRE PROTECTION PLAN	5/27/2022	
C100	SWPPP PLAN - INITIAL PHASE	5/27/2022	
C101	SWPPP PLAN - INTERMEDIATE PHASE	5/27/2022	
C102	SWPPP PLAN - FINAL PHASE	5/27/2022	
C110	EXISTING SITE & DEMOLITION PLAN	5/27/2022	
C200	SITE PLAN	5/27/2022	
C210	SITE DIMENSION PLAN	5/27/2022	
C300	GRADING & STORM DRAINAGE PLAN	5/27/2022	1
C310	GRADING & STORM DRAINAGE PROFILES	5/27/2022	
C400	UTILITY PLAN	5/27/2022	1, 2
C410	UTILITY PROFILES	5/27/2022	1
C610	CIVIL DETAILS - SWPPP	5/27/2022	
C611	CIVIL DETAILS - SWPPP	5/27/2022	
C612	CIVIL DETAILS - SWPPP NOTES	5/27/2022	
C620	CIVIL DETAILS - PAVEMENT	5/27/2022	
C621	CIVIL DETAILS - PAVEMENT	5/27/2022	
C630	CIVIL DETAILS - STORM DRAINAGE	5/27/2022	
C640	CIVIL DETAILS - WATER - CWS	5/27/2022	
C641	CIVIL DETAILS - SEWER - BCWS	5/27/2022	

LANDSCAPE ARCHITECTURE LIST OF DRAWINGS			
SHEET	TITLE	ISSUED	REVISED
L100	LANDSCAPE SITE PLAN	5/12/2023	
L200	LANDSCAPE PLANTING PLAN	5/12/2023	
L300	LANDSCAPE PLANTING DETAILS	5/12/2023	
L301	LANDSCAPE SITE DETAILS	5/12/2023	
L302	LANDSCAPE SITE DETAILS	5/12/2023	

IRRIGATION LIST OF DRAWINGS			
SHEET	TITLE	ISSUED	REVISED
IR-100	IRRIGATION PLAN	5/12/2023	
IR-101	IRRIGATION SCHEDULES, NOTES AND DETAILS	5/12/2023	
IR-102	IRRIGATION DETAILS	5/12/2023	

MARINE ENGINEERING LIST OF DRAWINGS			
SHEET	TITLE	ISSUED	REVISED
M100	BOARDWALK, PIER AND FLOATING DOCK NOTES	5/12/2023	
M101	BOARDWALK & FLOATING DOCK LAYOUT PLAN	5/12/2023	
M102	PILE BENT & FRAMING LAYOUT PLAN	5/12/2023	
M103	COVERED PIERHEAD FRAMING PLAN & DETAILS	5/12/2023	
M104	BOARDWALK FRAMING PLAN & DETAILS	5/12/2023	
M105	GANGWAY/FLOATING DOCK PLAN & DETAILS	5/12/2023	
M106	FLOATING DOCK FRAMING & DETAILS	5/12/2023	

ARCHITECTURE LIST OF DRAWINGS			
SHEET	TITLE	ISSUED	REVISED
G001	COVER SHEET, CODE MATRIX & LIFE SAFETY PLAN	5/12/2023	
D101	DEMOLITION PLAN - PAVILION	5/12/2023	
A001	ABBREVIATIONS, SYMBOLS, WALL TYPES AND DETAILS	5/12/2023	
A101	PAVILION FLOOR PLAN	5/12/2023	
A102	RESTROOMS PLANS & ELEVATIONS	5/12/2023	
A121	PAVILION - REFLECTED CEILING PLAN	5/12/2023	
A201	PAVILION ELEVATIONS	5/12/2023	
A301	PAVILION CHIMNEY PLANS AND DETAILS	5/12/2023	
A302	BUILDING SECTIONS	5/12/2023	

STRUCTURAL ENGINEERING LIST OF DRAWINGS			
SHEET	TITLE	ISSUED	REVISED
S001	GENERAL NOTES & DESIGN CRITERIA	5/12/2023	
S101	FOUNDATION PLANS	5/12/2023	
S102	SLAB PLANS	5/12/2023	
S103	ROOF FRAMING PLAN	5/12/2023	
S601	TYPICAL FOUNDATION QAND SLAB DETAILS	5/12/2023	
S610	TYPICAL DETAILS - WOOD	5/12/2023	
S611	TYPICAL MASONRY DETAILS	5/12/2023	
S612	TYPICAL MASONRY DETAILS	5/12/2023	
S621	TYPICAL STEEL DETAILS	5/12/2023	
S701	SECTIONS & DETAILS	5/12/2023	
S702	SECTIONS & DETAILS	5/12/2023	

MEP ENGINEERING LIST OF DRAWINGS			
SHEET	TITLE	ISSUED	REVISED
	MECHANICAL DRAWINGS		
M001	MECHANICAL GENERAL NOTES, LEGENDS & ABBREV.	5/12/2023	
M101	MECHANICAL SCHEDULES	5/12/2023	
M102	RESTROOM BUILDING MECHANICAL PLAN	5/12/2023	
	ELECTRICAL DRAWINGS		
E001	ELECTRICAL GENERAL NOTES, LEGEND AND ABBREV.	5/12/2023	
E101	PAVILION ELECTRICAL LIGHTING PLAN	5/12/2023	
E102	PAVILION ELECTRICAL POWER PLAN	5/12/2023	
E103	RESTROOM BLDG. ELEC. LIGHTING & POWER PLANS	5/12/2023	
E104	SITE ELECTRICAL PLAN	5/12/2023	
E501	ELECTRICAL SINGLE LINE DIAGRAM, DETAILS	5/12/2023	
E601	ELECTRICAL PANEL & LIGHT FIXTURE SCHEDULES	5/12/2023	
	PLUMBING DRAWINGS		
P001	PLUMBING GENERAL NOTES, LEGENDS & ABBREVIATION	5/12/2023	
P002	PLUMBING SCHEDULES & DETAILS	5/12/2023	
P101	RESTROOM BLDG. SAN. SEWER & DOMESTIC WATER	5/12/2023	

DOMINION LIST OF DRAWINGS			
SHEET	TITLE	ISSUED	REVISED
	THREE PHASE UNDERGROUND SERVICE	2/20/2023	
	LIGHTING LAYOUT	4/18/2023	

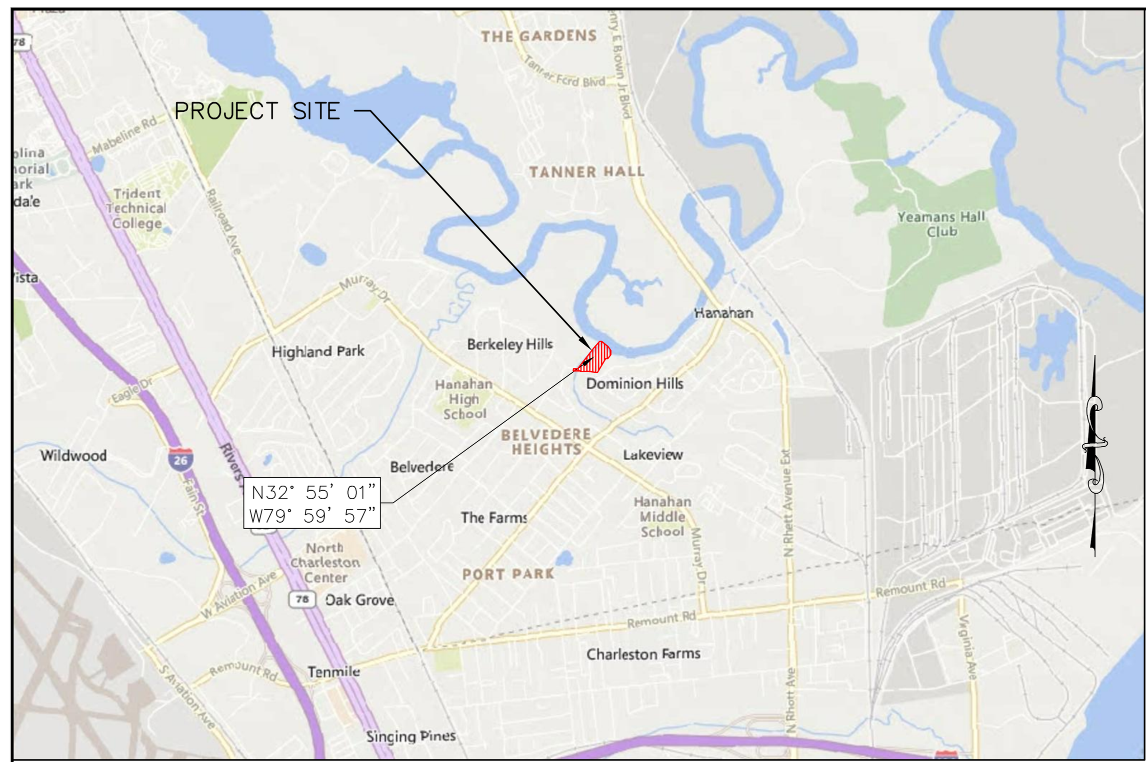
811 Know what's below. Call before you dig.

100% CONSTRUCTION DOCUMENTS
ADC PROJECT #: 20381.00
DATE: 12 MAY 2023

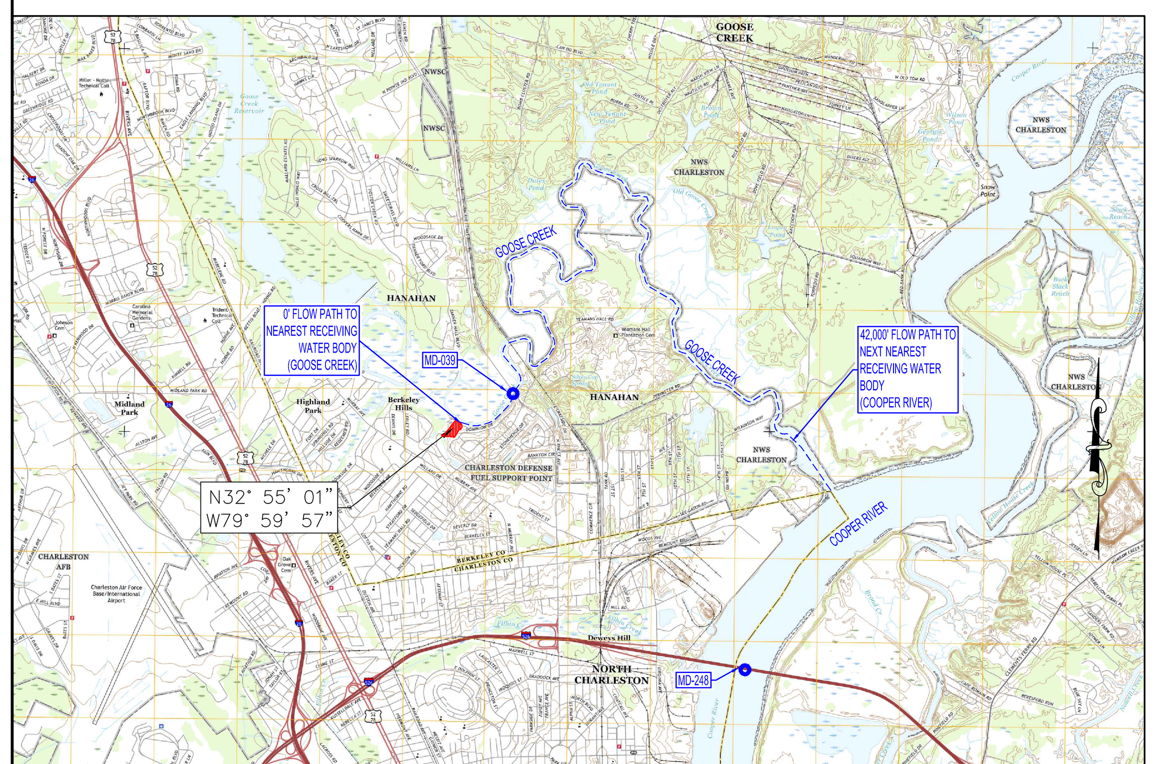
STEWARD STREET PARK RENOVATIONS

TMS# 265-08-03-058,265-08-04-016

HANAHAN, SC



LOCATION MAP



QUAD MAP

SCALE: 1" = 5,000'

CIVIL ABBREVIATIONS

BM	BENCHMARK
BMP	EROSION CONTROL BEST MANAGEMENT PRACTICES
BTTM	BOTTOM
BW	BOTH WAYS
CB	CATCH BASIN
CGP	NPDES CONSTRUCTION GENERAL PERMIT SCR 100000
CI	CURB INLET
CI	CAST IRON
CIP	CAST IRON PIPE
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CO	CLEANOUT
CONC	CONCRETE
CY	CUBIC YARDS
DCVA	DOUBLE CHECK VALVE ASSEMBLY
DI	DROP INLET
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DS	DOWNSPOUT
EL	ELEVATION
EW	EACH WAY
EXST	EXISTING
FFE	FINISHED FLOOR ELEVATION
FG	FINISHED GRADE
FH	FIRE HYDRANT
FIN	FINISHED
FM	FORCE MAIN
GI	GRATE INLET
HDPE	HIGH DENSITY POLYETHYLENE
IAW	IN ACCORDANCE WITH
IE	INVERT ELEVATION
JB	JUNCTION BOX
LF	LINEAR FEET
LP	LIGHT POLE
MATL	MATERIAL
MAX	MAXIMUM
MH	MANHOLE
MIN	MINIMUM
NIC	NOT IN CONTRACT
NOI	NOTICE OF INTENT
NOT	NOTICE OF TERMINATION
NPDES	NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
NTS	NOT TO SCALE
OC	ON CENTER
ODSA	OPERATOR OF DAY TO DAY SITE ACTIVITIES
PC	POINT OF CURVATURE
PCC	PORTLAND CEMENT CONCRETE
PP	POWER POLE
PT	POINT OF TANGENT
PVC	POLYVINYL CHLORIDE
PVMT	PAVEMENT
RAD	RADIUS
RCP	REINFORCED CONCRETE PIPE
RD	ROOF DRAIN
REQD	REQUIRED
RPBP	REDUCED PRESSURE BACKFLOW PREVENTER
R/W	RIGHT OF WAY
SABC	STABILIZED AGGREGATE BASE COURSE
SB	SILT BARRIER
SCDHEC	SOUTH CAROLINA DEPT OF HEALTH AND ENVIRONMENTAL CONTROL
SCDOT	SOUTH CAROLINA DEPT OF TRANSPORTATION
SD	STORM DRAINAGE
SF	SQUARE FEET
SS	SANITARY SEWER SERVICE
STA	STATION
SWPPP	STORM WATER POLLUTION PREVENTION PLAN
TBM	TEMPORARY BENCH MARK
TC	TOP OF CURB
TG	TOP OF GUTTER
TP	TOP OF PAVEMENT
TYP	TYPICAL
VC	VITRIFIED CLAY
W	WATER
W/	WITH
WS	WATER SERVICE
WV	WATER VALVE

GENERAL NOTES:

1. THE EROSION CONTROL PLANS CONTAINED HERE–IN ARE PART OF A LARGER COMPREHENSIVE STORMWATER POLLUTION PREVENTION PLAN (SWPPP). ALL CONTRACTORS/SUBCONTRACTORS/PERSONS THAT WILL BE ENGAGED IN LAND DISTURBING ACTIVITIES SHALL BECOME FAMILIAR WITH AND COMPLY WITH ALL EROSION AND SEDIMENT CONTROL AND STORMWATER POLLUTION PREVENTION REQUIREMENTS CONTAINED THROUGHOUT THE SWPPP, DRAWINGS, SPECIFICATIONS AND PERMITS.
2. ALL CONTRACTORS SHALL VISIT THE SITE PRIOR TO BIDDING TO DETERMINE THE EXTENT OF THE PROJECT.
3. TOPOGRAPHIC AND BOUNDARY INFORMATION BY PARKER LAND SURVEYING LLC, NOT VERIFIED BY ADC ENGINEERING, INC.
4. HORIZONTAL COORDINATES ARE BASED ON SC STATE PLANE COORDINATES NAD '83. VERTICAL DATUM IS BASED ON NAVD 88.
5. ALL PROJECT STAKEOUT, INCLUDING RELOCATION OF PROJECT BENCHMARKS AS NECESSARY, SHALL BE PERFORMED BY A REGISTERED LAND SURVEYOR TO BE PAID FOR BY THE CONTRACTOR. FOR STAKEOUT, DO NOT RELY SOLELY ON THE PHYSICAL SCALE AS SHOWN IN DRAWINGS. REFER TO THE GIVEN DIMENSIONS, SYMBOL LEGEND, KEYNOTES, AND REFERENCED DETAILS FOR CORRECT STAKEOUT.
6. THE EXISTING UNDERGROUND UTILITIES SHOWN HEREON ARE BASED UPON AVAILABLE INFORMATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATION OF ALL UTILITIES PRIOR TO BEGINNING ANY WORK. IF UTILITIES OTHER THAN THOSE SHOWN HEREON ARE ENCOUNTERED, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY AND TAKE APPROPRIATE MEASURES TO PROTECT THE LINE(S) AND ENSURE CONTINUED SERVICE. DAMAGE CAUSED TO EXISTING UTILITIES BY THE CONTRACTOR SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER. THE CONTRACTOR SHALL VERIFY THE CONNECTION POINTS OF NEW UTILITIES TO EXISTING UTILITIES PRIOR TO BEGINNING CONSTRUCTION.
7. THE CONTRACTOR SHALL INSTALL TREE PROTECTION BARRICADES PRIOR TO BEGINNING EARTHWORK OPERATIONS.
8. OFFSITE BORROW NECESSARY FOR THE CONSTRUCTION OF THIS PROJECT SHALL BE PROVIDED BY THE CONTRACTOR FROM SOURCES DEVELOPED BY THE CONTRACTOR.
9. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF UNSUITABLE MATERIAL IS DISCOVERED PRIOR TO BEGINNING ANY REMOVAL OPERATION.
10. THE CONTRACTOR SHALL PLACE 4" OF TOPSOIL IN ALL DISTURBED AND LANDSCAPED AREAS NOT TO BE PAVED. THE CONTRACTOR SHALL ALSO PROVIDE TEMPORARY AND PERMANENT SEEDING IN ALL AREAS INSIDE OR OUTSIDE THE LIMITS OF CONSTRUCTION THAT ARE DISTURBED BY THE CONTRACTOR'S OPERATIONS.
11. ALL TRAFFIC CONTROL SIGNS AND PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS AND THE SOUTH CAROLINA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, BOTH CURRENT EDITIONS.
12. CONTRACTOR SHALL GRADE ALL AREAS TO DRAIN FOR POSITIVE FLOW PRIOR TO FINAL APPROVAL.
13. THE DESIGN ADEQUACY AND SAFETY OF ALL BRACING, SHORING AND TEMPORARY SUPPORTS, ETC. IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
14. THE GENERAL CONTRACTOR SHALL REVIEW AND STAMP APPROVED ANY AND ALL SHOP DRAWINGS AND SUBMITTALS PRIOR TO SUBMITTING TO THE ENGINEER FOR REVIEW.
15. IT IS THE RESPONSIBILITY OF THE OWNER TO OBTAIN THE SERVICES OF A QUALIFIED GEOTECHNICAL ENGINEER WHO SHALL PERFORM INVESTIGATIONS TO VERIFY THAT THE SOIL CONDITIONS ARE AT LEAST THAT WHICH ARE STATED HEREIN.
16. ALL UTILITY WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF SCDHEC, CHARLESTON WATER SYSTEM AND BERKELEY COUNTY WATER AND SEWER. WHERE ANY DISCREPANCIES EXIST BETWEEN THESE DOCUMENTS AND SCDHEC AND CHARLESTON WATER SYSTEM AND BERKELEY COUNTY WATER AND SEWER REQUIREMENTS, THE MORE STRINGENT SHALL GOVERN.
17. IN PERFORMING CONSTRUCTION OBSERVATION VISITS TO THE JOB SITE, THE ENGINEER SHALL HAVE NO CONTROL OVER NOR RESPONSIBILITY FOR THE CONTRACTOR'S MEANS, METHODS, SEQUENCE, TECHNIQUES OR PROCEDURES IN PERFORMING THE WORK.
18. THE CONTRACTOR'S MEANS, METHODS, SEQUENCE, TECHNIQUES OR PROCEDURES IN PERFORMING THE WORK IS SOLELY THE RESPONSIBILITY OF THE CONTRACTOR, WHO IS ALSO RESPONSIBLE FOR COMPLYING WITH ALL HEALTH AND SAFETY PRECAUTIONS AS REQUIRED BY ANY REGULATORY AGENCY.
19. IT IS THE CONTRACTORS RESPONSIBILITY FOR DESIGN, ADEQUACY AND IMPLEMENTATION OF ALL DEWATERING. ALL DEWATERING ACTIVITIES SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE STORMWATER POLLUTION PREVENTION PLAN.
20. CONTRACTOR SHALL MAINTAIN SIGHT DISTANCE VISIBILITY AT ALL EXITS AND/OR INTERSECTIONS IN ACCORDANCE WITH SCDOT'S "ACCESS AND ROADSIDE MANAGEMENT STANDARDS" MANUAL, DURING AND AFTER CONSTRUCTION.

ARCHAEOLOGICAL NOTICE TO CONTRACTOR:

1. IN THE EVENT THAT ANY HISTORIC OR CULTURAL RESOURCES AND/OR ARCHAEOLOGICAL MATERIALS ARE FOUND DURING THE COURSE OF WORK, THE APPLICANT MUST NOTIFY THE STATE HISTORIC PRESERVATION OFFICE AND THE SOUTH CAROLINA INSTITUTE OF ARCHAEOLOGY AND ANTHROPOLOGY. HISTORIC OR CULTURAL RESOURCES CONSIST OF THOSE SITES LISTED IN THE NATIONAL REGISTER OF HISTORIC PLACES AND THOSE SITES THAT ARE ELIGIBLE FOR THE NATIONAL REGISTER. ARCHAEOLOGICAL MATERIALS CONSIST OF ANY ITEMS, FIFTY YEARS OLD OR OLDER, WHICH WERE MADE OR USED BY MAN. THESE ITEMS INCLUDE, BUT ARE NOT LIMITED TO, STONE PROJECTILE POINTS (ARROWHEADS), CERAMIC SHARDS, BRICKS, WORKED WOOD, BONE AND STONE, METAL AND GLASS OBJECTS, AND HUMAN SKELETAL MATERIALS.
2. IF UNANTICIPATED CULTURAL MATERIALS (E.G., LARGE, INTACT ARTIFACTS OR ANIMAL BONES; LARGE CLUSTERS OF ARTIFACTS OR ANIMAL BONES; LARGE SOILS STAINS OR PATTERNS OF SOIL STAINS; BURIED BRICK OR STONE STRUCTURES; CLUSTERS OF BRICK OR STONE) OR HUMAN SKELETAL REMAINS ARE DISCOVERED PRIOR TO OR DURING LAND ALTERING OR CONSTRUCTION ACTIVITIES, THEN THE APPLICANT WILL TEMPORARILY HALT ANY ACTIVITIES AND IMMEDIATELY NOTIFY SCDHEC–OCRM AND THE SHPO OF THE LATE DISCOVERIES.
3. IF HUMAN REMAINS ARE DISCOVERED ALL GROUND DISTURBANCE IN THE AREA WILL HALT IMMEDIATELY AND A 50–FOOT BUFFER WILL BE ESTABLISHED AROUND THE DISCOVERY. THE APPLICANT SHALL NOTIFY THE COUNTY CORONER, SCDHEC–OCRM, THE SHPO, AND THE STATE ARCHAEOLOGIST WITHIN TWO (2) BUSINESS DAYS OF THE DISCOVERY. EACH OF THESE PARTIES HAS TWO (2) BUSINESS DAYS TO RESPOND. THE PARTIES SHALL ATTEMPT TO REACH A CONSENSUS ON THE TREATMENT OF THE HUMAN REMAINS. IF A CONSENSUS IS REACHED, GROUND DISTURBING ACTIVITIES MAY RESUME ONCE THE CONDITIONS OF THE AGREEMENT ARE MET. NO PHOTOGRAPHS ARE TO BE TAKEN OF THE BURIAL, HUMAN REMAINS AND/OR FUNERARY OBJECTS AT ANY TIME. HUMAN REMAINS AND BURIAL GROUNDS ARE ALSO SUBJECT TO SOUTH CAROLINA LAW THAT ADDRESSES ABANDONED CEMETERIES AND BURIALS, INCLUDING BUT NOT LIMITED TO S.C. CODE ANN. §§ 27–43–10 TO 27–43–30, 16–17–600, AND 61–19–29.
4. AGENCY CONTACT INFORMATION IS AS FOLLOWS:
   SCDHEC–OCRM COASTAL ZONE CONSISTENCY: 843–953–0200
   SCDAH STATE HISTORIC PRESERVATION OFFICE (SHPO): 803–896–6196
   SCIAA / STATE ARCHAEOLOGIST: 803–576–6560
   BERKELEY COUNTY CORONER'S OFFICE: 843–719–4566

PROJECT INFORMATION		
DEVELOPMENT DATA		
PROJECT NAME	STEWARD STREET PARK RENOVATIONS	
DEVELOPMENT DESCRIPTION	THE PROJECT INCLUDES: RENOVATIONS TO THE EXISTING BUILDING, ADDITIONS OF NEW RESTROOMS, PARKING AREA AND DOCK, AND NEW UTILITY SERVICES.	
PROJECT OWNER / DEVELOPER	CITY OF HANAHAN	
PROJECT ARCHITECT	GJS ARCHITECTURE 3251 LANDMARK DRIVE SUITE 241 NORTH CHARLESTON, SC 29418 POINT OF CONTACT: ROBERT GERBER, AIA, 843-722-4334	
PROJECT LANDSCAPE ARCHITECT	ADC ENGINEERING, INC. 1226 YEAMANS HALL ROAD HANAHAN, SC 29410 POINT OF CONTACT: WARREN PRUITT 843-566-0161	
PROJECT CIVIL ENGINEER	ADC ENGINEERING, INC. 1226 YEAMANS HALL ROAD HANAHAN, SC 29410 POINT OF CONTACT: CHRIS COOK, P.E. 843-566-0161	
PROPERTY INFORMATION		
TMS	265-08-04-016, 265-08-03-058	
ADDRESS	5920 STEWARD STREET, HANAHAN, SC	
STREET CLASSIFICATION(S)		
STEWARD STREET	LOCAL ROADWAY (S-8-564)	
FLOOD ZONE STATEMENT	FEMA FLOOD INSURANCE RATE MAP 45015C0695E DATED DECEMBER 7, 2018 AND PANEL 45015C0715E DATED DECEMBER 7, 2018 INDICATES THAT THIS PROPERTY IS LOCATED IN FLOOD ZONE AE10 AND SHADED X AS DETERMINED BY SCALING.	
SUBDIVISION STATUS	NOT APPLICABLE	
WETLAND STATUS	DELINEATED-NO IMPACTS	
ZONING INFORMATION		
MUNICIPALITY, ZONING CONTACT	CITY OF HANAHAN, DAVID PIEPER (843-872-7413)	
SITE AREA	4.90 ACRES	
BUILDING AREA	533 SF	
EXISTING ZONING	C-P CONSERVATION/PRESERVATION DISTRICT	
PROPOSED ZONING	NO CHANGE	
ADJACENT ZONING		
NORTH	MARSH	
EAST	RSL	
SOUTH	RSL/CP/MARSH	
WEST	RS/CP	
MAXIMUM HEIGHT	35'	
SETBACKS/BUFFERS		
SETBACKS	REQUIRED	
NORTH (INTERIOR)	25'	
EAST (SIDE)	25'	
SOUTH (FRONT)	25'	
WEST (INTERIOR)	25'	
BUFFERS	REQUIRED	
ALL DIRECTIONS	10'/8'	
UTILITY INFORMATION		
WATER	CHARLESTON WATER SYSTEM	
SANITARY SEWER	BERKELEY COUNTY WATER AND SEWER	
STORM	BERKELEY COUNTY	
ELECTRIC	DOMINION ENERGY	
COMMUNICATIONS		
NATURAL GAS	DOMINION ENERGY	

△2

LIST OF DRAWINGS

SHEET	TITLE	ISSUED	REVISED
C001	CIVIL LEGEND, ABBREVIATIONS & NOTES	5/27/2022	1, 2
C002	TOPOGRAPHIC SURVEY	9/16/2021	
C003	SITE ADA PLAN	5/27/2022	
C004	FIRE PROTECTION PLAN	5/27/2022	
C100	SWPPP PLAN - INITIAL PHASE	5/27/2022	
C101	SWPPP PLAN - INTERMEDIATE PHASE	5/27/2022	
C102	SWPPP PLAN - FINAL PHASE	5/27/2022	
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C620	CIVIL DETAILS - PAVEMENT	5/27/2022	
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C630	CIVIL DETAILS - STORM DRAINAGE	5/27/2022	
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L300	LANDSCAPE PLANTING DETAILS	5/27/2022	
L301	LANDSCAPE SITE DETAILS	5/27/2022	
L302	LANDSCAPE SITE DETAILS	5/27/2022	

REVISIONS:

△1 09/16/22 – PLANS REVISED TO INCORPORATE COMMENTS FROM BERKELEY COUNTY STORMWATER (MS4) AND BCWSA.

△2 05/12/23 – FINAL BIDDING DOCUMENTS.

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

ADC ENGINEERING
1226 YEAMANS HALL ROAD
HANAHAN, SC 29410
843-566-0161
ADCENGINEERING.COM

Know what's below. Call before you dig.

DATE: 5/12/2023
ADC PROJECT #: 20381
DESIGNED: WWP/CBC
CHECKED: CBC
DRAWN: WWP/LOA
REVISION:
1 – 09/16/22 – MS4 & BCWSA COMMENT REVISIONS

CIVIL LEGEND,
ABBREVIATION
& NOTES

C001

100% CONSTRUCTION DOCUMENTS

LINE TABLE		
LINE	DIRECTION	LENGTH
L1	S34° 48' 29"W	9.04
L2	S35° 06' 18"W	5.08
L3	S34° 58' 40"W	46.01
L4	S76° 43' 41"E	12.81
L5	N31° 05' 32"E	1.37
L6	N67° 59' 57"E	5.17
L7	N34° 47' 31"E	0.94
L8	N50° 08' 09"W	1.36
L10	N65° 45' 19"W	33.92
L11	N69° 47' 16"W	4.65
L12	S84° 23' 03"E	13.85
L13	N85° 44' 04"W	13.82
L14	S28° 51' 00"W	18.01
L15	S85° 30' 08"W	10.90
L16	S28° 03' 38"W	24.59
L17	S87° 42' 39"W	3.68
L18	S40° 26' 49"W	4.27
L19	S87° 40' 58"W	12.98
L20	S62° 13' 15"W	4.79
L21	S38° 16' 31"W	11.29
L22	S54° 20' 12"W	5.88
L23	S66° 15' 14"W	42.16

LINE TABLE		
LINE	DIRECTION	LENGTH
L24	S77° 54' 03"W	12.66
L25	S40° 24' 37"W	10.64
L26	S65° 59' 44"W	33.68
L27	S70° 06' 33"W	17.04
L28	S55° 18' 51"W	19.31
L29	N33° 18' 29"E	22.88
L30	N27° 48' 43"E	10.65
L31	N08° 34' 25"W	62.58
L32	S57° 07' 23"W	13.40
L33	S16° 11' 49"W	13.93
L34	S33° 18' 20"W	21.29
L35	N88° 17' 03"W	14.67
L36	S41° 31' 28"E	13.70
L37	S35° 28' 32"W	8.18
L38	S22° 53' 03"W	18.97
L39	S24° 49' 46"W	14.04
L40	S02° 27' 06"W	29.27
L41	S30° 10' 23"W	15.81
L42	N70° 27' 43"W	4.28
L43	S01° 52' 58"W	22.70
L44	S09° 51' 30"E	26.68
L45	S58° 43' 59"E	10.00

LINE TABLE		
LINE	DIRECTION	LENGTH
L46	S55° 50' 32"W	35.44
L47	S55° 19' 25"E	19.83
L48	S15° 32' 07"E	13.97
L49	N87° 15' 48"E	1.86
L50	S25° 09' 08"W	17.47
L51	S16° 03' 21"W	86.65
L52	S15° 15' 27"W	49.41
L53	S12° 17' 17"W	34.34
L54	S23° 28' 26"W	52.74
L55	S54° 20' 24"E	13.17
L56	N67° 58' 22"E	8.41
L57	N40° 48' 34"E	8.48
L58	N29° 59' 31"E	42.14
L59	N24° 59' 47"E	48.37
L60	N08° 24' 57"E	46.00
L61	N11° 21' 38"E	23.26
L62	N16° 38' 15"E	22.63
L63	N05° 18' 01"E	34.54
L64	N80° 04' 57"E	11.13
L65	S47° 41' 35"E	31.33
L66	S54° 19' 52"E	54.20
L67	S16° 29' 01"E	16.18

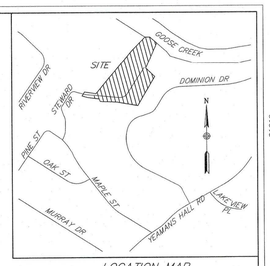
LINE TABLE		
LINE	DIRECTION	LENGTH
L68	S15° 31' 55"W	45.80
L69	S01° 17' 35"E	31.15
L70	S20° 16' 01"W	28.76
L71	S03° 15' 19"W	27.47
L72	S17° 48' 32"W	33.26
L73	S32° 02' 26"W	10.67
L74	N65° 45' 19"W	13.42
L75	N34° 20' 07"W	13.95
L76	N30° 33' 07"E	9.59
L77	N10° 57' 44"W	10.78
L78	N57° 26' 18"W	13.43
L79	S50° 18' 02"W	17.86
L80	S31° 56' 58"W	17.26
L81	S69° 12' 10"W	13.47
L82	S50° 54' 11"W	14.66
L83	N16° 58' 37"E	19.51
L84	N68° 21' 24"W	8.19
L85	S45° 00' 34"W	36.63
L86	S59° 30' 39"W	28.53
L87	S44° 07' 48"W	18.06
L88	S23° 51' 27"W	28.97
L89	S22° 37' 22"W	35.73

LINE TABLE		
LINE	DIRECTION	LENGTH
L90	S02° 08' 37"W	14.64
L91	S62° 42' 01"W	21.24
L92	S35° 24' 36"W	22.38
L93	S47° 48' 11"W	30.50
L94	S37° 55' 42"W	33.20
L95	S68° 26' 59"W	17.21
L96	S33° 50' 25"W	31.99
L97	S37° 22' 50"W	35.91
L98	S50° 48' 40"W	41.49
L99	S43° 35' 15"W	32.92
L100	S52° 17' 49"W	34.49
L101	N85° 43' 11"W	15.25
L102	N06° 27' 49"E	46.42
L103	N16° 02' 18"E	28.63
L104	N07° 48' 00"E	28.40
L105	S09° 03' 34"W	14.60
L106	S48° 23' 47"W	27.55
L107	S26° 50' 21"W	17.19
L108	S08° 54' 18"W	17.35
L109	S42° 41' 05"W	24.68
L110	S00° 09' 03"W	21.68
L111	S21° 20' 36"W	7.53

LINE TABLE		
LINE	DIRECTION	LENGTH
L112	S83° 27' 49"W	16.89
L113	N87° 05' 54"W	36.37
L114	N83° 32' 09"W	19.59
L115	N82° 21' 10"W	31.42
L116	N82° 37' 23"W	38.37
L117	S78° 18' 05"W	35.06
L118	N34° 14' 22"E	9.64
L119	S80° 57' 27"E	28.57
L120	S22° 48' 12"E	7.75
L121	N85° 27' 56"E	8.95
L122	S61° 19' 00"E	19.53
L123	S85° 04' 51"E	27.23
L124	S83° 52' 58"E	41.64
L125	S84° 08' 32"E	34.84
L126	S77° 53' 36"E	7.06

LINETYPE LEGEND

- PROPERTY LINE w/CORNER FOUND AS DESCRIBED
- PROPERTY LINE w/CORNER CALC'D
- RIGHT-OF-WAY LINE
- ADJACENT PROPERTY LINE
- EASEMENT LINE
- NON-WETLAND WATERS w/ TRAVERSE POINT
- WETLAND LINE w/ TRAVERSE POINT
- FENCE LINE
- UNDERGROUND STORM PIPE
- FLOOD LINE
- CONTOUR LINE
- SS — UNDERGROUND SEWER LINE
- GAS — UNDERGROUND GAS LINE
- UGE — UNDERGROUND ELECTRIC LINE
- WTR — UNDERGROUND WATER LINE
- UCC — UNDERGROUND CABLE LINE
- OHP — OVERHEAD POWER LINE
- GV — GAS VALVE
- TP — TELEPHONE PEDESTAL
- WM — WATER METER
- SS — SANITARY SEWER MANHOLE
- CO — CLEAN-OUT
- PP — POWER POLE w/GUY WIRE
- BRIDGE HAZARD SIGN
- FIRE HYDRANT
- LP — LIGHT POLE

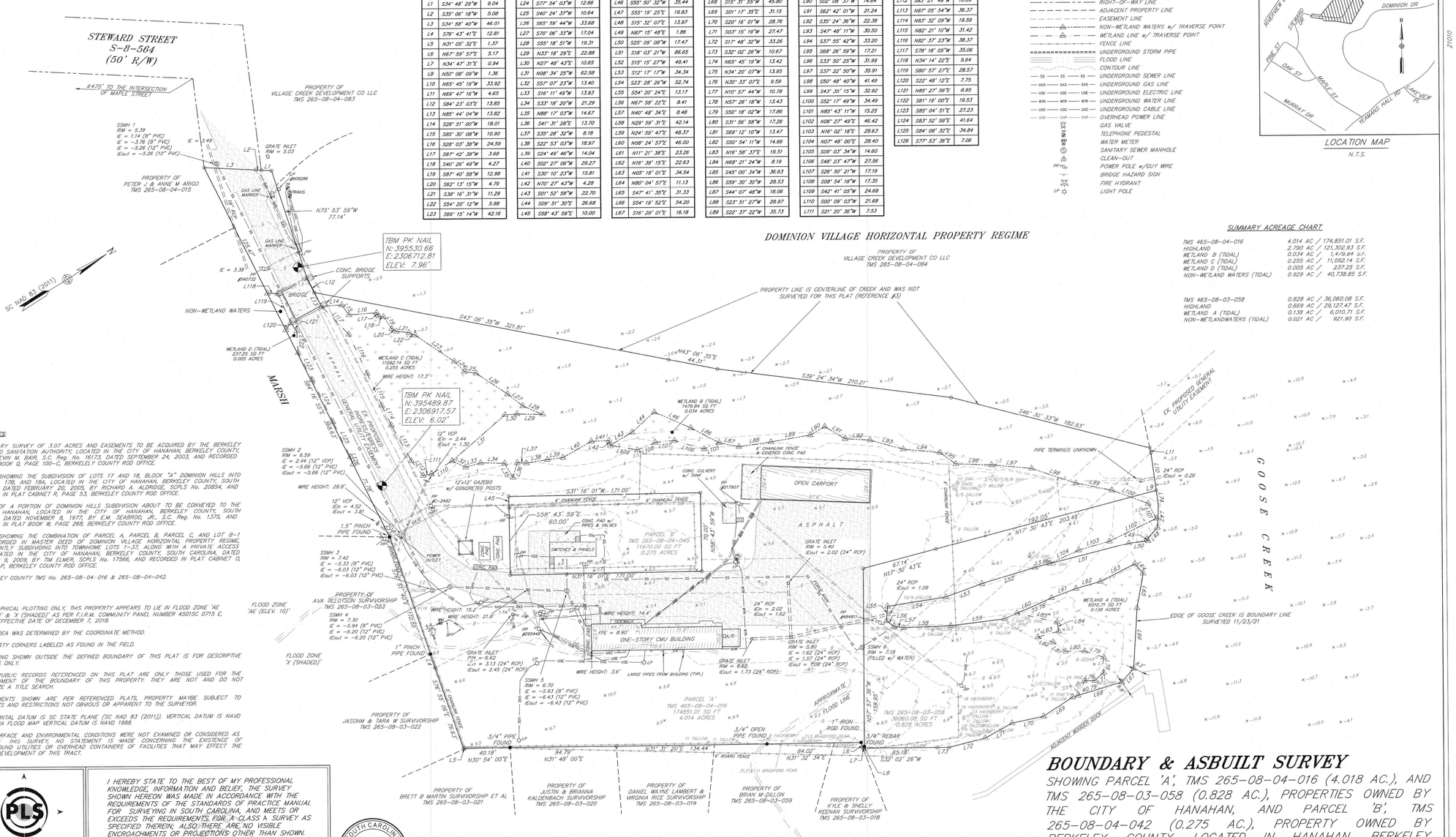


LOCATION MAP

N.T.S.

SUMMARY ACREAGE CHART

TMS 465-08-04-016	4.014 AC / 174,851.01 S.F.
HIGHLAND	2.790 AC / 121,302.93 S.F.
WETLAND B (TIDAL)	0.034 AC / 1,478.84 S.F.
WETLAND C (TIDAL)	0.255 AC / 11,092.14 S.F.
WETLAND D (TIDAL)	0.005 AC / 237.25 S.F.
NON-WETLAND WATERS (TIDAL)	0.929 AC / 40,738.85 S.F.
TMS 465-08-03-058	0.828 AC / 36,060.08 S.F.
HIGHLAND	0.669 AC / 29,127.47 S.F.
WETLAND A (TIDAL)	0.138 AC / 6,010.71 S.F.
NON-WETLANDWATERS (TIDAL)	0.021 AC / 921.90 S.F.



REFERENCES:

1. BOUNDARY SURVEY OF 3.07 ACRES AND EASEMENTS TO BE ACQUIRED BY THE BERKELEY WATER AND SANITATION AUTHORITY, LOCATED IN THE CITY OF HANAHAN, BERKELEY COUNTY, SC, BY KEVIN M. BAIR, S.C. Reg. No. 16173, DATED SEPTEMBER 24, 2003, AND RECORDED ON PLAT BOOK Q, PAGE 100-C, BERKELEY COUNTY ROD OFFICE.

2. PLAT SHOWING THE SUBDIVISION OF LOTS 17 AND 18, BLOCK "A" DOMINION HILLS INTO LOTS 17A, 17B, AND 18A, LOCATED IN THE CITY OF HANAHAN, BERKELEY COUNTY, SOUTH CAROLINA, DATED FEBRUARY 20, 2005, BY RICHARD A. ALDRIDGE, SCPLS No. 20854, AND RECORDED IN PLAT CABINET R, PAGE 53, BERKELEY COUNTY ROD OFFICE.

3. PLAT OF A PORTION OF DOMINION HILLS SUBDIVISION ABOUT TO BE CONVEYED TO THE CITY OF HANAHAN, LOCATED IN THE CITY OF HANAHAN, BERKELEY COUNTY, SOUTH CAROLINA, DATED NOVEMBER 8, 1977, BY E.M. SEABROOD, JR., S.C. Reg. No. 1,375, AND RECORDED IN PLAT BOOK W, PAGE 268, BERKELEY COUNTY ROD OFFICE.

4. PLAT SHOWING THE COMBINATION OF PARCEL A, PARCEL B, PARCEL C, AND LOT B-1 AAS RECORDED IN MASTER DEED OF DOMINION VILLAGE HORIZONTAL PROPERTY REGIME, SUBSEQUENTLY SUBDIVIDING INTO TOWNHOME LOTS 1-37, ALONG WITH A PRIVATE ACCESS WAY, LOCATED IN THE CITY OF HANAHAN, BERKELEY COUNTY, SOUTH CAROLINA, DATED DECEMBER 9, 2009, BY TIM ELMER, SCPLS No. 17566, AND RECORDED IN PLAT CABINET Q, PAGE 53-P, BERKELEY COUNTY ROD OFFICE.

5. BERKELEY COUNTY TMS No. 265-08-04-016 & 265-08-04-042.

NOTES:

1. BY GRAPHICAL PLOTTING ONLY, THIS PROPERTY APPEARS TO LIE IN FLOOD ZONE 'AE (ELEV. 10)' & 'X (SHADED)' AS PER F.I.R.M. COMMUNITY PANEL NUMBER 45015C 0715 E, WITH AN EFFECTIVE DATE OF DECEMBER 7, 2018.

2. THE AREA WAS DETERMINED BY THE COORDINATE METHOD.

3. PROPERTY CORNERS LABELED AS FOUND IN THE FIELD.

4. ANYTHING SHOWN OUTSIDE THE DEFINED BOUNDARY OF THIS PLAT IS FOR DESCRIPTIVE PURPOSES ONLY.

5. THE PUBLIC RECORDS REFERENCED ON THIS PLAT ARE ONLY THOSE USED FOR THE ESTABLISHMENT OF THE BOUNDARY OF THIS PROPERTY. THEY ARE NOT AND DO NOT CONSTITUTE A TITLE SEARCH.

6. EASEMENTS SHOWN ARE PER REFERENCED PLATS, PROPERTY MAYBE SUBJECT TO EASEMENTS AND RESTRICTIONS NOT OBVIOUS OR APPARENT TO THE SURVEYOR.

7. HORIZONTAL DATUM IS SC STATE PLANE (SC NAD 83 (2011)), VERTICAL DATUM IS NAVD 1988. FEMA FLOOD MAP VERTICAL DATUM IS NAVD 1988.

8. SUBSURFACE AND ENVIRONMENTAL CONDITIONS WERE NOT EXAMINED OR CONSIDERED AS PART OF THIS SURVEY. NO STATEMENT IS MADE CONCERNING THE EXISTENCE OF UNDERGROUND UTILITIES OR OVERHEAD CONTAINERS OF FACILITIES THAT MAY EFFECT THE USE OR DEVELOPMENT OF THIS TRACT.

Parker Land Surveying, LLC
5910 Griffin Street
Hanahan, SC 29410
Phone: (843) 554-7777
Fax: (843) 554-7779

I HEREBY STATE TO THE BEST OF MY PROFESSIONAL KNOWLEDGE, INFORMATION AND BELIEF, THE SURVEY SHOWN HEREON WAS MADE IN ACCORDANCE WITH THE REQUIREMENTS OF THE STANDARDS OF PRACTICE MANUAL FOR SURVEYING IN SOUTH CAROLINA, AND MEETS OR EXCEEDS THE REQUIREMENTS FOR A CLASS A SURVEY AS SPECIFIED THEREIN; ALSO THERE ARE NO VISIBLE ENCROACHMENTS OR PROJECTIONS OTHER THAN SHOWN.

SOUTH CAROLINA PROFESSIONAL ENGINEER No. 5933 Tier B — ANDREW C. GILLETTE

9/30/2021

ANDREW C. GILLETTE P.L.S. 5933-B

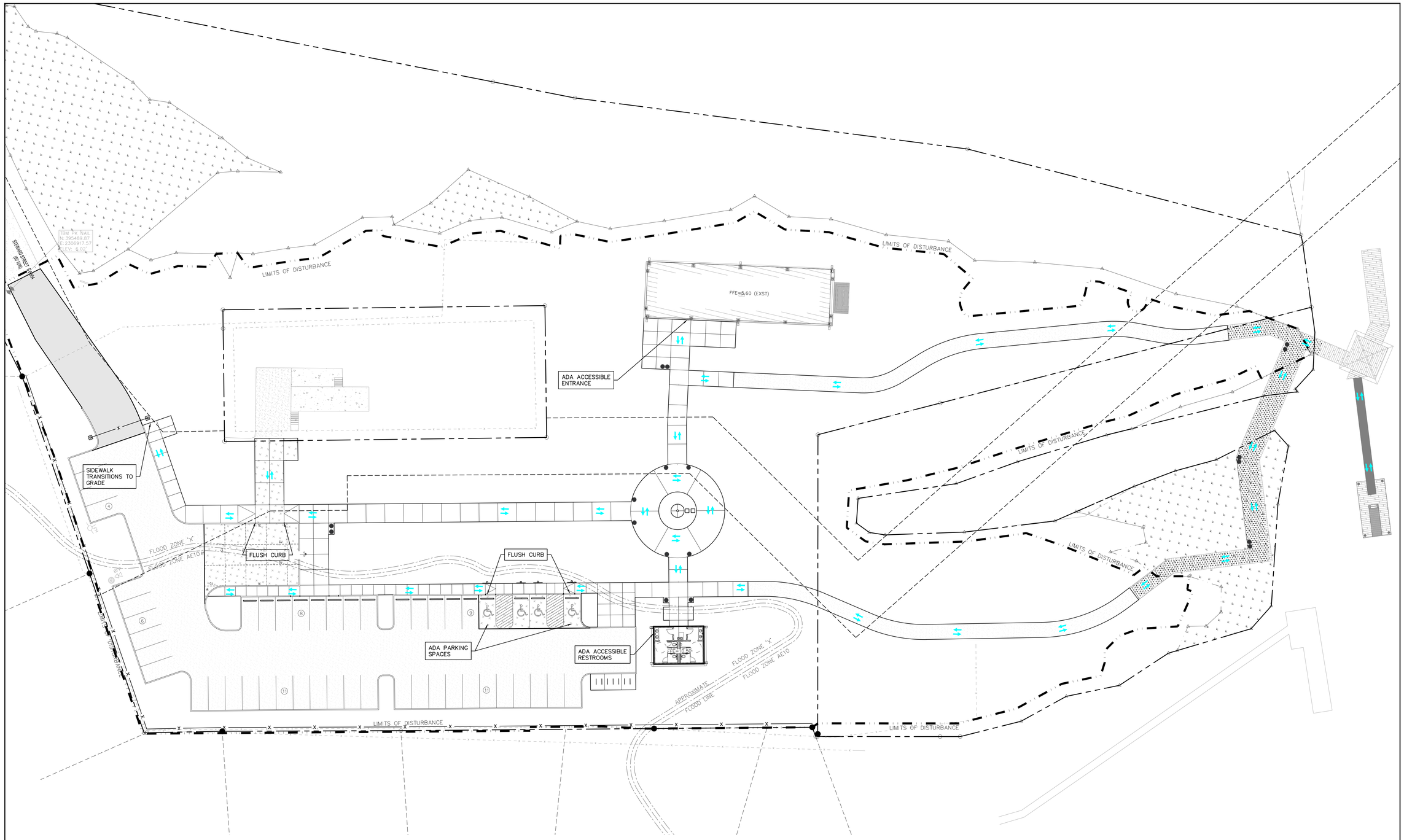
SOUTH CAROLINA PARKER LAND SURVEYING, LLC No. 3814 CERTIFICATE OF AUTHORIZATION

BOUNDARY & ASBUILT SURVEY

SHOWING PARCEL 'A', TMS 265-08-04-016 (4.018 AC.), AND TMS 265-08-03-058 (0.828 AC.), PROPERTIES OWNED BY THE CITY OF HANAHAN, AND PARCEL 'B', TMS 265-08-04-042 (0.275 AC.), PROPERTY OWNED BY BERKELEY COUNTY, LOCATED IN HANAHAN, BERKELEY COUNTY, SOUTH CAROLINA

DATE: FEBRUARY 17, 2021 SCALE: 1" = 40'

JOB NO. 21010 EAR



GENERAL NOTES:

1. SEE SHEET C001 FOR CIVIL NOTES AND ABBREVIATIONS.
2. CONTRACTOR IS RESPONSIBLE FOR ALL WORK SHOWN, UNLESS SPECIFICALLY INDICATED OTHERWISE.
3. CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING TO DETERMINE THE EXTENT OF THE PROJECT.
4. CONTRACTOR SHALL CONTACT PALMETTO UTILITY LOCATION SERVICE AT 1-888-721-7877 PRIOR TO ANY WORK. CONTRACTOR IS RESPONSIBLE FOR FIELD LOCATING AND PROTECTING ALL UTILITIES. CONTACT THE ENGINEER IN THE EVENT THAT UTILITIES CONFLICT WITH NEW FACILITIES.
5. ALL PROJECT STAKEOUT SHALL BE PERFORMED BY A REGISTERED LAND SURVEYOR TO BE PAID FOR BY THE CONTRACTOR. FOR STAKEOUT, DO NOT RELY SOLELY ON THE PHYSICAL SCALE AS SHOWN IN DRAWINGS. REFER TO THE GIVEN DIMENSIONS, SYMBOL LEGEND, KEYNOTES, AND REFERENCED DETAILS FOR CORRECT STAKEOUT.
6. ALL CONTRACTORS/SUBCONTRACTORS/PERSON THAT WILL BE ENGAGED IN LAND DISTURBING ACTIVITIES SHALL COMPLY WITH ALL EROSION CONTROL AND STORMWATER POLLUTION PREVENTION REQUIREMENTS CONTAINED THROUGHOUT THE DRAWINGS, SPECIFICATIONS AND PERMITS.
7. ALL TRAFFIC CONTROL DEVICES MUST MEET MUTCD STANDARDS.
8. ALL EXITS AND INTERSECTIONS MUST BE MAINTAINED IAW SCDOT'S ACCESS AND ROADSIDE MANAGEMENT STANDARDS MANUAL.
9. SLOPES IN HANDICAP ACCESSIBLE AREAS SHALL NOT EXCEED 1/4" PER 1'.

LEGEND:

NEW ADA SIDEWALK

ACCESSIBLE ROUTE ARROW

NEW ADA RAMP

HORIZONTAL SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

100% CONSTRUCTION DOCUMENTS

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

SOUTH CAROLINA PROFESSIONAL ENGINEER
ADC ENGINEERING INC
No. 00253

SOUTH CAROLINA PROFESSIONAL ENGINEER
No. 14557
CHRISTOPHER B. COX

CITY OF HANAHAN SOUTH CAROLINA

ADC ENGINEERING
1226 YEAMANS HALL ROAD
HANAHAN, SC 29410
843-566-0161
ADCENGINEERING.COM

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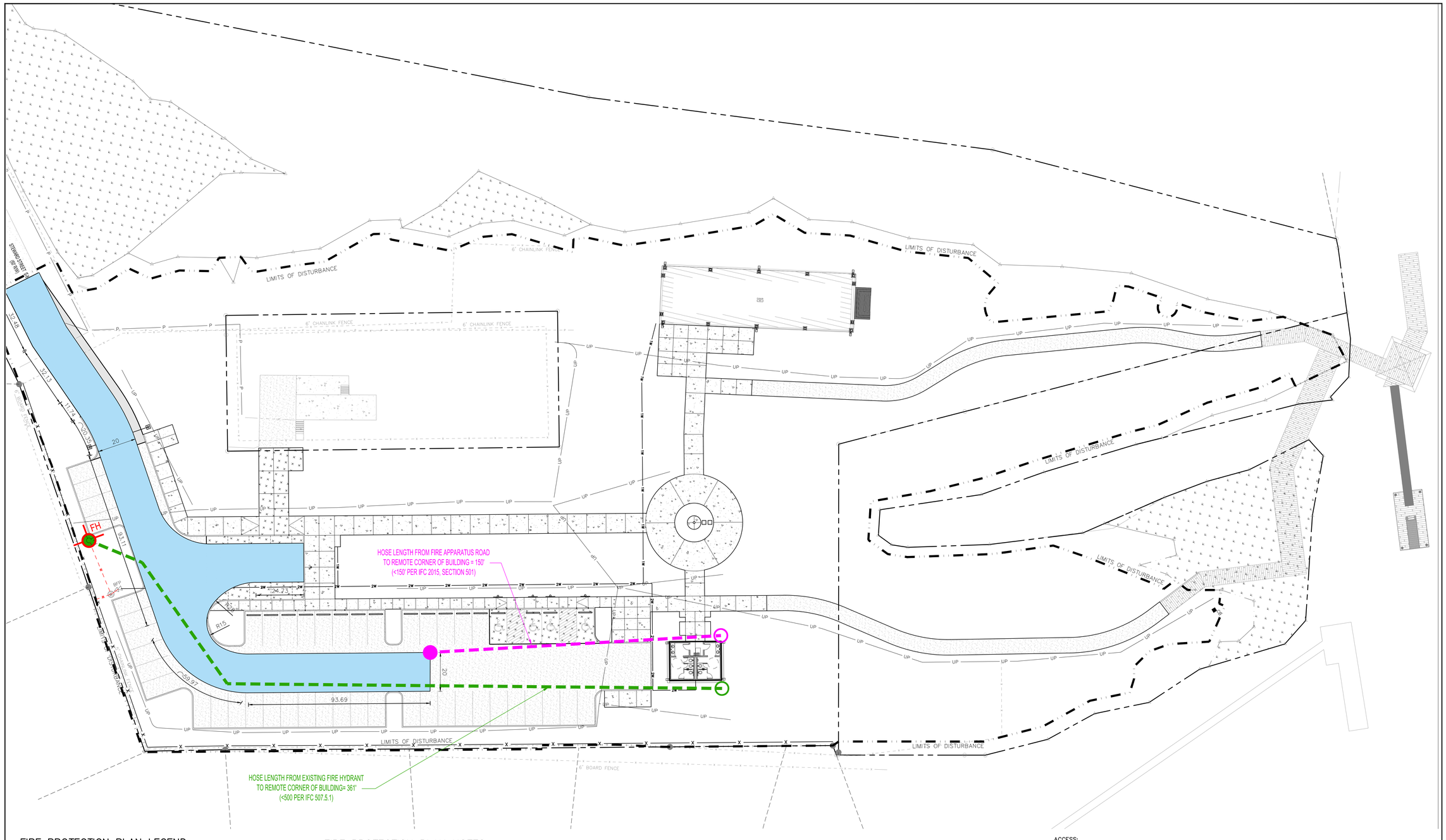
DATE:	5/12/2023
ADC PROJECT #:	20381
DESIGNED:	WWP/CBC
CHECKED:	CBC
DRAWN:	WWP/LOA
REVISION:	

SITE ADA PLAN

C003



FIRE PROTECTION PLAN LEGEND:

- EXISTING FIRE HYDRANT
- PROPOSED WATER LINE & SIZE
- EXISTING WATER LINE
- HOSE LINE ROUTE FROM A HYDRANT (START – END)
- HOSE LINE ROUTE FROM FIRE APPARATUS ACCESS ROAD (START – END)
- FIRE APPARATUS ACCESS ROAD

HYDRANT FLOW TEST	
DATE	12/22/2020
PERSONNEL	BEASLEY/GAILLARD
TEST HYDRANT	05-803-0209
FLOW HYDRANT	05-803-0028
STATIC PRESSURE	93 PSI
RESIDUAL PRESSURE	56 PSI
FLOW RATE	1384 GPM
FLOW @ 17 PSI	692 GPM

FIRE TRUCK AERIAL

	FEET
WIDTH	: 8.00
TRACK	: 8.00
LOCK TO LOCK TIME	: 6.0
STEERING ANGLE	: 40.0

FIRE PROTECTION PLAN NOTES:

BUILDING INFORMATION:

1. CONSTRUCTION TYPE II–B

   TOTAL AREA = 533 SF
   –1ST FLOOR = 533 SF

   1 STORIES ABOVE GRADE

   0 STORIES BELOW GRADE

   ROOF HEIGHT ABOVE FINISHED FLOOR = 12' TO TALLEST PARAPET

THE BUILDING WILL NOT INCLUDE AN AUTOMATIC SPRINKLER SYSTEM.

2. NO FIRE WALLS WITHOUT OPENINGS ARE PROPOSED WITHIN THE NEW BUILDING.

HYDRANTS:

1. ONE EXISTING PUBLIC FIRE HYDRANT IS SHOWN ON THIS PLAN IN THE VICINITY OF THE BUILDING.

   HOSE LINE DISTANCE FROM A HYDRANT TO ALL POINTS ON THE BUILDING IS LESS THAN 600' IAW IFC 2018, SECTION 507.5.1, EXCEPTION 2.

2. AN EXISTING 6" PUBLIC MAIN FEEDS THE EXISTING HYDRANT IN THE AREA.

3. AVAILABLE FIRE FLOW:

   BASED ON A FIRE HYDRANT FLOW TEST PERFORMED BY CHARLESTON WATER SYSTEM ON **DECEMBER 22, 2020** WITH THE FOLLOWING RESULTS.

   - TEST HYDRANT = ACROSS WEST AVENUE FROM PROJECT DRIVEWAY
   - STATIC PRESSURE = 93 PSI
   - RESIDUAL PRESSURE = 56 PSI
   - FLOW AT RESIDUAL = 1384 GPM
   - CALCULATED Q20 = 1997 GPM

4. REQUIRED FIRE FLOW IAW IFC 2018, **APPX "B":**

   533 SF BUILDING AREA
   CONSTRUCTION TYPE II–B
   REQUIRED FLOW = 1500 GPM FOR 2 HOURS
   (IAW TABLE B105.1(2))

5. THERE ARE NO NEW FIRE HYDRANTS ASSOCIATED WITH THIS PROJECT.

ACCESS:

1. EXISTING AND PROPOSED FIRE APPARATUS ACCESS ROADS ARE SHOWN ON THIS PLAN. ROAD DIMENSIONS ARE IAW IFC 2018, SECTION 503.2.1.

2. FIRE APPARATUS ACCESS ROADS ARE SHOWN AND THE FIRE PERSONNEL PATH TO THE MOST REMOTE POINTS ON THE BUILDING ARE SHOWN.

   HOSE LINE DISTANCES FROM A FIRE APPARATUS ACCESS ROAD TO ALL PORTIONS OF THE FACILITY AND ALL PORTIONS OF THE EXTERIOR WALLS OF THE FIRST STORY OF THE BUILDING ARE REQUIRED TO BE LESS THAN 150' IAW IFC 2018, SECTION 503.1.1.

3. FIRE APPARATUS ACCESS ROADS ARE EITHER EXISTING PAVED PUBLIC STREETS OR PROPOSED PAVED DRIVES ASSOCIATED WITH THE PROJECT.

4. THERE ARE NO SIGNIFICANT GRADE CHANGES ALONG THE FIRE APPARATUS ACCESS ROADS.

5. THERE ARE NO DEAD END FIRE APPARATUS ACCESS ROADS GREATER THAN 150' IN LENGTH, THEREFORE NO FIRE TRUCK TURN–AROUNDS ARE REQUIRED IAW IFC 2018, SECTION 503.2.5.

6. NO FIRE LANE STRIPING OR SIGNAGE IS ANTICIPATED.

KEY BOX:

7. NOT REQUIRED

HORIZONTAL SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

100% CONSTRUCTION DOCUMENTS

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

SOUTH CAROLINA ADC ENGINEERING INC. No. 00253

SOUTH CAROLINA No. 14557 CHRISTOPHER B. COX

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ADC ENGINEERING
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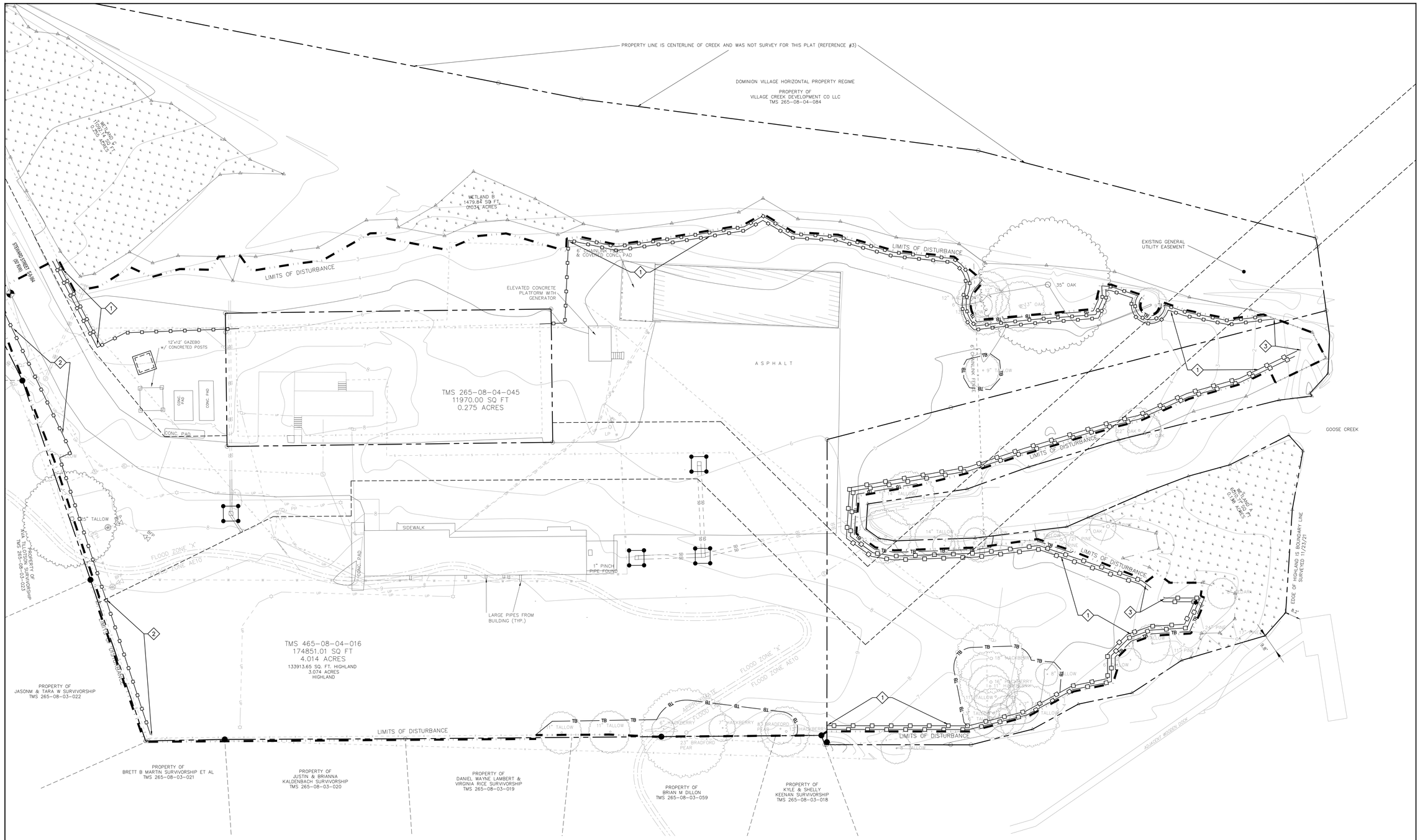
DRAWN:	WWP/LOA
REVISION:	

FIRE PROTECTION PLAN

C004



GENERAL NOTES:

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CIVIL LEGEND – EROSION CONTROL

- (TS) TEMPORARY SEEDING – INSTALL IAW DETAIL A/C611.
- (PS) PERMANENT SEEDING – INSTALL IAW DETAIL A/C611.
- (LA) LANDSCAPING – INSTALL IAW LANDSCAPING DRAWINGS.
- SILT FENCE – INSTALL IAW DETAIL B/C610.
- TB TREE BARRICADE – INSTALL IAW DETAIL D/C610.
- INLET PROTECTION – INSTALL IAW DETAIL C/C611.
- CW CONCRETE WASHOUT – INSTALL IAW DETAIL D/C611.

KEYNOTES: ◇

1. INSTALL DOUBLE-ROW SILT FENCE TO PROTECT ADJACENT WATERS/WETLANDS.
2. INSTALL SINGLE-ROW SILT FENCE.
3. CORRIDINATE OPENING IN SLIT FENCE WITH THE CONSTRUCTION OF THE BOARDWALK/WALKWAY. IF NECESSARY INSTALL DOUBLE-ROW OF SILT FENCE UNTIL BOARDWALK CONSTRUCTION BEGINS.

INITIAL PHASE LAND DISTURBANCE/SWPPP SEQUENCE OF CONSTRUCTION NOTES:

1. PRIOR TO ANY LAND DISTURBANCE ACTIVITY CONDUCT A SWPPP PRE-CONSTRUCTION CONFERENCE. GENERAL CONTRACTOR SHALL SCHEDULE AND CONDUCT SWPPP PRE-CONSTRUCTION MEETING WITH SWPPP PREPARING ENGINEER, BERKELEY COUNTY, SCDHEC, OWNER AND ALL LAND DISTURBING CONTRACTORS BEFORE PROCEEDING WITH CONSTRUCTION.
2. STAKE OUT CLEARING LIMITS, WETLAND BUFFER ZONES AND TREE PROTECTION AREAS.
3. CONDUCT LIMITED CLEARING, TIMBERING AND DEMOLITION AS REQUIRED TO INSTALL PERIMETER BEST MANAGEMENT PRACTICES AND CONSTRUCTION ENTRANCE.
4. INSTALL SWPPP SIGN, TREE BARRICADES, SILT FENCE, SILT FENCE OUTLETS, INLET PROTECTION AND CONSTRUCTION ENTRANCE AS SHOWN ON THE PLANS.
5. STOP AND GET SITE INSPECTED/CERTIFIED.
6. CONSTRUCT LIMITED PERMANENT STORM DRAINAGE, AND CONTRACTOR AREAS WHERE INDICATED ON THE PLANS.
7. STABILIZE SLOPES WITH JUTE AND TEMPORARY SEEDING IMMEDIATELY IAW DETAILS. VERIFY REQUIREMENTS WITH DETAILS AND SPECIFICATIONS.
8. TEMPORARILY SEED OTHER DISTURBED AREAS IAW THE PLANS AND THE CONSTRUCTION GENERAL PERMIT.
9. MAINTAIN BEST MANAGEMENT PRACTICES THROUGHOUT CONSTRUCTION.
10. COMPLETE INSPECTION REPORTS IAW THE CONSTRUCTION GENERAL PERMIT.

HORIZONTAL SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

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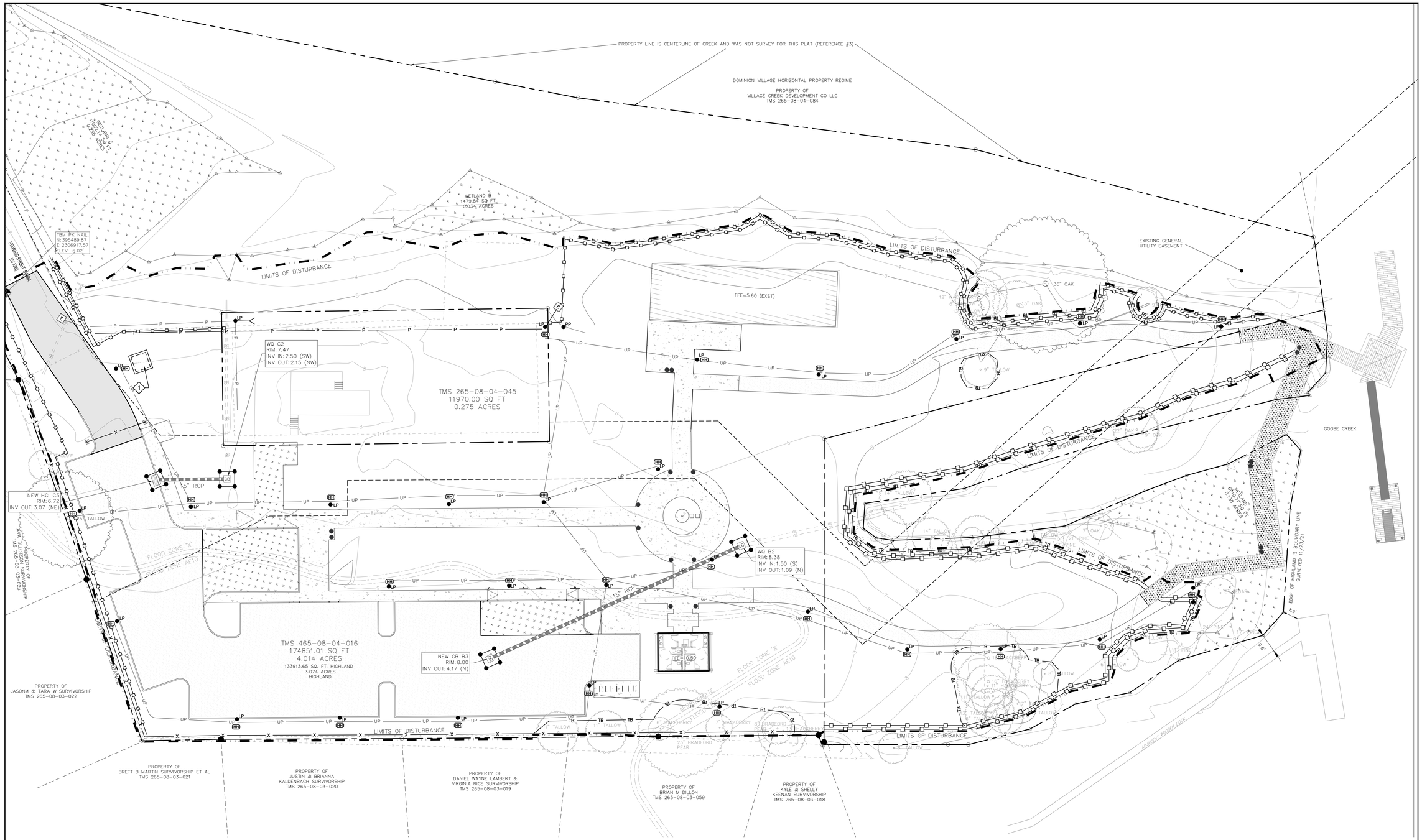
DRAWN:	WWP/LOA
REVISION:	

SWPPP PLAN - INITIAL PHASE

C100

100% CONSTRUCTION DOCUMENTS



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- (PS) PERMANENT SEEDING – INSTALL IAW DETAIL A/C611.
- (LA) LANDSCAPING – INSTALL IAW LANDSCAPING DRAWINGS.
- SILT FENCE – INSTALL IAW DETAIL B/C610.
- —TB— TREE BARRICADE – INSTALL IAW DETAIL D/C610.
- INLET PROTECTION – INSTALL IAW DETAIL C/C611.
- (CW) CONCRETE WASHOUT – INSTALL IAW DETAIL D/C611.

KEYNOTES: ◇

1. INSTALL CONCRETE WASHOUT PRIOR TO DELIVERY OF ANY CONCRETE TO THE PROJECT SITE.

INTERMEDIATE PHASE LAND DISTURBANCE/SWPPP SEQUENCE OF CONSTRUCTION NOTES:

1. INSTALL REMAINING SILT FENCE, SILT FENCE OUTLETS, AS SHOWN ON THE PLANS.
2. STABILIZE SLOPES WITH JUTE AND TEMPORARY SEEDING IMMEDIATELY IAW DETAILS.
3. CONDUCT MASS GRADING AS SHOWN.
4. ADJUST AND STABILIZE SILT FENCE, SILT FENCE OUTLETS AS SITE IS BROUGHT TO ROUGH GRADE.
5. INSTALL BUILDING PADS AND PAVED AREAS AS SHOWN.
6. INSTALL CONCRETE WASH OUT AREA.
7. BEGIN BUILDING AND PAVEMENT CONSTRUCTION.
8. INSTALL NEW STORM DRAIN PIPES AND STRUCTURES. DO NOT INSTALL INTERIOR COMPONENTS OF THE WATER QUAILITY DEVICES UNTIL FINAL PHASE.
9. TEMPORARILY SEED DISTURBED AREAS IAW THE PLANS, DETAILS AND THE CONSTRUCTION GENERAL PERMIT.
10. MAINTAIN BEST MANAGEMENT PRACTICES THROUGH OUT CONSTRUCTION.
11. COMPLETE INSPECTION REPORTS IAW CONSTRUCTION GENERAL PERMIT.

HORIZONTAL SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

100% CONSTRUCTION DOCUMENTS

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

SOUTH CAROLINA PROFESSIONAL ENGINEERING ADC ENGINEERING INC No. 00253

SOUTH CAROLINA PROFESSIONAL ENGINEER No. 14557 CHRISTOPHER B. COX

CITY OF HANAHAN SOUTH CAROLINA

ADC ENGINEERING
1226 YEAMANS HALL ROAD
HANAHAN, SC 29410
843-566-0161
ADCENGINEERING.COM

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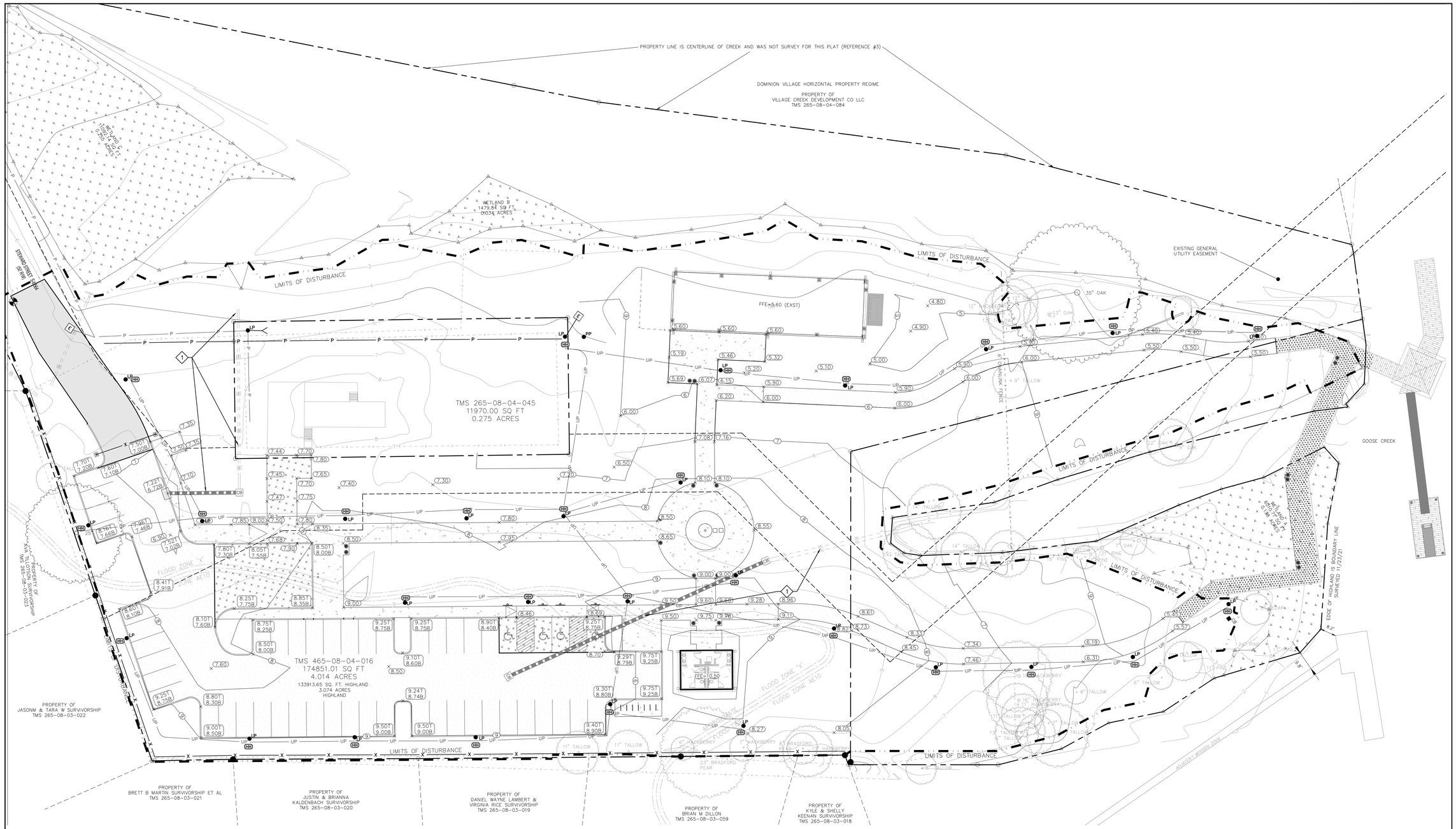
DATE:	5/12/2023
ADC PROJECT #:	20381
DESIGNED:	WWP/CBC
CHECKED:	CBC
DRAWN:	WWP/LOA
REVISION:	

SWPPP PLAN - INTERMEDIATE PHASE

C101



GENERAL NOTES:

1. SEE SHEET C001 FOR CIVIL NOTES AND ABBREVIATIONS.
2. CONTRACTOR IS RESPONSIBLE FOR ALL WORK SHOWN, UNLESS SPECIFICALLY INDICATED OTHERWISE.
3. CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING TO DETERMINE THE EXTENT OF THE PROJECT.
4. CONTRACTOR SHALL CONTACT PALMETTO UTILITY LOCATION SERVICE AT 1-888-721-7877 PRIOR TO ANY WORK. CONTRACTOR IS RESPONSIBLE FOR FIELD LOCATING AND PROTECTING ALL UTILITIES. CONTACT THE ENGINEER IN THE EVENT THAT UTILITIES CONFLICT WITH NEW FACILITIES.
5. ALL PROJECT STAKEOUT SHALL BE PERFORMED BY A REGISTERED LAND SURVEYOR TO BE PAID FOR BY THE CONTRACTOR. FOR STAKEOUT, DO NOT RELY SOLELY ON THE PHYSICAL SCALE AS SHOWN IN DRAWINGS. REFER TO THE GIVEN DIMENSIONS, SYMBOL LEGEND, KEYNOTES, AND REFERENCED DETAILS FOR CORRECT STAKEOUT.
6. ALL CONTRACTORS/SUBCONTRACTORS/PERSON THAT WILL BE ENGAGED IN LAND DISTURBING ACTIVITIES SHALL COMPLY WITH ALL EROSION CONTROL AND STORMWATER POLLUTION PREVENTION REQUIREMENTS CONTAINED THROUGHOUT THE DRAWINGS, SPECIFICATIONS AND PERMITS.

CIVIL LEGEND – EROSION CONTROL

- (TS) TEMPORARY SEEDING – INSTALL IAW DETAIL A/C611.
- (PS) PERMANENT SEEDING – INSTALL IAW DETAIL A/C611.
- (LA) LANDSCAPING – INSTALL IAW LANDSCAPING DRAWINGS.
- SILT FENCE – INSTALL IAW DETAIL B/C610.
- TB TREE BARRICADE – INSTALL IAW DETAIL D/C610.
- INLET PROTECTION – INSTALL IAW DETAIL C/C611.
- CONCRETE WASHOUT – INSTALL IAW DETAIL D/C611.

KEYNOTES: ◇

1. CONTECTOR IS REQUIRED TO CLEAN AND REMOVE SEDIMENT/SILT/DIRT FROM NEW AND EXISTING STORM DRAIN PIPES.

FINAL PHASE LAND DISTURBANCE/SWPPP SEQUENCE OF CONSTRUCTION NOTES:

1. GRADE SITE TO ELEVATIONS SHOWN ON PLAN. SEE GRADING PLANS FOR SPOT ELEVATIONS.
2. INSTALL INLET PROTECTION AS STRUCTURES ARE COMPLETED.
3. INSTALL/COORDINATE REMAINING UTILITIES.
4. PREPARE SITE FOR PAVING.
5. INSTALL CURBS, SIDEWALKS AND PAVE SITE.
6. INSTALL APPROPRIATE INLET PROTECTION DEVICES FOR PAVED AREAS AS WORK PROGRESSES.
7. COMPLETE REMAINING GRADING.
8. PERMANENTLY STABILIZE DISTURBED AREAS IAW LANDSCAPE PLAN AND DETAILS.
9. MAINTAIN BEST MANAGEMENT PRACTICES THROUGHOUT CONSTRUCTION.
15. CLEAN ALL STORM PIPES AND BOXES.
16. INSTALL INTERIOR COMPONENTS FOR THE WATER QUAILITY DEVICES.
17. PREPARE THE STORMWATER AS-BUILTS AS INDICATED ON SHEET C610. SCHEDULE AN ONSITE INSPECTION WITH BERKELEY COUNTY AND THE ENGINEER AFTER THE SITE IS FULLY STABILIZED.
18. REMOVE ALL REMAINING TEMPORARY EROSION AND SEDIMENT CONTROL DEVICES AFTER APPROVAL OF THE ENGINEER AND STABILIZE ANY AREAS DISTURBED BY THE REMOVAL OF THE BEST MANAGEMENT PRACTICES.
19. CONTINUE INSPECTION REPORTS IAW CONSTRUCTION GENERAL PERMIT UNTIL THE SITE IS FULLY STABILIZED AND THE PERMIT MAY BE TERMINATED.

HORIZONTAL SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

100% CONSTRUCTION DOCUMENTS

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

ADC ENGINEERING INC. No. 00253

No. 14557 CHRISTOPHER B. COX

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HANAHAN, SC 29410
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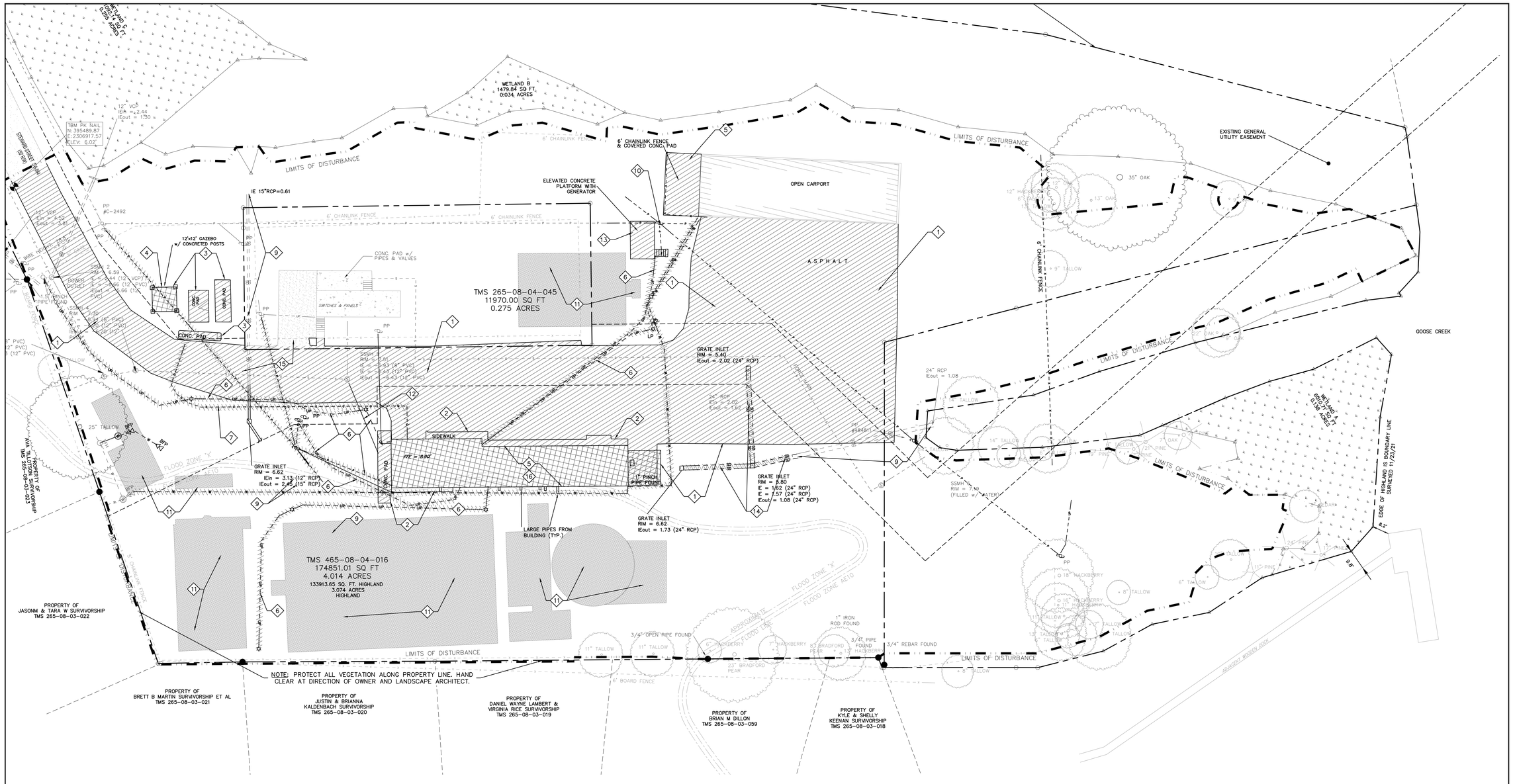
REVISION:	

SWPPP PLAN - FINAL PHASE

C102



NOTE: PROTECT ALL VEGETATION ALONG PROPERTY LINE. HAND CLEAR AT DIRECTION OF OWNER AND LANDSCAPE ARCHITECT.

GENERAL NOTES:

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5. ALL CONTRACTORS/SUBCONTRACTORS/PERSON THAT WILL BE ENGAGED IN LAND DISTURBING ACTIVITIES SHALL COMPLY WITH ALL EROSION CONTROL AND STORMWATER POLLUTION PREVENTION REQUIREMENTS CONTAINED THROUGHOUT THE DRAWINGS, SPECIFICATIONS AND PERMITS.

KEYNOTES: ◇

1. DEMOLISH ASPHALT PAVEMENT.
2. DEMOLISH CONCRETE SIDEWALK.
3. DEMOLISH CONCRETE PAD.
4. GAZEBO PREVIOUSLY REMOVED BY OTHERS.
5. DEMOLISH BUILDING TO INCLUDE ALL FOUNDATIONS AND ABANDONNED UTILITIES.
6. DEMOLISH EXISTING UNDERGROUND ELECTRIC LINE AND OVERHEAD ELECTRIC LINE TO LOCATION SHOWN.
7. DEMOLISH EXISTING GAS LINE TO LOCATION SHOWN.
8. NOT USED.
9. CLEAN AND REMOVE ALL SAND/SILT/DEBRIS FROM THE EXISTING STORM DRAIN PIPES..
10. RELOCATE EXISTING POWER POLE. SEE SHEET C400 FOR LOCATION.
11. BCWS OLD SEWER TREATMENT FOUNDATIONS THAT WERE DEMOLISHED TO 18" BELOW GRADE. FOUNDATIONS MAY STILL EXIST BELOW 18".
12. PLUG AND ABANDON IN PLACE THE EXISTING SEWER SERVICE.
13. DEMOLISH ELEVATED CONCRETE PLATFORM. GENERATOR TO BE REMOVED BY OTHERS.
14. DEMOLISH EXISTING STORM DRAIN PIPES FOR INSTALLATION OF NEW STORM DRAIN STRUCTURES AND PIPES.
15. MAINTAIN BCWS VEHICULAR ACCESS FROM STEWARD STREET TO EXISTING LIFT STATION GATE AT ALL TIMES.
16. VERTICAL PORTION OF BUILDING HAS BEEN REMOVED BY OTHERS. CONTRACTOR SHALL VISIT PROJECT SITE TO DETERMINE EXTENT OF DEMOLITION REQUIRED.

EXISTING SITE LEGEND

W WV	WATER LINE W/ VALVE	SIZE/TYPE	EXISTING TREE
S	SANITARY SEWER PIPE		POWER POLE, GUY WIRE
FM	FORCE MAIN	E	ELECTRICAL BOX
SD	STORM DRAIN		LIGHT POLE
P	POWER LINE (OVERHEAD)	S	SANITARY MANHOLE
UP	POWER LINE (UNDERGROUND)	CB	CATCH BASIN
G	GAS LINE	FH	FIRE HYDRANT
		BFP	BACKFLOW PREVENTER
		W	WATER METER
		AC	AIR CONDITION UNIT
		G	GAS METER
		X	FENCE
			SIGN
		24	CONTOUR
		x23.45	SPOT ELEVATION
			PROPERTY LINE
			LIMITS OF CONSTRUCTION/DISTURBANCE

EXISTING DEMO LEGEND

	ITEMS TO BE DEMOLISHED
	BUILDING TO BE DEMOLISHED

HORIZONTAL SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

100% CONSTRUCTION DOCUMENTS

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

ADC ENGINEERING INC. No. 00253

No. 14551 CHRISTOPHER B. COOK

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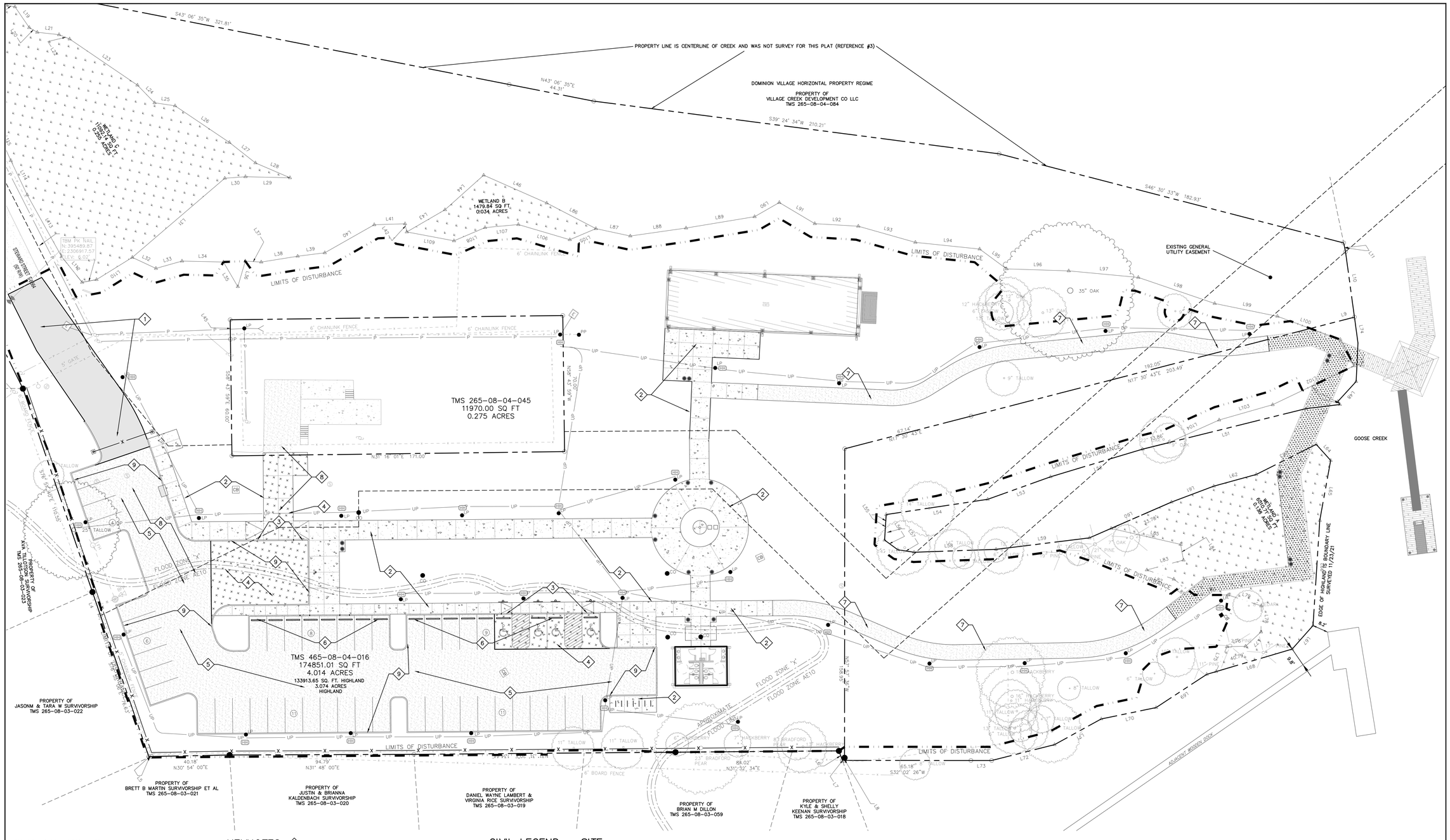
EXISTING SITE & DEMOLITION PLAN

C110



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KEYNOTES: ◇

1. INSTALL ASPHALT PAVEMENT TO LIMITS SHOWN IAW DETAIL B/C620.
2. INSTALL CONCRETE SIDEWALK TO LIMITS SHOWN IAW DETAIL F/C620.
3. TRANSITION SIDEWALK CURB TO FLUSH CURB IAW DETAIL C/C620.
4. INSTALL HEAVY DUTY CONCRETE PAVEMENT TO LIMITS SHOWN IAW DETAIL E/C620.
5. INSTALL PLANTATION MIX PARKING LOT IAW DETAIL A/C620.
6. INSTALL WHEEL STOPS IAW DETAIL G/C620.
7. INSTALL PLANTATION MIX SIDEWALK IAW LANDSCAPE PLANS.
8. MAINTAIN BCWS VEHICULAR ACCESS TO EXISTING LIFT STATION AT ALL TIMES.
9. INSTALL CONCRETE CURB & GUTTER IAW DETAIL C/C620.

CIVIL LEGEND – SITE

- STANDARD DUTY ASPHALT PAVEMENT – INSTALL IAW DETAIL B/C620.
- CONCRETE PAVEMENT/SIDEWALK – INSTALL IAW DETAIL F/C620.
- HEAVY DUTY CONCRETE PAVEMENT/SIDEWALK – INSTALL IAW DETAIL E/C620.
- PLANTATION MIX PAVEMENT/SIDEWALK – INSTALL IAW DETAIL A/C620.
- CJ — CONTRACTION JOINT – INSTALL IAW DETAIL H/C620.
- EJ — EXPANSION JOINT – INSTALL IAW DETAIL H/C620.
- TE — THICKENED EDGE – INSTALL IAW DETAIL H/C620.
- ACCESSIBLE PARKING SPACE AND AISLE – IAW DETAIL B/C621.
- SIDEWALK RAMP – INSTALL IAW DETAIL A/C621.
- SWSL/4" — SINGLE WHITE SOLID LINE / 4" WIDE
- (25) — PARKING SPACES – STRIPE WITH 4" SINGLE WHITE SOLID LINE
- NEW TRAFFIC SIGN – INSTALL PER PLAN AND IAW DETAILS E/C621 & F/C621.
- LIMITS OF CONSTRUCTION/LIMITS OF DISTURBANCE

HORIZONTAL SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

100% CONSTRUCTION DOCUMENTS

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Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

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CHRISTOPHER B. COX
5/12/23

CITY OF HANAHAN SOUTH CAROLINA

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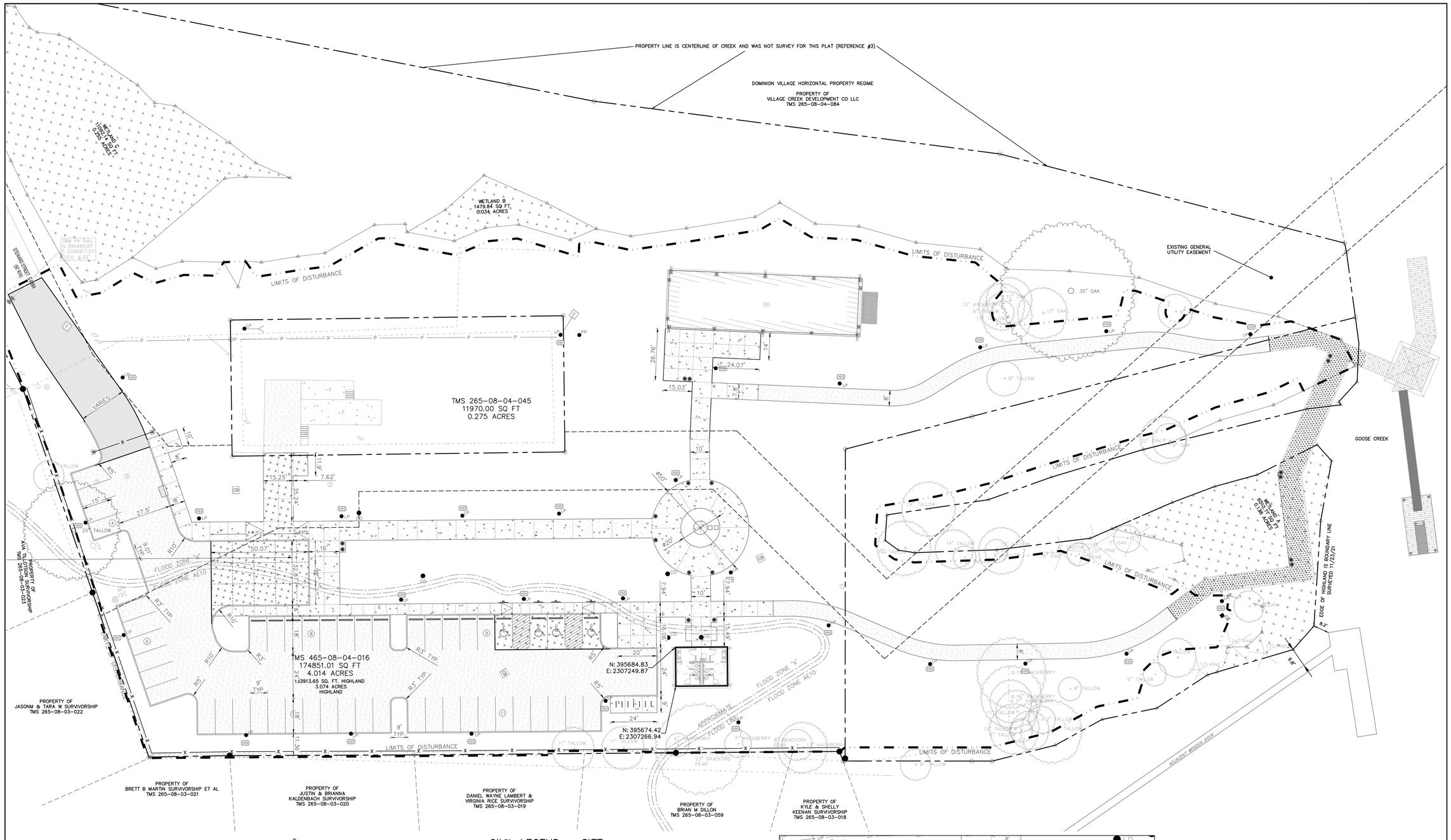
REVISION:	

SITE PLAN

C200



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2. INSTALL CONCRETE SIDEWALK TO LIMITS SHOWN IAW DETAIL F/C620.
3. TRANSITION SIDEWALK CURB TO FLUSH CURB IAW DETAIL C/C620.
4. INSTALL HEAVY DUTY CONCRETE PAVEMENT TO LIMITS SHOWN IAW DETAIL E/C620.
5. INSTALL PLANTATION MIX PARKING LOT IAW DETAIL A/C620.
6. INSTALL WHEEL STOPS IAW DETAIL G/C620.
7. INSTALL PLANTATION MIX SIDEWALK IAW LANDSCAPE PLANS.
8. MAINTAIN BCWS VEHICULAR ACCESS TO EXISTING LIFT STATION AT ALL TIMES.
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CIVIL LEGEND – SITE

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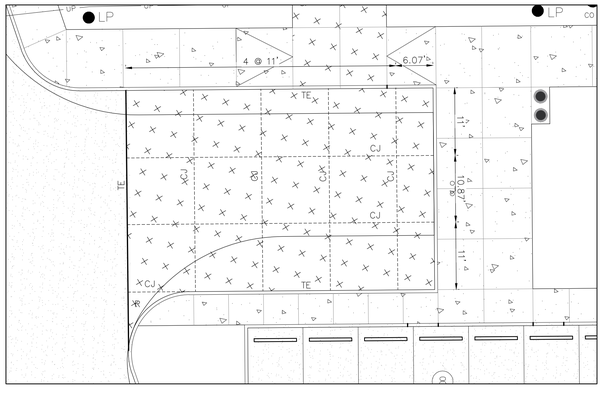
- 25 — PARKING SPACES – STRIPE WITH 4" SINGLE WHITE SOLID LINE
- NEW TRAFFIC SIGN – INSTALL PER PLAN AND IAW DETAILS E/C621 & F/C621.
- LIMITS OF CONSTRUCTION/LIMITS OF DISTURBANCE



ENLARGED PLAN
SCALE: 1" = 10'

HORIZONTAL SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

100% CONSTRUCTION DOCUMENTS

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

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SOUTH CAROLINA

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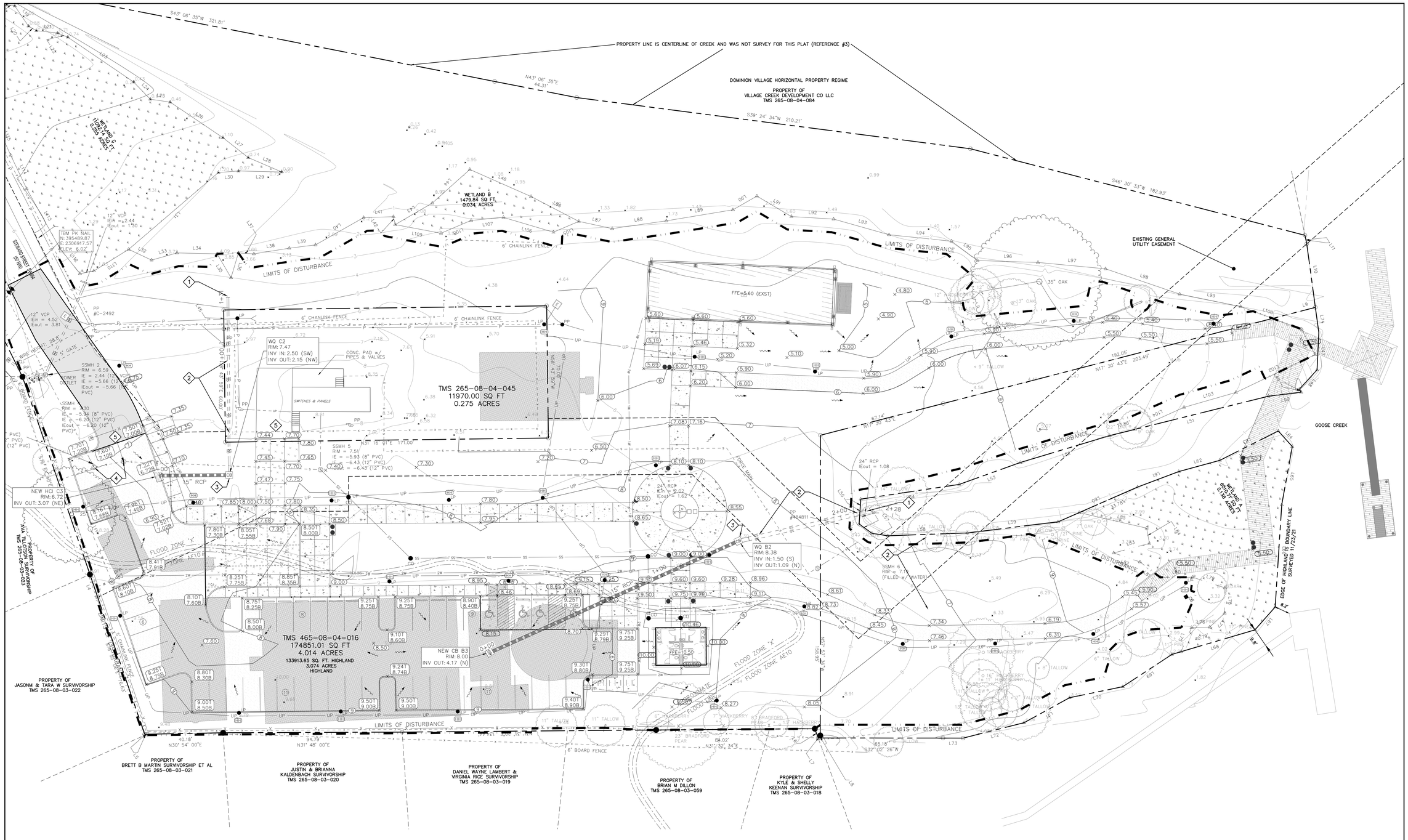
REVISION:	

SITE DIMENSION PLAN

C210



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GRADING AND DRAINAGE NOTES:

1. ALL SPOTS GIVEN ARE TO BOTTOM OF CURB OR TOP OF ASPHALT UNLESS NOTED OTHERWISE.
2. GENERAL CONTRACTOR SHALL COORDINATE ALL SITE UTILITIES AND STORM DRAINAGE INSTALLATION SCHEDULES TO AVOID POTENTIAL UTILITY CONFLICTS.

KEYNOTES: ◇

1. CLEAN OUT ALL DEBRIS AT EXISTING PIPE OUTFALL.
2. CLEAN AND REMOVE ALL SAND/SILT/DEBRIS FROM THE EXISTING STORM DRAIN PIPES PRIOR TO INSTALLING NEW.
3. INSTALL WATER QUALITY UNIT IAW DETAIL D/C630.
4. ADJUST EXISTING MANHOLE FRAME & COVER TO MATCH NEW, FINISHED GRADE. SEE C400-UTILITY PLAN.
5. MAINTAIN BCWS VEHICULAR ACCESS TO EXISTING LIFT STATION AT ALL TIMES.

CIVIL LEGEND – GRADING AND DRAINAGE

- CB — CATCH BASIN – INSTALL IAW DETAIL A/C630.
- SCDOT TYPE 1 CURB INLET – INSTALL IAW DETAIL C/C630.
- STORM DRAINAGE PIPE – INSTALL IAW DETAIL B/C630.
- X 20.00 — NEW FINISHED GRADE SPOT ELEVATION
- 11 — NEW FINISHED CONTOUR
- X 14.00 — EXISTING GRADE SPOT
- 19 — EXISTING GRADE CONTOUR
- DRAINAGE FLOW ARROW
- LIMITS OF CONSTRUCTION/LIMITS OF DISTURBANCE

HORIZONTAL SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

100% CONSTRUCTION DOCUMENTS

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

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SOUTH CAROLINA

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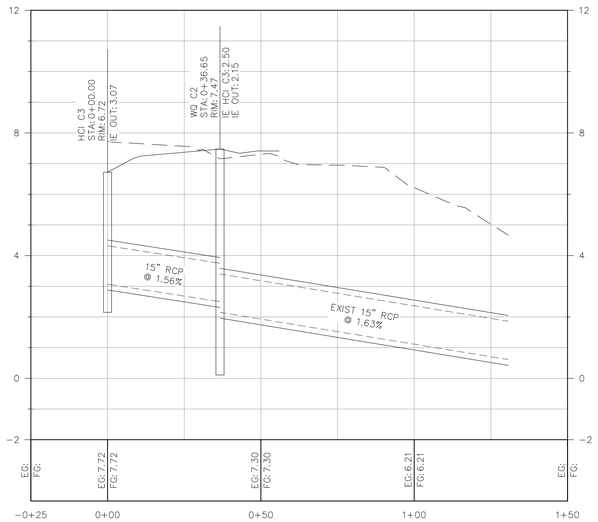
REVISION:	

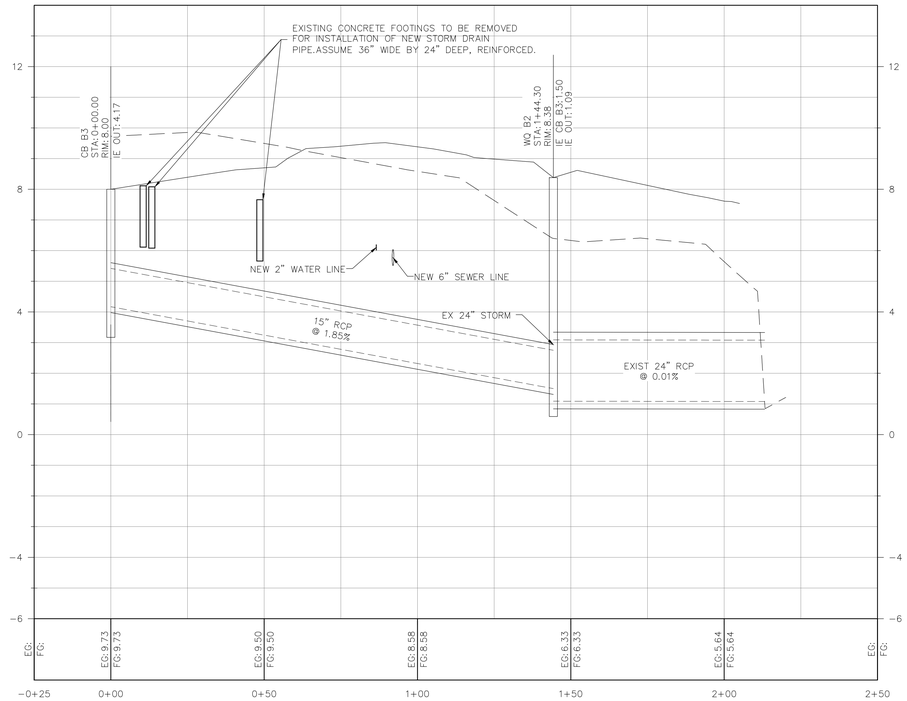
1 - 09/16/22 - MS4 & BCWSA COMMENT REVISIONS

GRADING &
STORM
DRAINAGE PLAN

C300



STORM DRAIN A PROFILE



STORM DRAIN B PROFILE

STORM DRAINAGE PROFILE NOTES:

1. SEE SHEET C001 FOR CIVIL NOTES AND ABBREVIATIONS.

DRAINAGE PROFILE LEGEND:

EXISTING GRADE

FINISHED GRADE

HYDRAULIC GRADE LINE

HORIZONTAL SCALE

(IN FEET)
1 inch = 20 ft.

VERTICAL SCALE

(IN FEET)
1 inch = 2 ft.

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

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SOUTH CAROLINA No. 14567 CHRISTOPHER B. COOK 5/27/23

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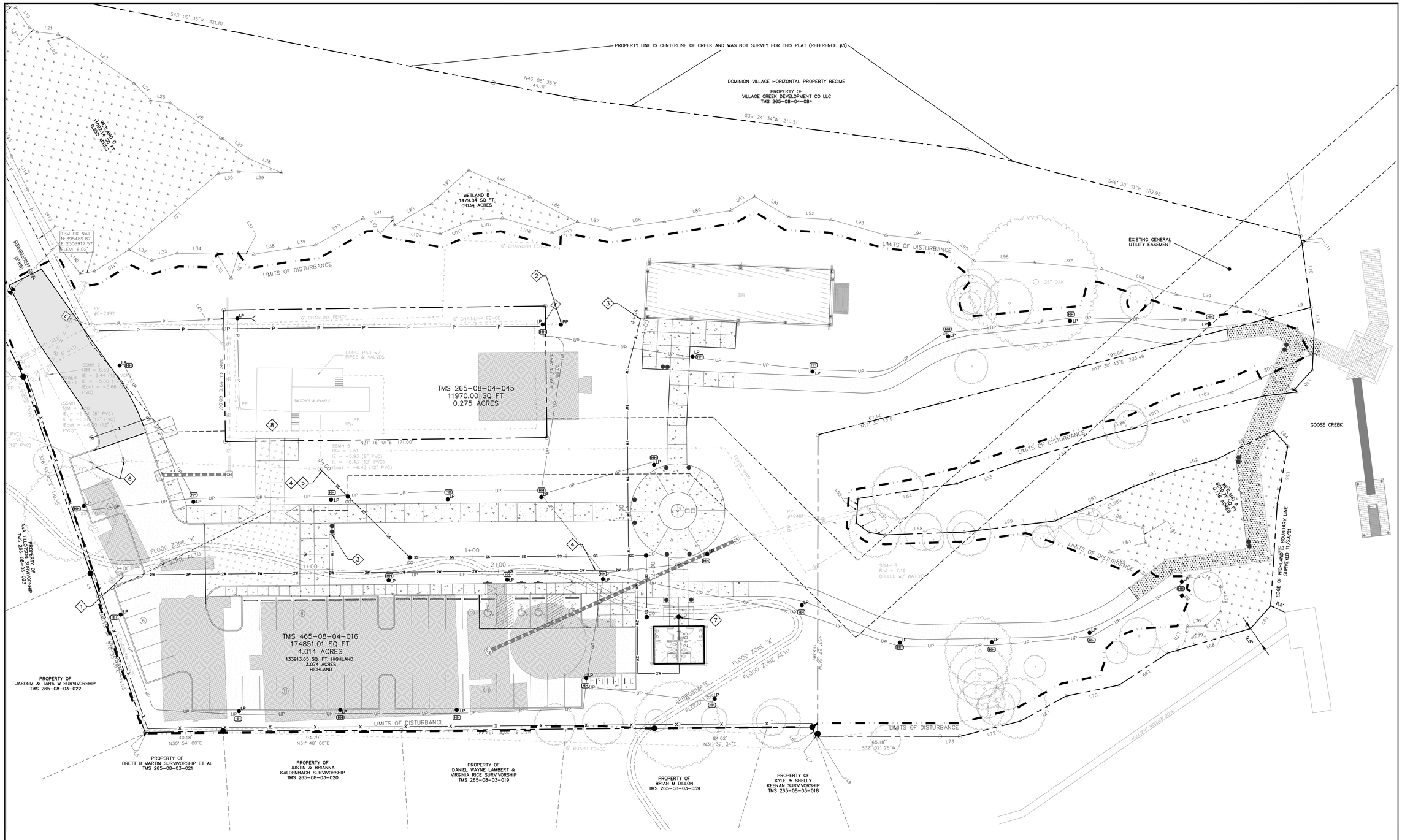
GRADING & STORM DRAINAGE PROFILES

C310

100% CONSTRUCTION DOCUMENTS



GENERAL NOTES:

1. SEE SHEET C001 FOR CIVIL NOTES AND ABBREVIATIONS.
2. CONTRACTOR IS RESPONSIBLE FOR ALL WORK SHOWN, UNLESS SPECIFICALLY INDICATED OTHERWISE.
3. CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING TO DETERMINE THE EXTENT OF THE PROJECT.
4. ALL PROJECT STAKEOUT SHALL BE PERFORMED BY A REGISTERED LAND SURVEYOR TO BE PAID FOR BY THE CONTRACTOR. FOR STAKEOUT, DO NOT RELY SOLELY ON THE PHYSICAL SCALE AS SHOWN IN DRAWINGS. REFER TO THE GIVEN DIMENSIONS, SYMBOL LEGEND, KEYNOTES, AND REFERENCED DETAILS FOR CORRECT STAKEOUT.
5. ALL CONTRACTORS/SUBCONTRACTORS/PERSON THAT WILL BE ENGAGED IN LAND DISTURBING ACTIVITIES SHALL COMPLY WITH ALL EROSION CONTROL AND STORMWATER POLLUTION PREVENTION REQUIREMENTS CONTAINED THROUGHOUT THE DRAWINGS, SPECIFICATIONS AND PERMITS.

KEYNOTES: ◇

1. CONNECT TO EXISTING BACKFLOW PREVENTOR WITH REDUCER AND NEW 2-INCH WATER SERVICE AND GATE VALVE IN A VALVE BOX.
2. RELOCATE EXISTING POWER POLE. SEE ELECTRICAL SHEET E104 FOR DETAILS.
3. INSTALL 1" FREEZE PROOF, NON-WINTERIZING SANITARY YARD HYDRANT MEETING ASSE 1057 WITH INTERNAL BACKFLOW PREVENTOR MEETING ASSE 1052. FREEZEFLOW MODEL 2133E OR APPROVED EQUAL.
4. INSTALL NEW 6-INCH SERVICE SEWER CONNECTION TO EXISTING MANHOLE IAW BCWS REQUIREMENTS. CONTRACTOR IS TO VERIFY MH ELEVATIONS AND NOTIFY ENGINEER AND BCWS OF ANY DISCREPANCIES. CONTACT BCWS A MINIMUM OF 72 HOURS PRIOR TO CONNECTION.
5. REMOVE EXISTING 8-INCH SERVICE AND SEAL OPENING WITH NON-SHRINK GROUT IAW BCWS REQUIREMENTS.
6. ADJUST EXISTING MANHOLE LIDS TO MATCH NEW GRADES. SEE C300.
7. INSTALL SANITARY TEE AND CLEANOUT AT BUILDING CONNECTION.
8. MAINTAIN BCWS VEHICULAR ACCESS TO EXISTING LIFT STATION AT ALL TIMES.

UTILITY NOTES:

1. GENERAL CONTRACTOR SHALL COORDINATE ALL SITE UTILITIES AND STORM DRAINAGE INSTALLATION SCHEDULES TO AVOID POTENTIAL UTILITY CONFLICTS.
2. FIRE SERVICE LINE AND ALL ASSOCIATED FIRE SERVICE ITEMS SHALL BE CONSTRUCTED IN ACCORDANCE WITH NFPA 24 REQUIREMENTS.
3. BACKFLOW PREVENTERS SHALL BE LOCATED INSIDE THE BUILDING.
4. UTILITY CONTRACTOR SHALL PROVIDE WATER AND SEWER RECORD DRAWINGS AND EASEMENT PLATS IN ACCORDANCE WITH UTILITY PROVIDER'S REQUIREMENTS.
5. CONTRACTOR SHALL COORDINATE ALL WORK FOR POWER AND LIGHTING WITH DOMINION ENERGY. SEE THE SITE ELECTRICAL PLAN AND THE LIGHTING LAYOUT PLAN BY DOMINION ENERGY (4/18/23) AND THE THREE PHASE UNDERGROUND SERVICE PLAN BY DOMINION ENERGY (2/20/23). 2

CIVIL LEGEND – WATER AND SEWER

- CO — SEWER CLEANOUT – INSTALL USING 75' MIN. SPACING AND IAW DETAIL A/C641.
- 1W — 1" WATER SERVICE
- 2W — 2" WATER SERVICE
- SS — 6" SEWER SERVICE – INSTALL IAW ASTM D 3034. ALL WORK SHALL MEET ASTM D 2321 AND SCDHEC REQUIREMENTS.
- UP — UNDERGROUND LIGHTING CIRCUIT BY CONTRACTOR, WIRE BY DOMINION
- PP — NEW POWER POLE
- LP — NEW LIGHT POLE BY DOMINION ENERGY
- E — NEW TRANSFORMER
- HH — HANDHOLE BY DOMINION ENERGY
- LIMITS OF CONSTRUCTION/LIMITS OF DISTURBANCE

2

HORIZONTAL SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

100% CONSTRUCTION DOCUMENTS

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

SOUTH CAROLINA PROFESSIONAL ENGINEER
ADC ENGINEERING INC.
No. 00253

SOUTH CAROLINA PROFESSIONAL ENGINEER
No. 14457
CHRISTOPHER B. COOK
5/12/23

CITY OF HANAHAN SOUTH CAROLINA

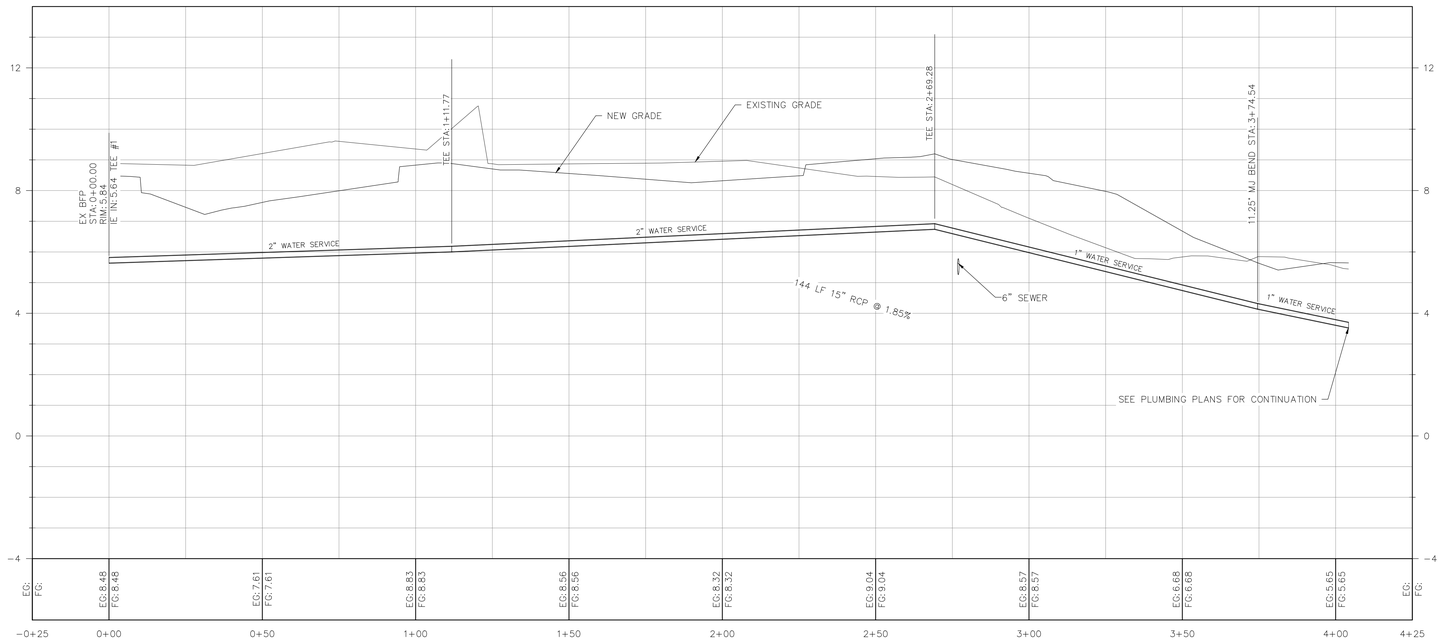
ADC ENGINEERING
1226 YEAMANS HALL ROAD
HANAHAN, SC 29410
843-566-0161
ADCENGINEERING.COM

811 Know what's below. Call before you dig.

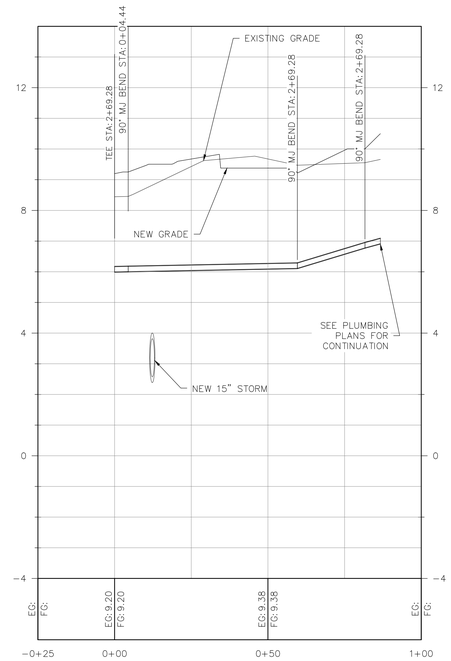
DATE:	5/12/2023
ADC PROJECT #:	20381
DESIGNED:	WWP/CBC
CHECKED:	CBC
DRAWN:	WWP/LOA
REVISION:	
1 - 09/16/22 - MS4 & BCWSA COMMENT REVISIONS	

UTILITY PLAN

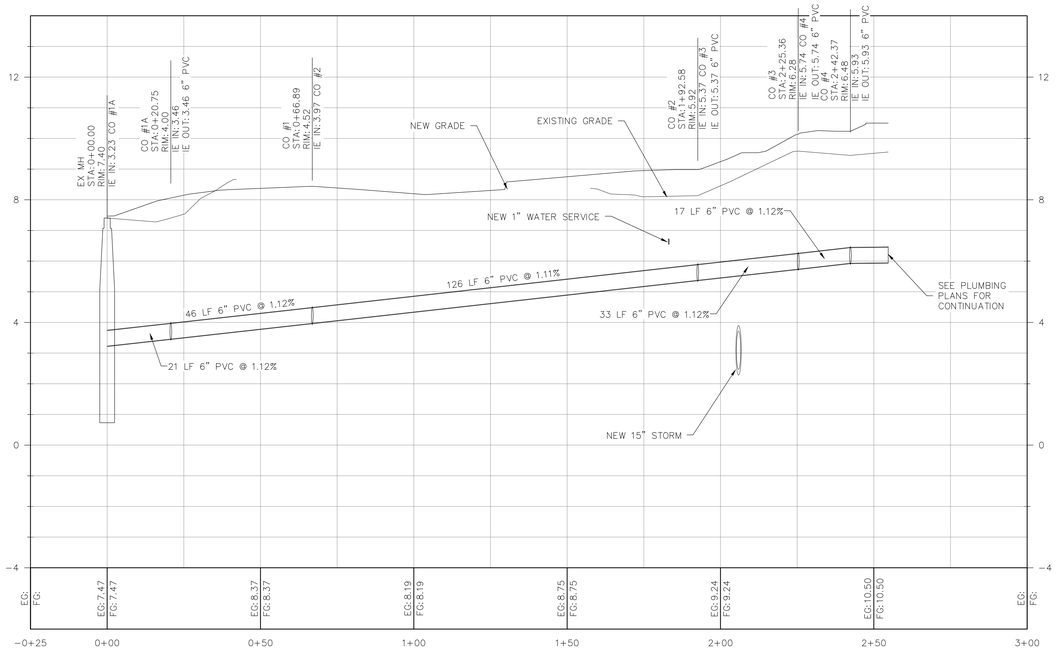
C400



WATER SERVICE PROFILE



WATER SERVICE TO BLDG PROFILE



SANITARY SEWER SERVICE PROFILE

UTILITY PROFILE NOTES:

1. SEE SHEET C001 FOR CIVIL NOTES AND ABBREVIATIONS.

UTILITY PROFILE LEGEND:

EXISTING GRADE
FINISHED GRADE

HORIZONTAL SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

VERTICAL SCALE

2 0 1 2 4 8

(IN FEET)
1 inch = 2 ft.

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

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No. 00253

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No. 14597
CHRISTOPHER B. COOK
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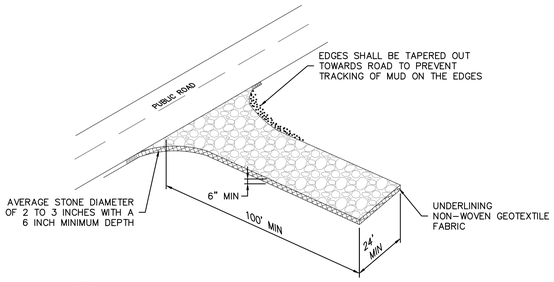
UTILITY PROFILES

C410

100% CONSTRUCTION DOCUMENTS



NOTES:

1. INSTALL A CULVERT PIPE ACROSS THE ENTRANCE WHEN NEEDED TO PROVIDE POSITIVE DRAINAGE.
2. DIVERT ALL SURFACE RUNOFF AND DRAINAGE FROM THE STONE PAD TO A SEDIMENT TRAP OR BASIN OR OTHER SEDIMENT TRAPPING STRUCTURE.

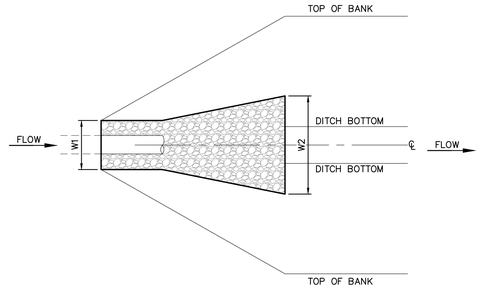
GENERAL NOTES:

1. STABILIZED CONSTRUCTION ENTRANCES SHOULD BE USED AT ALL POINTS WHERE TRAFFIC WILL EGRESS/INGRESS A CONSTRUCTION SITE ONTO A PUBLIC ROAD OR ANY IMPERVIOUS SURFACES, SUCH AS PARKING LOTS.
2. INSTALL A NON-WOVEN GEOTEXTILE FABRIC PRIOR TO PLACING ANY STONE.
3. INSTALL A CULVERT PIPE ACROSS THE ENTRANCE WHEN NEEDED TO PROVIDE POSITIVE DRAINAGE.
4. THE ENTRANCE SHALL CONSIST OF 2-INCH TO 3-INCH D50 STONE PLACED AT A MINIMUM DEPTH OF 6-INCHES.
5. MINIMUM DIMENSIONS OF THE ENTRANCE SHALL BE 24-FEET WIDE BY 100-FEET LONG, AND MAY BE MODIFIED AS NECESSARY TO ACCOMMODATE SITE CONSTRAINTS.
6. THE EDGES OF THE ENTRANCE SHALL BE TAPERED OUT TOWARDS THE ROAD TO PREVENT TRACKING AT THE EDGE OF THE ENTRANCE.
7. DIVERT ALL SURFACE RUNOFF AND DRAINAGE FROM THE STONE PAD TO A SEDIMENT TRAP OR BASIN OR OTHER SEDIMENT TRAPPING STRUCTURE.
8. LIMESTONE MAY NOT BE USED FOR THE STONE PAD.

INSPECTION AND MAINTENANCE:

1. THE KEY TO FUNCTIONAL CONSTRUCTION ENTRANCES IS WEEKLY INSPECTIONS, ROUTINE MAINTENANCE, AND REGULAR SEDIMENT REMOVAL.
2. REGULAR INSPECTIONS OF CONSTRUCTION ENTRANCES SHALL BE CONDUCTED ONCE EVERY CALENDAR WEEK AND, AS RECOMMENDED, WITHIN 24-HOURS AFTER EACH RAINFALL EVEN THAT PRODUCES 1/2-INCH OR MORE OF PRECIPITATION.
3. DURING REGULAR INSPECTIONS, CHECK FOR MUD AND SEDIMENT BUILDUP AND PAD INTEGRITY. INSPECTION FREQUENCIES MAY NEED TO BE MORE FREQUENT DURING LONG PERIODS OF WET WEATHER.
4. RESHAPE THE STONE PAD AS NECESSARY FOR DRAINAGE AND RUNOFF CONTROL.
5. WASH OR REPLACE STONES AS NEEDED AND AS DIRECTED BY SITE INSPECTOR. THE STONE IN THE ENTRANCE SHOULD BE WASHED OR REPLACED WHENEVER THE ENTRANCE FAILS TO REDUCE THE AMOUNT OF MUD BEING CARRIED OFF-SITE BY VEHICLES. FREQUENT WASHING WILL EXTEND THE USEFUL LIFE OF STONE PAD.
6. IMMEDIATELY REMOVE MUD AND SEDIMENT TRACKED OR WASHED ONTO ADJACENT IMPERVIOUS SURFACES BY BRUSHING OR SWEEPING. FLUSHING SHOULD ONLY BE USED WHEN THE WATER CAN BE DISCHARGED TO A SEDIMENT TRAP OR BASIN.
7. DURING MAINTENANCE ACTIVITIES, ANY BROKEN PAVEMENT SHOULD BE REPAIRED IMMEDIATELY.
8. CONSTRUCTION ENTRANCES SHOULD BE REMOVED AFTER THE SITE HAS REACHED FINAL STABILIZATION. PERMANENT VEGETATION SHOULD REPLACE AREAS FROM WHICH CONSTRUCTION ENTRANCES HAVE BEEN REMOVED, UNLESS AREA WILL BE CONVERTED TO AN IMPERVIOUS SURFACE TO SERVE POST-CONSTRUCTION.

CE A SCDHEC STABILIZED CONSTRUCTION ENTRANCE



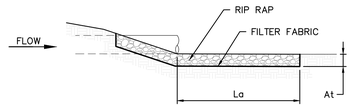
PLAN

RIPRAP APRON #	d50 (ft)	dmax (ft)	MIN. WT.	APRON THICKNESS (At)	La (ft)	W1 (ft)	W2 (ft)	SCDOT Class
--	0.5	0.75	12 LB	1.25 FT	34	12	18	A
--	0.5	0.75	12 LB	1.25 FT	24	12	15	A
--	0.5	0.75	12 LB	1.25 FT	14	9	14	A

d50 = AVERAGE STONE SIZE
dmax = MAXIMUM STONE SIZE

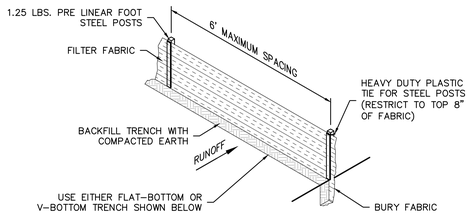
MAINTENANCE INSTRUCTIONS

1. INSPECT ROCK CHECK DAM EVERY SEVEN (7) CALENDAR DAYS.
2. REPAIR/REPLACE/SUPPLEMENT RIP RAP THAT HAS BEEN DISPLACED OR COVERED WITH SEDIMENT.

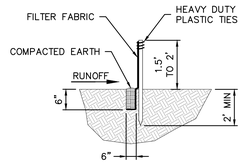


SECTION

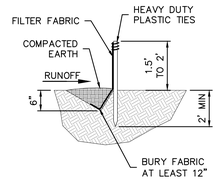
RR ECB or TRM RipRap E OUTLET PROTECTION



SILT FENCE INSTALLATION



FLAT-BOTTOM TRENCH DETAIL



V-SHAPED TRENCH DETAIL

GENERAL NOTES:

1. DO NOT PLACE SILT FENCE ACROSS CHANNELS OR IN OTHER AREAS SUBJECT TO CONCENTRATED FLOWS. SILT FENCE SHOULD NOT BE USED AS A VELOCITY CONTROL BMP. CONCENTRATED FLOWS ARE ANY FLOWS GREATER THAN 0.5 CFS.
2. MAXIMUM SHEET OR OVERLAND FLOW PATH LENGTH TO THE SILT FENCE SHALL BE 100-FEET.
3. MAXIMUM SLOPE STEEPNESS (NORMAL [PERPENDICULAR] TO THE FENCE LINE) SHALL BE 2:1.
4. SILT FENCE JOINTS, WHEN NECESSARY, SHALL BE COMPLETED BY ONE OF THE FOLLOWING OPTIONS:
   - WRAP EACH FABRIC TOGETHER AT A SUPPORT POST WITH BOTH ENDS FASTENED TO THE POST, WITH A 1-FOOT MINIMUM OVERLAP;
   - OVERLAP SILT FENCE BY INSTALLING 3-FEET PASSED THE SUPPORT POST TO WHICH THE NEW SILT FENCE ROLL IS ATTACHED. ATTACH OLD ROLL TO NEW ROLL WITH HEAVY-DUTY PLASTIC TIES; OR,
   - OVERLAP ENTIRE WIDTH OF EACH SILT FENCE ROLL FROM ONE SUPPORT POST TO THE NEXT SUPPORT POST.
5. ATTACH FILTER FABRIC TO THE STEEL POSTS USING HEAVY-DUTY PLASTIC TIES THAT ARE EVENLY SPACED WITHIN THE TOP 8-INCHES OF THE FABRIC.
6. INSTALL THE SILT FENCE PERPENDICULAR TO THE DIRECTION OF THE STORMWATER FLOW AND PLACE THE SILT FENCE THE PROPER DISTANCE FROM THE TOE OF STEEP SLOPES TO PROVIDE SEDIMENT STORAGE AND ACCESS FOR MAINTENANCE AND CLEANOUT.
7. INSTALL SILT FENCE CHECKS (TIE-BACKS) EVERY 50-100 FEET, DEPENDENT ON SLOPE, ALONG SILT FENCE THAT IS INSTALLED WITH SLOPE AND WHERE CONCENTRATED FLOWS ARE EXPECTED OR ARE DOCUMENTED ALONG THE PROPOSED/INSTALLED SILT FENCE.

FABRIC REQUIREMENTS:

1. SILT FENCE MUST BE COMPOSED OF WOVEN GEOTEXTILE FILTER FABRIC THAT CONSISTS OF THE FOLLOWING REQUIREMENTS:
   - COMPOSED OF FIBERS CONSISTING OF LONG CHAIN SYNTHETIC POLYMERS OF AT LEAST 85% BY WEIGHT OF POLYOLEFINS, POLYESTERS, OR POLYAMIDES THAT ARE FORMED INTO A NETWORK SUCH THAT THE FILAMENTS OR YARNS RETAIN DIMENSIONAL STABILITY RELATIVE TO EACH OTHER;
   - FREE OF ANY TREATMENT OR COATING WHICH MIGHT ADVERSELY ALTER ITS PHYSICAL PROPERTIES AFTER INSTALLATION;
   - FREE OF ANY DEFECTS OR FLAWS THAT SIGNIFICANTLY AFFECT ITS PHYSICAL AND/OR FILTERING PROPERTIES; AND,
   - HAVE A MINIMUM WIDTH OF 36-INCHES.
2. USE ONLY FABRIC APPEARING ON SC DOT'S QUALIFIED PRODUCTS LISTING (QPL), APPROVAL SHEET #34, MEETING THE REQUIREMENTS OF THE MOST CURRENT EDITION OF THE SC DOT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
3. 12-INCHES OF THE FABRIC SHOULD BE PLACED WITHIN EXCAVATED TRENCH AND TOED IN WHEN THE TRENCH IS BACKFILLED.
4. FILTER FABRIC SHALL BE PURCHASED IN CONTINUOUS ROLLS AND CUT TO THE LENGTH OF THE BARRIER TO AVOID JOINTS.
5. FILTER FABRIC SHALL BE INSTALLED AT A MINIMUM OF 24-INCHES ABOVE THE GROUND.

POST REQUIREMENTS:

1. SILT FENCE POSTS MUST BE 48-INCH LONG STEEL POSTS THAT MEET, AT A MINIMUM, THE FOLLOWING PHYSICAL CHARACTERISTICS.
   - COMPOSED OF A HIGH STRENGTH STEEL WITH A MINIMUM YIELD STRENGTH OF 50,000 PSI.
   - INCLUDE A STANDARD "T" SECTION WITH A NOMINAL FACE WIDTH OF 1.38-INCHES AND A NOMINAL "T" LENGTH OF 1.48-INCHES.
   - WEIGH 1.25 POUNDS PER FOOT (± 8%)
2. POSTS SHALL BE EQUIPPED WITH PROJECTIONS TO AID IN FASTENING OF FILTER FABRIC.
3. STEEL POSTS MAY NEED TO HAVE A METAL SOIL STABILIZATION PLATE WELDED NEAR THE BOTTOM WHEN INSTALLED ALONG STEEP SLOPES OR INSTALLED IN LOOSE SOILS. THE PLATE SHOULD HAVE A MINIMUM CROSS SECTION OF 17-SQUARE INCHES AND BE COMPOSED OF 15 GAUGE STEEL, AT A MINIMUM. THE METAL SOIL STABILIZATION PLATE SHOULD BE COMPLETELY BURIED.
4. INSTALL POSTS TO A MINIMUM OF 24-INCHES. A MINIMUM HEIGHT OF 1- TO 2- INCHES ABOVE THE FABRIC SHALL BE MAINTAINED, AND A MAXIMUM HEIGHT OF 3 FEET SHALL BE MAINTAINED ABOVE THE GROUND.
5. POST SPACING SHALL BE AT A MAXIMUM OF 6-FEET ON CENTER.

INSPECTION AND MAINTENANCE:

THE KEY TO FUNCTIONAL SILT FENCE IS WEEKLY INSPECTIONS, ROUTINE MAINTENANCE, AND REGULAR SEDIMENT REMOVAL.

REGULAR INSPECTIONS OF SILT FENCE SHALL BE CONDUCTED ONCE EVERY CALENDAR WEEK AND, AS RECOMMENDED, WITHIN 24-HOURS AFTER EACH RAINFALL EVEN THAT PRODUCES 1/2-INCH OR MORE OF PRECIPITATION.

ATTENTION TO SEDIMENT ACCUMULATIONS ALONG THE SILT FENCE IS EXTREMELY IMPORTANT. ACCUMULATED SEDIMENT SHOULD BE CONTINUALLY MONITORED AND REMOVED WHEN NECESSARY.

REMOVE ACCUMULATED SEDIMENT WHEN IT REACHES 1/3 THE HEIGHT OF THE SILT FENCE.

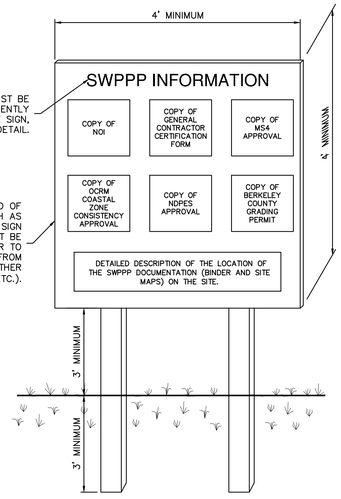
REMOVED SEDIMENT SHALL BE PLACED IN STOCKPILE STORAGE AREAS OR SPREAD THINLY ACROSS DISTURBED AREA. STABILIZE THE REMOVED SEDIMENT AFTER IT IS RELOCATED.

CHECK FOR AREAS WHERE STORMWATER RUNOFF HAS ERODED A CHANNEL BENEATH THE SILT FENCE, OR WHERE THE FENCE HAS SAGGED OR COLLAPSED DUE TO RUNOFF OVERTOPPING THE SILT FENCE. INSTALL CHECKS/TIE-BACKS AND/OR REINSTALL SILT FENCE, AS NECESSARY.

CHECK FOR TEARS WITHIN THE SILT FENCE, AREAS WHERE SILT FENCE HAS BEGUN TO DECOMPOSE, AND FOR ANY OTHER CIRCUMSTANCE THAT MAY RENDER THE SILT FENCE INEFFECTIVE. REMOVED DAMAGED SILT FENCE AND REINSTALL NEW SILT FENCE IMMEDIATELY.

SILT FENCE SHOULD BE REMOVED WITHIN 30 DAYS AFTER FINAL STABILIZATION IS ACHIEVED AND ONCE IT IS REMOVED, THE RESULTING DISTURBED AREA SHALL BE PERMANENTLY STABILIZED.

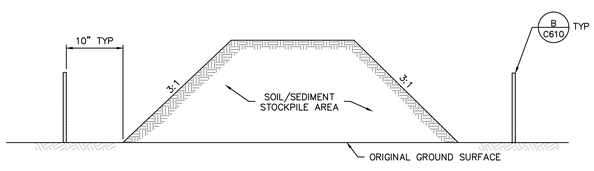
SF B SCDHEC SILT FENCE DETAIL



NOTES:

1. THE SWPPP INFORMATION SIGN MUST BE LOCATED IN A PROMINENT, PUBLICLY ACCESSIBLE LOCATION NEAR THE MAIN ENTRANCE OF THE SITE, SUCH THAT THE DOCUMENTATION CAN BE READ WITHOUT ACCESSING THE JOBSITE, BUT NOT OBSTRUCTING VIEWS AS TO CAUSE A TRAFFIC SAFETY HAZARD.
2. ALL POSTED DOCUMENTS MUST BE MAINTAINED IN A CLEARLY READABLE CONDITION AT ALL TIMES THROUGHOUT CONSTRUCTION AND UNTIL THE NOTICE-OF-TERMINATION (NOT) IS FILED FOR THE PERMIT.
3. ALL PAGES OF NOTICES OF INTENT AND PERMIT AUTHORIZATIONS MUST BE POSTED. THE CONTRACTOR MAY UTILIZE ACCESSIBLE WATERPROOF FOLDERS TO STORE THESE DOCUMENTS IF IT WILL BE DIFFICULT TO POST ALL PAGES INDIVIDUALLY.
4. CONTRACTOR SHALL POST OTHER STORMWATER AND/OR EROSION AND SEDIMENT CONTROL RELATED PERMITS ON THE SIGN AS REQUIRED BY THE GOVERNING AGENCIES.
5. SUBSEQUENT PERMIT MODIFICATION REQUESTS OR RENEWAL APPLICATIONS AND THEIR ASSOCIATED AUTHORIZATIONS OR RESPONSES SHALL BE POSTED ON THE SWPPP SIGN.
6. SIGN SHALL BE LOCATED OUTSIDE OF PUBLIC RIGHT-OF-WAY AND EASEMENTS UNLESS APPROVED BY THE GOVERNING AGENCY.
7. CONTRACTOR IS RESPONSIBLE FOR ENSURING STABILITY OF THE SWPPP INFORMATION SIGN.

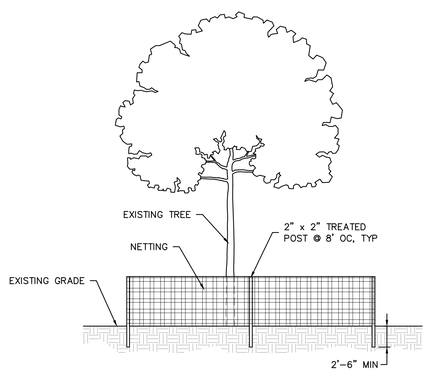
SS F SWPPP SIGN



NOTES:

1. SILT FENCE TO EXTEND AROUND ENTIRE PERIMETER OF STOCKPILE, OR IF STOCKPILE AREA IS LOCATED ON/NEAR A SLOPE THE SILT FENCE IS TO EXTEND ALONG CONTOURS OF THE DOWN-GRADIENT AREA.
2. IF STOCKPILE IS TO REMAIN FOR MORE THAN 14 DAYS, TEMPORARY STABILIZATION MEASURES MUST BE IMPLEMENTED.
3. SILT FENCE SHALL BE MAINTAINED UNTIL STOCKPILE AREA HAS EITHER BEEN REMOVED OR PERMANENTLY STABILIZED.
4. THE KEY TO FUNCTIONAL TEMPORARY STOCKPILE AREAS IS WEEKLY INSPECTIONS, ROUTINE MAINTENANCE, AND REGULAR SEDIMENT REMOVAL.

C SCDHEC TEMPORARY STOCKPILE AREA



NETTING:

4' HIGH POLYETHYLENE LAMINAR SAFETY NETTING AROUND TREE FENCE TO BE FLUORESCENT ORANGE OR YELLOW. ATTACH NETTING TO POST WITH GALVANIZED STAPLES.

D TREE BARRICADE DETAIL

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

SOUTH CAROLINA PROFESSIONAL ENGINEER ADC ENGINEERING INC. No. 00253

SOUTH CAROLINA PROFESSIONAL ENGINEER No. 14557 CHRISTOPHER B. COX 5/12/23

CITY OF HANAHAN SOUTH CAROLINA

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DESIGNED: WWP/CBC
CHECKED: CBC
DRAWN: WWP/LOA
REVISION:

CIVIL DETAILS - SWPPP

C610

100% CONSTRUCTION DOCUMENTS

NOTES:

1. THE GENERAL CONTRACTOR IS REQUIRED TO, AT A MINIMUM, INITIATE SOIL STABILIZATION MEASURES IMMEDIATELY WHENEVER ANY CLEARING, GRADING, EXCAVATING OR OTHER EARTH DISTURBING ACTIVITIES HAVE PERMANENTLY CEASED ON ANY PORTION OF THE SITE, OR TEMPORARILY CEASED ON ANY PORTION OF THE SITE AND WILL NOT LIKELY RESUME FOR A PERIOD EXCEEDING 14 CALENDAR DAYS. DIVERSION CHANNELS/DITCHES SHALL BE STABILIZED WITHIN 7 DAYS OF INSTALLATION.

2. THE GENERAL CONTRACTOR HAS 7 DAYS FROM INITIATION OF STABILIZATION TO COMPLETE SOIL PREPARATION, SEEDING, MULCHING, AND ANY OTHER REQUIRED ACTIVITIES RELATED TO THE PLANTING AND ESTABLISHMENT OF VEGETATION. THE GENERAL CONTRACTOR ALSO HAS 7 DAYS FROM INITIATION OF STABILIZATION TO COMPLETELY INSTALL NON-VEGETATED MEASURES, IF UTILIZED.

3. ALL DISTURBED AREAS MUST BE STABILIZED TEMPORARILY WITH THE USE OF FAST-GERMINATING ANNUAL GRASS/GRAIN VARIETIES APPROPRIATE FOR SITE SOIL AND CLIMATE CONDITIONS. MULCH IS REQUIRED FOR ALL SEEDING APPLICATIONS, AND ALL MULCH APPLICATIONS MUST INCLUDE A SUITABLE FORM OF MULCH ANCHORING TO MINIMIZE MOVEMENT OF MULCH BY WIND OR WATER.

SCDHEC PERMANENT SEEDING – COASTAL													
SPECIES	LBS/AC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
SANDY, DROUGHTY SITES													
BROWNTOP MILLET BAHIAGRASS	10 40												
BROWNTOP MILLET BAHIAGRASS SERICEA LESPEDEZA	10 20 40												
BROWNTOP MILLET ATLANTIC COASTAL PANIC GRASS	10 15 PLS												
BROWNTOP MILLET SWITCHGRASS (ALAMO) LITTLE BLUESTEM SERICEA LESPEDEZA	10 8 PLS 4 20												
BROWNTOP MILLET WEEPING LOVEGRASS	10 8												
WELL DRAINED, CLAYEY/LOAMEY SITES													
BROWNTOP MILLET BAHIAGRASS	10 40												
RYE, GRAIN BAHIAGRASS CLOVER,CRIMSON (ANNUAL)	10 40 5												
BROWNTOP MILLET BAHIAGRASS SERICEA LESPEDEZA	10 20 40												
BROWNTOP MILLET BERMUDA, COMMON SERICEA LESPEDEZA	10 10 40												
BROWNTOP MILLET BERMUDA, COMMON KOBE LESPEDEZA (ANNUAL)	10 12 10												
BROWNTOP MILLET BAHIAGRASS BERMUDA, COMMON SERICEA LESPEDEZA	10 20 8 40												
BROWNTOP MILLETSWITCHGRASS LITTLE BLUESTEM INDIANGRASS	10 8 PLS 3 PLS 3 PLS												

SCDHEC TEMPORARY SEEDING – COASTAL													
SPECIES	LBS/AC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
SANDY, DROUGHTY SITES													
BROWNTOP MILLET	40												
RYE, GRAIN	56												
RYEGRASS	50												
WELL DRAINED, CLAYEY/LOAMEY SITES													
BROWNTOP MILLET OR JAPANESE MILLET	40												
RYE, GRAIN OR OATS	56 75												
RYEGRASS	50												

SEEDING PREPARATION:
A. TILL AREA TO BE SEEDED TO A DEPTH OF 4".
B. APPLY 10-10-10 FERTILIZER AT A RATE OF 11.5 POUNDS PER 1,000 SQUARE FEET.
C. THE FERTILIZER SHALL BE WORKED INTO THE TOP 4 INCHES OF SOIL PRIOR TO SEEDING.

STRAW MULCH:
A. APPLY STRAW MULCH BY HAND OR MACHINE AT A RATE OF 1.5-2.0 TONS PER ACRE (90 POUNDS PER 1,000 SF) THEN TACKED WITH EMULSIFIED ASPHALT.

4. ALTERNATIVE STABILIZATION MEASURES TO SEEDING, SUCH AS ANCHORED MULCH APPLICATION (WITHOUT SEEDING), MAY BE UTILIZED DURING PERIODS WHEN VEGETATIVE GROWTH IS UNLIKELY (E.G. WINTER MONTHS).

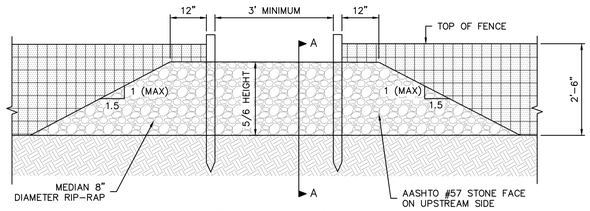
5. IT IS NOT ACCEPTABLE TO ALLOW BARE SOIL TO REMAIN EXPOSED AT ANY TIME DURING THE YEAR, REGARDLESS OF WEATHER/TEMPERATURE/SITE CONDITIONS.

6. ALTERNATIVE STABILIZATION MEASURES INCLUDE, BUT ARE NOT LIMITED TO: ANCHORED STRAW/HAY MULCH, WOOD CELLULOSE FIBER MULCH, SPRAY-ON SOIL GLUES/BINDERS, AND ROLLED EROSION CONTROL PRODUCTS.

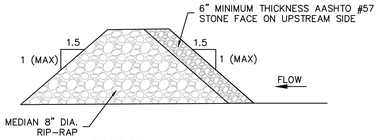
7. ALL ROLLED EROSION CONTROL PRODUCTS SHALL HAVE CURRENT QDOR(TM) STATUS ISSUED BY THE EROSION CONTROL TECHNOLOGY COUNCIL (ECTC) PLUS ANY STATE OR AGENCY-SPECIFIC REQUIREMENTS. EVIDENCE OF QDOR(TM) APPROVAL SHALL ACCOMPANY THE PRODUCT SHIPPED TO THE JOBSITE FOR READY IDENTIFICATION BY THE CONTRACTOR OR AGENCY INSPECTOR.

8. ROLLED EROSION CONTROL PRODUCTS (NETS, BLANKETS, TURF REINFORCED MATES) AND VEGETATED AREAS NOT MEETING REQUIRED VEGETATIVE DENSITIES FOR FINAL STABILIZATION MUST BE INSPECTED DAILY. RILLING, RUTTING AND OTHER SIGNS OF EROSION INDICATE THE SPECIFIED EROSION CONTROL DEVICE IS NOT FUNCTIONING OR INSTALLED PROPERLY AND/OR ADDITIONAL EROSION CONTROL DEVICES ARE WARRANTED.

TS PS A SCDHEC TEMPORARY AND PERMANENT SEEDING/VEGETATION NOTES



ELEVATION – UP-SLOPE FACE



SECTION A–A

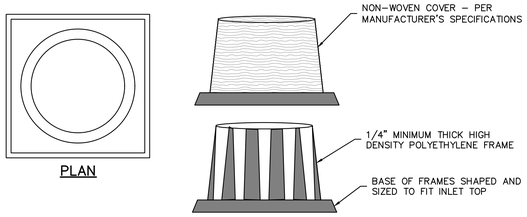
NOTES:

1. WASHED STONE (#57) TO BE REMOVED AND REPLACED ONCE IT BECOMES CLOGGED WITH SEDIMENT.

2. SEDIMENT TO BE REMOVED WHEN ACCUMULATIONS REACH 1/3 HEIGHT OF SILT FENCE.

3. THE KEY TO FUNCTIONAL ROCK OUTLETS IS WEEKLY INSPECTIONS, ROUTINE MAINTENANCE, AND REGULAR SEDIMENT REMOVAL.

RO B SCDHEC SILT FENCE ROCK OUTLET



PLAN

SECTION

TYPICAL CONSTRUCTION SEQUENCE FOR DOME FRAME AND COVER:

1. EXCAVATE APPROXIMATELY 4" TO 6" BELOW THE TOP OF THE INLET STRUCTURE.

2. PLACE THE FRAME ONTO THE INLET STRUCTURE, ENSURING PROPER SEATING OF FRAME TO STRUCTURE.

3. SLIDE THE COVER OVER THE FRAME.

4. FILL THE COVER POCKETS WITH SOIL, #57 GRAVEL OR EQUIVALENT. THE COVER POCKETS SHOULD BE COMPLETELY FILLED TO ENSURE A GOOD SEAL BETWEEN THE GROUND AND INLET STRUCTURE.

5. BACK FILL AROUND THE FRAME AND COVER ASSEMBLY IS NOT REQUIRED TO COMPLETE INSTALLATION; HOWEVER, BACKFILLING MAY BE NECESSARY TO COMPLETE EXCAVATION REQUIREMENTS FOR THE SITE.

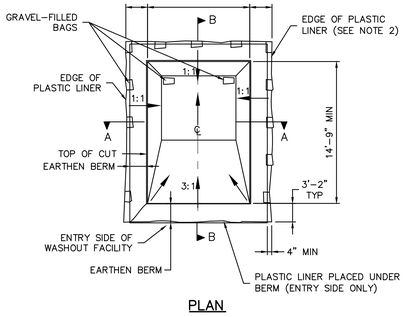
INSPECTION AND MAINTENANCE:

1. INSPECT MEASURES EVERY 7 CALENDAR DAYS FOR SEDIMENT AND DEBRIS ACCUMULATION AND DAMAGE.

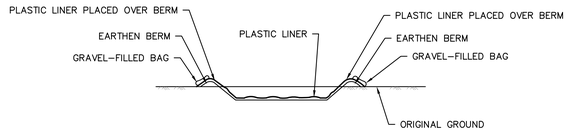
2. SEDIMENT SHOULD BE REMOVED WHEN IT REACHES 1/2 HEIGHT OF THE DOME IS COVERED.

3. REPLACE DOME AND/OR COVER WHENEVER DAMAGED.

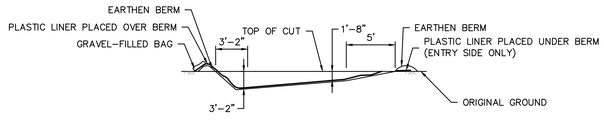
IP2 A C DOMED INLET PROTECTION
NOT TO SCALE



PLAN



SECTION A–A



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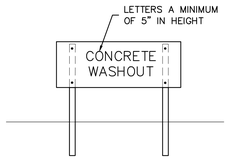

CONCRETE WASHOUT SIGN DETAIL

NOTES:

1. ACTUAL LAYOUT DETERMINED IN FIELD.

2. INSTALL CONCRETE WASHOUT SIGN (24"X24", MINIMUM) WITHIN 30' OF THE TEMPORARY CONCRETE WASHOUT FACILITY.

3. TEMPORARY WASHOUT AREA MUST BE AT LEAST 50' FROM A STORM DRAIN, CREEK BANK OR PERIMETER CONTROL.

4. CLEAN OUT CONCRETE WASHOUT AREA WHEN 50% FULL.

5. THE KEY TO FUNCTIONAL CONCRETE WASHOUTS IS WEEKLY INSPECTIONS, ROUTINE MAINTENANCE, AND REGULAR CLEAN OUT.

6. SILT FENCE SHALL BE INSTALLED AROUND PERIMETER OF CONCRETE WASHOUT AREA EXCEPT FOR THE SIDE UTILIZED FOR ACCESSING THE WASHOUT.

7. A ROCK CONSTRUCTION ENTRANCE MAY BE NECESSARY ALONG ONE SIDE OF THE WASHOUT TO PROVIDE VEHICLE ACCESS.

CW D BELOW GRADE CONCRETE WASHOUT
NOT TO SCALE

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

ADC ENGINEERING INC. No. 00253
SOUTH CAROLINA
CHRISTOPHER R. COX No. 14557

CITY OF HANAHAN SOUTH CAROLINA

ADC ENGINEERING
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HANAHAN, SC 29410
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CHECKED:	CBC
DRAWN:	WWP/LOA
REVISION:	

CIVIL DETAILS - SWPPP

C611

100% CONSTRUCTION DOCUMENTS

SCDHEC STANDARD NOTES:

1. IF NECESSARY, SLOPES, WHICH EXCEED EIGHT (8) VERTICAL FEET SHOULD BE STABILIZED WITH SYNTHETIC OR VEGETATIVE MATS, IN ADDITION TO HYDROSEEDING. IT MAY BE NECESSARY TO INSTALL TEMPORARY SLOPE DRAINS DURING CONSTRUCTION. TEMPORARY BERMS MAY BE NEEDED UNTIL THE SLOPE IS BROUGHT TO GRADE.

2. STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED, BUT IN NO CASE MORE THAN FOURTEEN (14) DAYS AFTER WORK HAS CEASED, EXCEPT AS STATED BELOW.
– WHERE STABILIZATION BY THE 14TH DAY IS PRECLUDED BY SNOW COVER OR FROZEN GROUND CONDITIONS STABILIZATION MEASURES MUST BE INITIATED AS SOON AS PRACTICABLE.
– WHERE CONSTRUCTION ACTIVITY ON A PORTION OF THE SITE IS TEMPORARILY CEASED, AND EARTH–DISTURBING ACTIVITIES WILL BE RESUMED WITHIN 14 DAYS, TEMPORARY STABILIZATION MEASURES DO NOT HAVE TO BE INITIATED ON THAT PORTION OF THE SITE.

3. ALL SEDIMENT AND EROSION CONTROL DEVICES SHALL BE INSPECTED ONCE EVERY CALENDAR WEEK. IF PERIODIC INSPECTION OR OTHER INFORMATION INDICATES THAT A BMP HAS BEEN INAPPROPRIATELY OR INCORRECTLY INSTALLED, THE PERMITTEE MUST ADDRESS THE NECESSARY REPLACEMENT OR MODIFICATION REQUIRED TO CORRECT THE BMP WITHIN 48 HOURS OF IDENTIFICATION.

4. PROVIDE SILT FENCE AND/OR OTHER CONTROL DEVICES, AS MAY BE REQUIRED, TO CONTROL SOIL EROSION DURING UTILITY CONSTRUCTION. ALL DISTURBED AREAS SHALL BE CLEANED, GRADED, AND STABILIZED WITH GRASSING IMMEDIATELY AFTER THE UTILITY INSTALLATION. FILL, COVER, AND TEMPORARY SEEDING AT THE END OF EACH DAY ARE RECOMMENDED. IF WATER IS ENCOUNTERED WHILE TRENCHING, THE WATER SHOULD BE FILTERED TO REMOVE SEDIMENT BEFORE BEING PUMPED BACK INTO ANY WATERS OF THE STATE.

5. ALL EROSION CONTROL DEVICES SHALL BE PROPERLY MAINTAINED DURING ALL PHASES OF CONSTRUCTION UNTIL THE COMPLETION OF ALL CONSTRUCTION ACTIVITIES AND ALL DISTURBED AREAS HAVE BEEN STABILIZED. ADDITIONAL CONTROL DEVICES MAY BE REQUIRED DURING CONSTRUCTION IN ORDER TO CONTROL EROSION AND/OR OFFSITE SEDIMENTATION. ALL TEMPORARY CONTROL DEVICES SHALL BE REMOVED ONCE CONSTRUCTION IS COMPLETE AND THE SITE IS STABILIZED.

6. THE CONTRACTOR MUST TAKE NECESSARY ACTION TO MINIMIZE THE TRACKING OF MUD ONTO PAVED ROADWAY(S) FROM CONSTRUCTION AREAS AND THE GENERATION OF DUST. THE CONTRACTOR SHALL DAILY REMOVE MUD/SOIL FROM PAVEMENT, AS MAY BE REQUIRED.

7. RESIDENTIAL SUBDIVISIONS REQUIRE EROSION CONTROL FEATURES FOR INFRASTRUCTURE AS WELL AS FOR INDIVIDUAL LOT CONSTRUCTION. INDIVIDUAL PROPERTY OWNERS SHALL FOLLOW THESE PLANS DURING CONSTRUCTION OR OBTAIN APPROVAL OF AN INDIVIDUAL PLAN IN ACCORDANCE WITH S.C REG. 72–300 ET SEQ. AND SCR100000.

8. TEMPORARY DIVERSION BERMS AND/OR DITCHES WILL BE PROVIDED AS NEEDED DURING CONSTRUCTION TO PROTECT WORK AREAS FROM UPSLOPE RUNOFF AND/OR TO DIVERT SEDIMENT–LADEN WATER TO APPROPRIATE TRAPS OR STABLE OUTLETS.

9. ALL WATERS OF THE STATE (WOS), INCLUDING WETLANDS, ARE TO BE FLAGGED OR OTHERWISE CLEARLY MARKED IN THE FIELD. A DOUBLE ROW OF SILT FENCE IS TO BE INSTALLED IN ALL AREAS WHERE A 50–FOOT BUFFER CAN'T BE MAINTAINED BETWEEN THE DISTURBED AREA AND ALL WOS. A 10–FOOT BUFFER SHOULD BE MAINTAINED BETWEEN THE LAST ROW OF SILT FENCE AND ALL WOS.

10. LITTER, CONSTRUCTION DEBRIS, OILS, FUELS, AND BUILDING PRODUCTS WITH SIGNIFICANT POTENTIAL FOR IMPACT (SUCH AS STOCKPILES OF FRESHLY TREATED LUMBER) AND CONSTRUCTION CHEMICALS THAT COULD BE EXPOSED TO STORM WATER MUST BE PREVENTED FROM BECOMING A POLLUTANT SOURCE IN STORM WATER DISCHARGES.

11. A COPY OF THE SWPPP, INSPECTIONS RECORDS, AND RAINFALL DATA MUST BE RETAINED AT THE CONSTRUCTION SITE OR A NEARBY LOCATION EASILY ACCESSIBLE DURING NORMAL BUSINESS HOURS, FROM THE DATE OF COMMENCEMENT OF CONSTRUCTION ACTIVITIES TO THE DATE THAT FINAL STABILIZATION IS REACHED.

12. INITIATE STABILIZATION MEASURES ON ANY EXPOSED STEEP SLOPE (3H:1V OR GREATER) WHERE LAND–DISTURBING ACTIVITIES HAVE PERMANENTLY OR TEMPORARILY CEASED, AND WILL NOT RESUME FOR A PERIOD OF 7 CALENDAR DAYS.

13. MINIMIZE SOIL COMPACTION AND, UNLESS INFEASIBLE, PRESERVE TOPSOIL.

14. MINIMIZE THE DISCHARGE OF POLLUTANTS FROM EQUIPMENT AND VEHICLE WASHING, WHEEL WASH WATER, AND OTHER WASH WATERS. WASH WATERS MUST BE TREATED IN A SEDIMENT BASIN OR ALTERNATIVE CONTROL THAT PROVIDES EQUIVALENT OR BETTER TREATMENT PRIOR TO DISCHARGE.

15. MINIMIZE THE DISCHARGE OF POLLUTANTS FROM DEWATERING OF TRENCHES AND EXCAVATED AREAS. THESE DISCHARGES ARE TO BE ROUTED THROUGH APPROPRIATE BMPS (SEDIMENT BASIN, FILTER BAG, ETC.).

16. THE FOLLOWING DISCHARGES FROM SITES ARE PROHIBITED:
– WASTEWATER FROM WASHOUT OF CONCRETE, UNLESS MANAGED BY AN APPROPRIATE CONTROL;
– WASTEWATER FROM WASHOUT AND CLEANOUT OF STUCCO, PAINT, FORM RELEASE OILS, CURING COMPOUNDS AND OTHER CONSTRUCTION MATERIALS;
– FUELS, OILS, OR OTHER POLLUTANTS USED IN VEHICLE AND EQUIPMENT OPERATION AND MAINTENANCE; AND
– SOAPS OR SOLVENTS USED IN VEHICLE AND EQUIPMENT WASHING.

17. AFTER CONSTRUCTION ACTIVITIES BEGIN, INSPECTIONS MUST BE CONDUCTED AT A MINIMUM OF AT LEAST ONCE EVERY CALENDAR WEEK AND MUST BE CONDUCTED UNTIL FINAL STABILIZATION IS REACHED ON ALL AREAS OF THE CONSTRUCTION SITE.

18. IF EXISTING BMPS NEED TO BE MODIFIED OR IF ADDITIONAL BMPS ARE NECESSARY TO COMPLY WITH THE REQUIREMENTS OF THIS PERMIT AND/OR SC'S WATER QUALITY STANDARDS, IMPLEMENTATION MUST BE COMPLETED BEFORE THE NEXT STORM EVENT WHENEVER PRACTICABLE. IF IMPLEMENTATION BEFORE THE NEXT STORM EVENT IS IMPRACTICABLE, THE SITUATION MUST BE DOCUMENTED IN THE SWPPP AND ALTERNATIVE BMPS MUST BE IMPLEMENTED AS SOON AS REASONABLY POSSIBLE.

19. A PRE–CONSTRUCTION CONFERENCE MUST BE HELD FOR EACH CONSTRUCTION SITE WITH AN APPROVED ON–SITE SWPPP PRIOR TO THE IMPLEMENTATION OF CONSTRUCTION ACTIVITIES. FOR NON–LINEAR PROJECTS THAT DISTURB 10 ACRES OR MORE THIS CONFERENCE MUST BE HELD ON–SITE UNLESS THE DEPARTMENT HAS APPROVED OTHERWISE.

DEWATERING NOTES:

1. THE DESIGN, ADEQUACY AND OPERATION OF ANY AND ALL DEWATERING ACTIVITIES IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

2. THE CONTRACTOR SHALL PROTECT ALL ADJACENT PROPERTIES, RIGHTS OF WAYS, NATURAL AREAS AND EXISTING UTILITY SYSTEMS FROM EROSION AND SEDIMENTATION ASSOCIATED WITH DEWATERING ACTIVITIES.

3. DEWATERING OF EXISTING PONDS OR LARGE PONDING AREAS SHALL ALWAYS UTILIZE A FLOATING INTAKE.

4. DEWATERING DISCHARGES SHALL ALWAYS BE DIRECTED THROUGH SUITABLE BEST MANAGEMENT PRACTICE (BMP) SUCH AS A TEMPORARY SEDIMENT POND/TRAP OR SEDIMENT TRAPPING DEWATERING BAG.

5. ALL DEWATERING ACTIVITIES SHOULD BE IN ACCORDANCE WITH THE SCDHEC CGP.

SCDHEC POST–CONSTRUCTION MAINTENANCE REQUIREMENTS

SYSTEM	MAINTENANCE REQUIREMENTS	MAINTENANCE FREQUENCY
A. VEGETATED AREAS	1. MOW GRASS 2. REMOVE ALL LITTER AND DEBRIS 3. REMOVE AND REPLACE DEAD OR DISEASED VEGETATION 4. REPLACE / REPLENISH MULCH 5. REMOVE WEEDS 6. PRUNE VEGETATION TO MAINTAIN APPEARANCE	1. MONTHLY 2. MONTHLY 3. SEMI–ANNUALLY 4. SEMI–ANNUALLY 5. SEMI–ANNUALLY 6. SEMI–ANNUALLY
B. STORM DRAINAGE SYSTEM	1. REMOVE ALL LITTER AND DEBRIS FROM PIPES 2. REMOVE SEDIMENT FROM DRAINAGE STRUCTURE SUMPS	1. ANNUALLY 2. ANNUALLY, OR WHEN SUMP VOLUME HAS BEEN REDUCED BY 50%

BERKELEY COUNTY STORMWATER AS–BUILT/RECORD DRAWING REQUIREMENTS:

1. PRIOR TO SUBSTANTIAL COMPLETION AND PRIOR TO REQUESTING FINAL SITE INSPECTION BY BERKELEY COUNTY THE CONTRACTOR SHALL PROVIDE AND RECEIVE APPROVAL OF AS–BUILT/RECORD DRAWINGS CONSISTING OF SURVEY DRAWINGS MEETING THE FOLLOWING REQUIREMENTS:

   A. FIELD SURVEYED DRAWINGS BASED ON AN AS–BUILT SURVEY OF NEWLY CONSTRUCTED STORM WATER MANAGEMENT FACILITIES WITH:

      (i) EXISTING GRADES/CONTOURS/DEPTHS OF THE FACILITY.
      (ii) ELEVATIONS AND DIMENSIONS OF ALL INLET/OUTLET STRUCTURES, INCLUDING:
      –PIPE AND ORIFICE INVERTS AND DIAMETERS.
      –WEIR ELEVATIONS AND DIMENSIONS.
      –RISER DIMENSIONS AND ELEVATIONS.
      –EMERGENCY SPILLWAY DIMENSIONS AND ELEVATIONS.
      –LOCATIONS AND INVERTS FOR ALL PIPES DISCHARGING INTO THE FACILITY.
      –LOCATIONS AND INVERTS FOR ALL PIPES EXITING THE FACILITY.
      –DETAILED SKETCHES OF THE STRUCTURES SHALL BE PROVIDED IF NECESSARY FOR CLARITY.
      (iii) SPOT ELEVATIONS ALONG THE TOP, BOTTOM AND SHELVES OF THE FACILITY'S EMBANKMENT.
      (iv) CONTOURS, DIMENSION, AND LOCATIONS OF ALL STRUCTURAL COMPONENTS (E.G., FOREBAYS, LEVEL SPREADERS, RIP RAP APRONS, INLET STRUCTURES, LOW FLOW CHANNELS) OF THE FACILITY.
      (v) TABLE OF ELEVATIONS AND ASSOCIATED CONTOUR AREA AT EACH ELEVATION FOR STAGE/STORAGE VERIFICATION. IF FACILITY IS SEPARATED INTO DIFFERENT BASINS OR FOREBAYS, THE TABLE SHALL PROVIDE AREA DATA FOR EACH SEPARATE BASIN.
      (vi) WETLAND AREAS

   B. AS–BUILT SURVEYS SHALL BE PREPARED IN STATE PLANE COORDINATES NAD 83 DATUM.

   C. AS–BUILT SURVEYS SHALL BE PREPARED USING THE SAME VERTICAL DATUM AS USED ON THE APPROVED DESIGN PLANS.

   D. ALL DRAWINGS SHALL BEAR THE FOLLOWING STATEMENTS SIGNED BY THE SURVEYOR:

      "I HEREBY SIGN, DATE AND AFFIX MY SEAL TO CERTIFY THAT THE AS–BUILT/RECORD DRAWING SURVEY SHOWN IS CORRECT AND ACCURATE."

      _____
      S.C. REGISTERED PROFESSIONAL LAND SURVEYOR

2. THE CONTRACTOR SHALL SUBMIT PRELIMINARY VERSIONS OF THE AS–BUILT/RECORD DRAWINGS TO THE ENGINEER FOR REVIEW PRIOR TO SUBMITTING TO BERKELEY COUNTY FOR REVIEW.

3. UPON RECEIPT OF ANY COMMENTS FROM THE ENGINEER, THE CONTRACTOR SHALL MAKE ALL NECESSARY CORRECTIONS AND RESUBMIT FINAL VERSIONS OF THE AS–BUILT/RECORD DRAWINGS TO THE ENGINEER FOR FORWARDING TO BERKELEY COUNTY FOR REVIEW AND/OR APPROVAL.

4. UPON RECEIPT OF ANY COMMENTS FROM BERKELEY COUNTY, THE CONTRACTOR SHALL MAKE ALL NECESSARY CORRECTIONS AND RESUBMIT CORRECTED FINAL VERSIONS OF THE AS–BUILT/RECORD DRAWINGS TO THE ENGINEER FOR FORWARDING TO BERKELEY COUNTY FOR REVIEW AND/OR APPROVAL.

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

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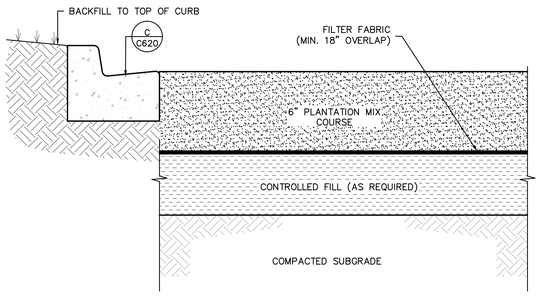
DRAWN: WWP/LOA
REVISION:

CIVIL DETAILS - SWPPP NOTES

C612



A PLANTATION MIX SECTION
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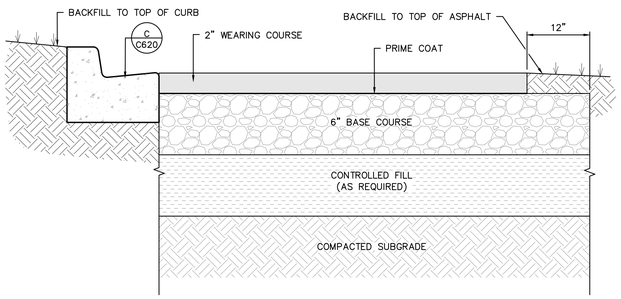
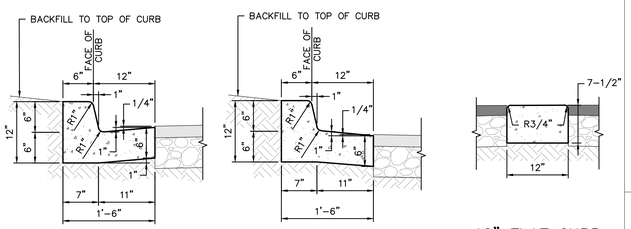


B TYPICAL ASPHALTIC CONCRETE PAVEMENT SECTION



18" STANDARD

18" REVERSED PITCH

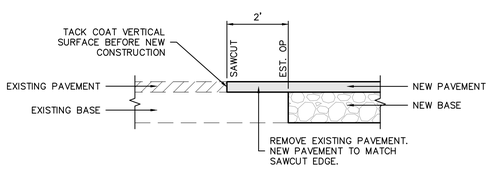
12" FLAT CURB

NOTES:

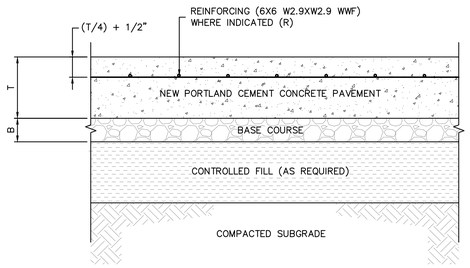
1. WHERE PAVEMENT SLOPE IS TOWARDS CURB, USE STANDARD.
2. WHERE PAVEMENT SLOPE IS AWAY FROM CURB, USE REVERSE PITCHED.
3. PLACE CONTRACTION JOINTS AT 10' INTERVAL (5' MIN.).
4. PLACE EXPANSION JOINTS AT 50' MAXIMUM INTERVALS AND WHERE NEW CURB ABUTS EXISTING CURBS OR STRUCTURES.
5. CURB & GUTTER SHALL BE IN ACCORDANCE WITH SCDOT STANDARD DRAWING NO. 720-105-01.

18" CURB AND GUTTER

C CURB/CURB AND GUTTER DETAILS



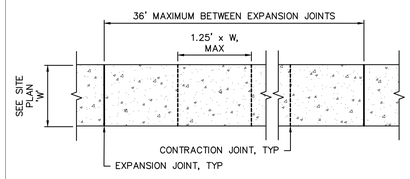
D PAVEMENT TIE-IN TO EXISTING PAVEMENT



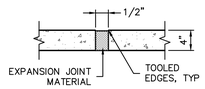
	T	B
HEAVY DUTY	8"	6"

PAVEMENT THICKNESS = T
BASE COURSE THICKNESS = B

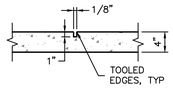
E TYPICAL PORTLAND CEMENT CONCRETE PAVEMENT SECTION



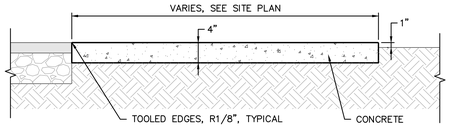
PLAN



EXPANSION JOINT



CONTRACTION JOINT

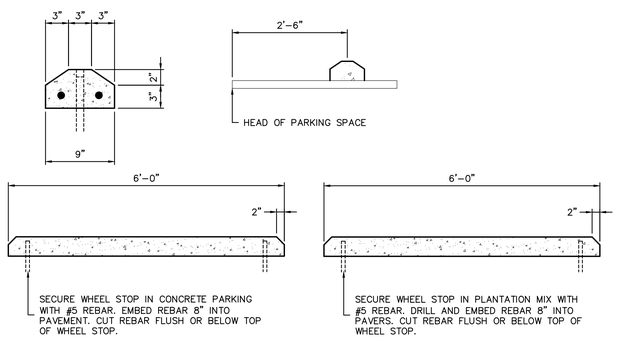


SECTION

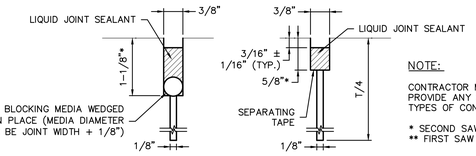
NOTES:

1. PROVIDE EXPANSION JOINTS WHERE SIDEWALK ABUTS STRUCTURES OR OTHER SIDEWALKS.
2. SIDEWALK SHALL HAVE A CROSS SLOPE NO LESS THAN 1% AND NO GREATER THAN 2%.

F SIDEWALK DETAIL



G CONCRETE WHEEL STOP DETAIL

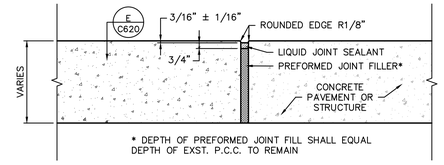


NOTE:

CONTRACTOR MAY AT HIS OPTION, PROVIDE ANY ONE OF THE ABOVE TYPES OF CONTRACTION JOINTS.

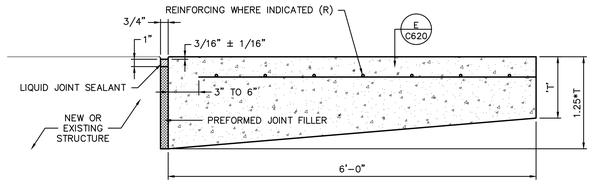
* SECOND SAW CUT
** FIRST SAW CUT

CONTRACTION JOINTS (CJ)

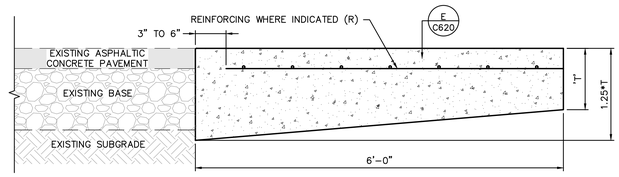


* DEPTH OF PREFORMED JOINT FILL SHALL EQUAL DEPTH OF EXST. P.C.C. TO REMAIN

EXPANSION JOINT (EJ)



THICKENED EDGE EXPANSION JOINT (TEEJ)



THICKENED EDGE (TE)

PAVEMENT THICKNESS = T

H PAVEMENT JOINTS

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

ADC ENGINEERING INC. No. 00253

STATE OF SOUTH CAROLINA
No. 14557
CHRISTOPHER B. COX

CITY OF HANAHAN SOUTH CAROLINA

ADC ENGINEERING
1226 YEAMANS HALL ROAD
HANAHAN, SC 29410
843-566-0161
ADCENGINEERING.COM

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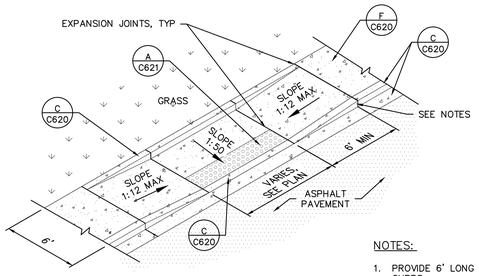
DATE: 5/12/2023
ADC PROJECT #: 20381
DESIGNED: WWP/CBC
CHECKED: CBC
DRAWN: WWP/LOA
REVISION:

CIVIL DETAILS-
PAVEMENT

C620

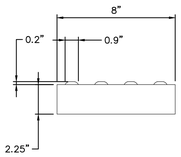
100% CONSTRUCTION DOCUMENTS

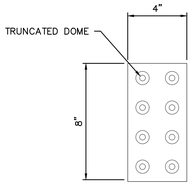


NOTES:

1. PROVIDE 6' LONG RAMP FOR 6" TALL CURBS.
2. PROVIDE 8' LONG RAMP WHEN 8" TALL CURB IS BEING UTILIZED FOR FORCE PROTECTION.

TRANSITION RAMP





DETECTABLE WARNING PAVER

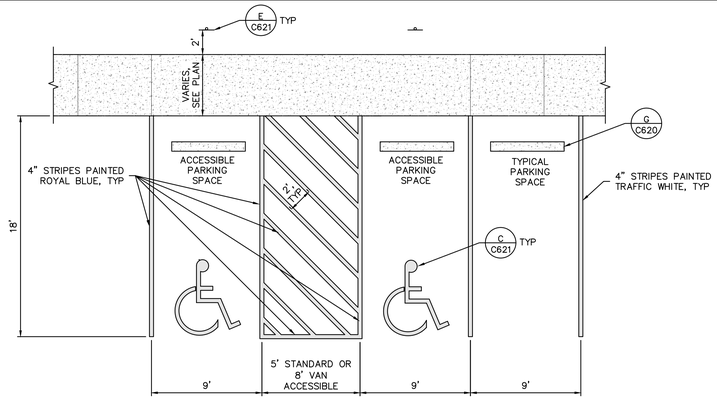
DETECTABLE WARNING NOTES:

1. DETECTABLE WARNING SHALL BE CONCRETE PAVERS. MATCH COLOR OF OTHER ON-SITE CONCRETE PAVERS.
2. INSTALL PAVERS ON 1" LATEX MODIFIED SETTING BED ON 4" CONCRETE SLAB.
3. INSTALL PAVERS IAW MANUFACTURER'S STANDARD INSTRUCTIONS.
4. PLACE ALL DETECTABLE WARNING SURFACES FLUSH WITH TOP OF SIDEWALK.

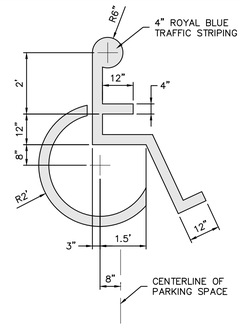
NOTES:

1. CONSTRUCT PER AMERICANS WITH DISABILITIES ACT STANDARDS.
2. REFER TO PLANS FOR ADJACENT SLOPES.
3. THE CROSS SLOPE OF THE RAMP SURFACE SHALL BE NO GREATER THAT 1:50.
4. THE SURFACE OF RAMP SHALL HAVE A TRANSVERSE BROOMED SURFACE TEXTURE ROUGHER THAN THE SURROUNDING SIDEWALK.
5. PROVIDE DETECTABLE WARNINGS AS SHOWN.

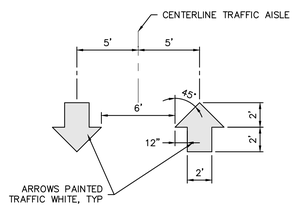
A ACCESSIBLE SIDEWALK RAMPS



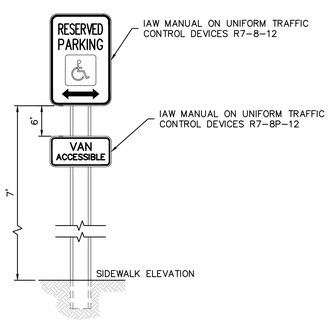
B ACCESSIBLE PARKING DETAIL



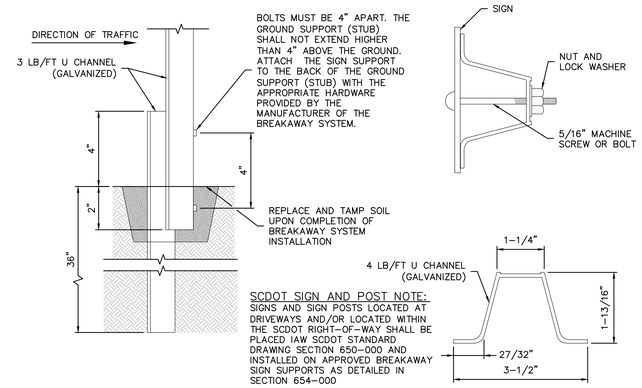
C INTERNATIONAL SYMBOL OF ACCESSIBILITY



D INTERIOR ARROW DETAIL



E ACCESSIBLE PARKING SIGN



SCDOT SIGN AND POST NOTE:
SIGNS AND SIGN POSTS LOCATED AT DRIVEWAYS AND/OR LOCATED WITHIN THE SCDOT RIGHT-OF-WAY SHALL BE PLACED IAW SCDOT STANDARD DRAWING SECTION 650-000 AND INSTALLED ON APPROVED BREAKAWAY SIGN SUPPORTS AS DETAILED IN SECTION 654-000

F BREAKAWAY SIGN POST DETAIL UPDATED 8/6/20 LH REVISED

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

ADC ENGINEERING INC. No. 00253

SOUTH CAROLINA No. 14587 CHRISTOPHER B. COX

CITY OF HANAHAN SOUTH CAROLINA

ADC ENGINEERING
1226 YEAMANS HALL ROAD
HANAHAN, SC 29410
843-566-0161
ADCENGINEERING.COM

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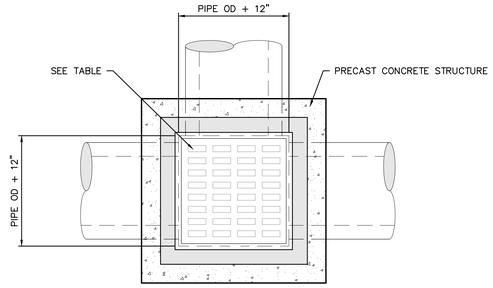
DESIGNED:	WWP/CBC
CHECKED:	CBC
DRAWN:	WWP/LOA
REVISION:	

CIVIL DETAILS - PAVEMENT

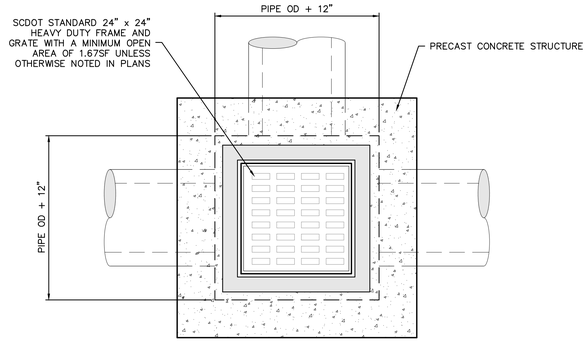
C621

100% CONSTRUCTION DOCUMENTS



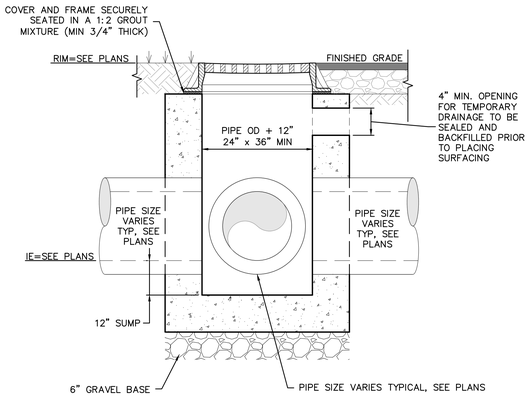
PLAN VIEW – CATCH BASIN WITHOUT SLAB TOP

FINISHED GRADE, PAVING, OR TURF NOT SHOWN THIS VIEW

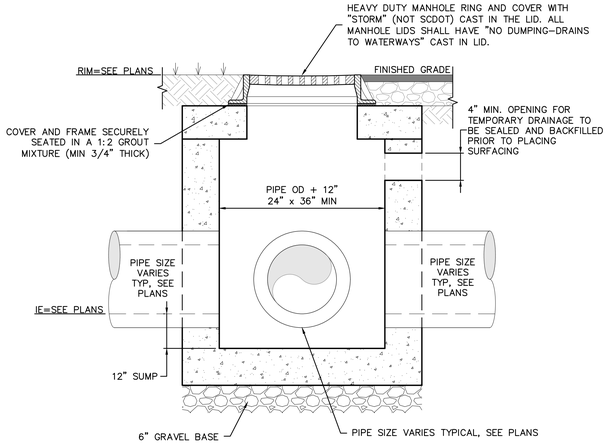


PLAN VIEW – CATCH BASIN WITH SLAB TOP

FINISHED GRADE, PAVING, OR TURF NOT SHOWN THIS VIEW



SECTION VIEW CATCH BASIN WITHOUT SLAB TOP



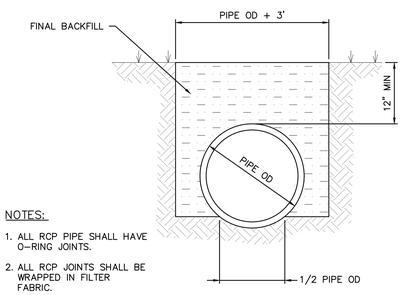
SECTION VIEW CATCH BASIN WITH SLAP TOP

NOTES:

1. PRECAST STRUCTURES SHALL BE DESIGNED BY MANUFACTURER FOR SOIL LOADING AND HS–20 TRAFFIC LOADING.
2. REFER TO PLANS AND PROFILES FOR RIM AND INVERT ELEVATIONS.
3. COVER AND FRAME SHALL BE TRAFFIC RATED WITH "NO DUMPING – DRAINS TO WATERWAYS" CAST INTO COVER.
4. FOR STRUCTURES GREATER THAN 4' IN DEPTH, PROVIDE STEPS AT 16" ON CENTER AND IN ACCORDANCE WITH SPECIFICATIONS.
5. ALL PIPE CONNECTIONS SHALL BE MADE WITH FLEXIBLE BOOTS PER SPECIFICATIONS.

STRUCTURE TABLE				
STR. NAME	TYPE	"A" (IN)	"B" (IN)	FRAME AND GRATE MODEL #
X	X	X	X	X

CB (A) CATCH BASIN DETAILS

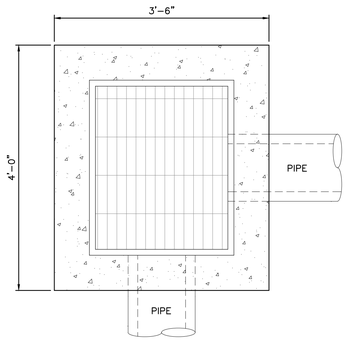


NOTES:

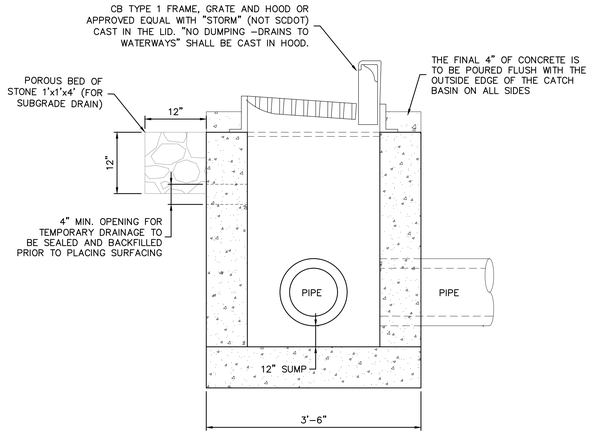
1. ALL RCP PIPE SHALL HAVE O–RING JOINTS.
2. ALL RCP JOINTS SHALL BE WRAPPED IN FILTER FABRIC.

(B) REINFORCED CONCRETE PIPE TRENCH

NOT TO SCALE



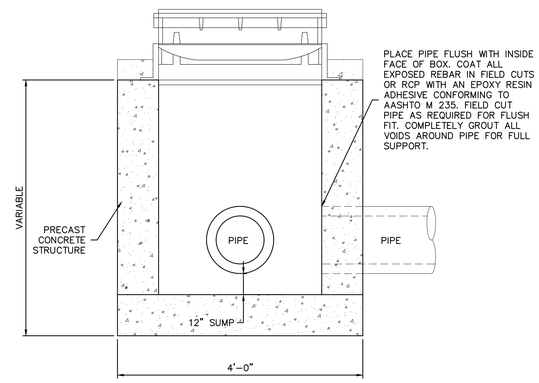
TOP VIEW



SECTION

NOTES:

1. REFER TO SCDOT STANDARD DRAWINGS 719–001–01 TO 719–001–05 FOR CATCH BASIN TYPE 1.
2. REFER TO SCDOT STANDARD DRAWINGS 719–017–01 AND 719–017–02 FOR CATCH BASIN TYPE 17.
3. CONTRACTOR SHALL OFFSET TEMPORARY DRAIN OPENING TO AVOID CONFLICT WITH PERMANENT DRAIN PIPES.
4. IF STRUCTURE DEPTH EXCEEDS 4', METAL STEPS ARE TO BE PLACED ON WALL SPACED 16" ON CENTER.
5. REFER TO PLANS AND PROFILES FOR RIM AND INVERT ELEVATIONS.
6. PRECAST STRUCTURES SHALL BE DESIGNED BY MANUFACTURER FOR SOIL LOADING AND HS–20 TRAFFIC LOADING.



SECTION

(C) SCDOT TYPE 1 HOODED CURB INLET

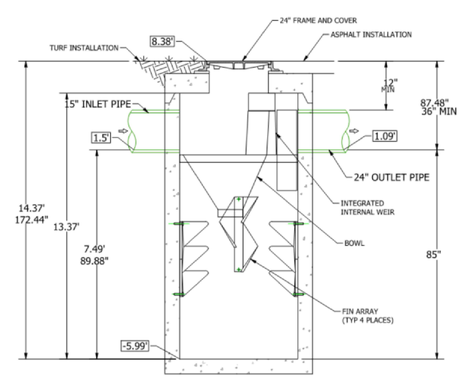
PRODUCT SPECIFICATIONS

- THE STORMWATER TREATMENT UNIT SHALL BE AN INLINE UNIT CAPABLE OF CONVEYING 100% OF THE DESIGN PEAK FLOW. IF PEAK FLOW RATES EXCEED MAXIMUM HYDRAULIC RATE, THE UNIT SHALL BE INSTALLED OFFLINE.
- THE BARRACUDA UNIT SHALL BE DESIGNED TO REMOVE AT LEAST 80% OF THE SUSPENDED SOLIDS ON AN ANNUAL AGGREGATE REMOVAL BASIS. SAID REMOVAL SHALL BE BASED ON FULL-SCALE THIRD PARTY TESTING USING OK-110 MEDIA GRADATION OR EQUIVALENT AND 360 mg/L INFLUENT CONCENTRATION. SAID FULL SCALE TESTING SHALL HAVE INCLUDED SEDIMENT CAPTURE BASED ON ACTUAL TOTAL MASS COLLECTED BY THE STORMWATER TREATMENT UNIT.
  -OR -
  THE BARRACUDA UNIT SHALL BE DESIGNED TO REMOVE AT LEAST 50% OF TSS USING A MEDIA MIX WITH d50=75 MICRON AND 200 MG/L INFLUENT CONCENTRATION.
  -OR -
  THE BARRACUDA UNIT SHALL BE DESIGNED TO REMOVE AT LEAST 50% OF TSS PER CURRENT NJDEP/NJCAT HDS PROTOCOL.

INCLUDES WEIR SCREEN. INCLUDES OUTLET SCREEN.

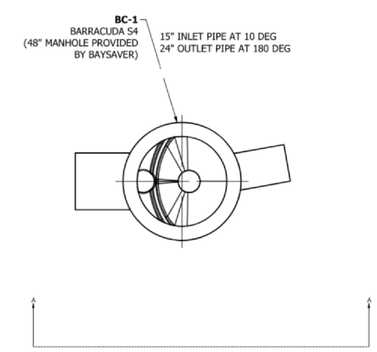
BARRACUDA S4	
UNIT ID	S4
PEAK FLOW RATE CFS	2.3
TREATMENT FLOW RATE CFS	0.42

*TREATMENT FLOW RATE PER OK-110



SECTION VIEW A-A

SCALE: N.T.S.



SITE SPECIFIC PLAN VIEW

SCALE 1:27

STEWARD STREET PARK
HANAHAN, SC 29410
(TMS 347-00-00-081)

DATE:
DRAWN:
CHECKED:
PROJECT #:

1030 Stone Ridge Drive
Mount Airy, MD 21771
1-800-634-5448
www.baysaver.com

ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026
Advanced Drainage Systems, Inc.

SCALE: AS NOTED

SHEET: 1 OF 1

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(D) WATER QUALITY UNIT

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

ADC ENGINEERING INC. No. 00253

SOUTH CAROLINA PROFESSIONAL ENGINEER No. 14557 CHRISTOPHER B. COX

CITY OF HANAHAN SOUTH CAROLINA

ADC ENGINEERING
1226 YEAMANS HALL ROAD
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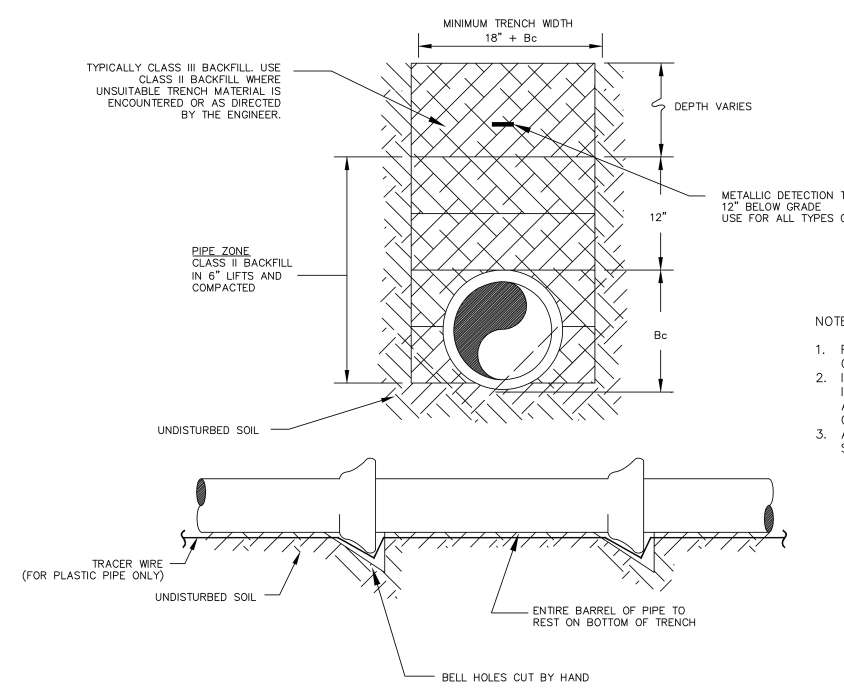
CIVIL DETAILS - STORM DRAINAGE

C630

100% CONSTRUCTION DOCUMENTS



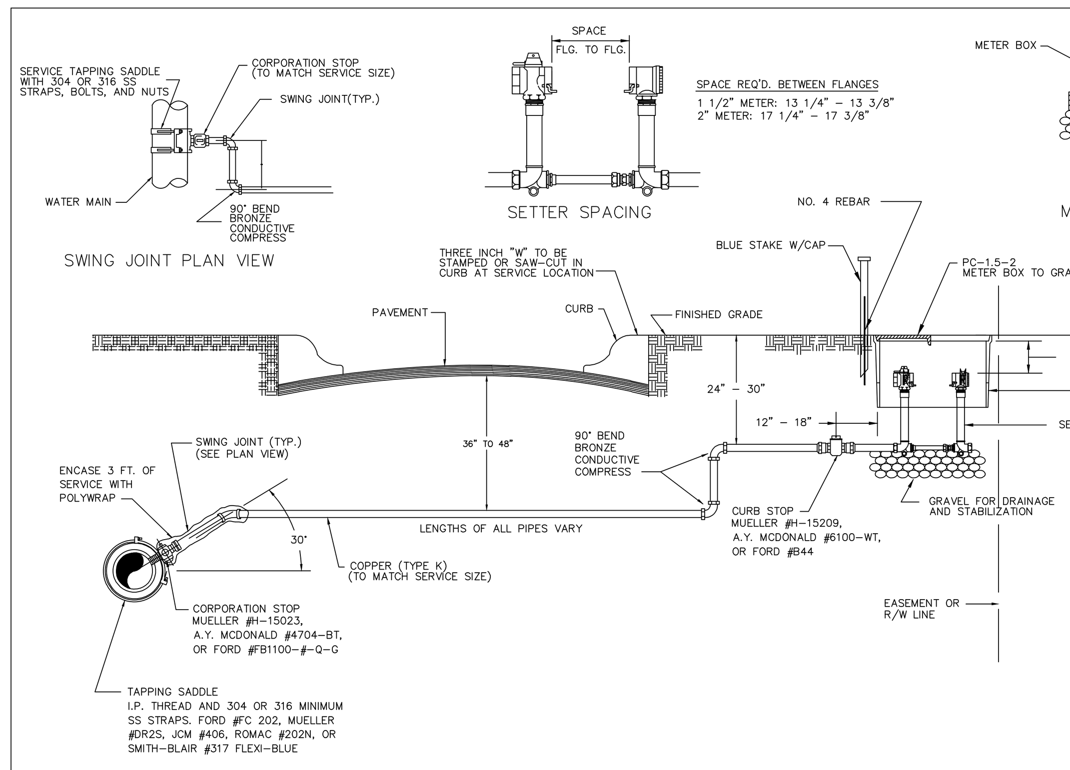
NOTES:

1. REFER TO SCDOT HIGHWAY DEPARTMENT, CITY, OR COUNTY PERMITS FOR ADDITIONAL REQUIREMENTS.
2. IF UNSUITABLE MATERIAL BENEATH FINAL PIPE GRADE IS ENCOUNTERED, SUCH MATERIAL SHALL BE REMOVED AND REPLACED WITH CRUSHED STONE AND COMPACTED TO PROPER GRADE.
3. ANY DEBRIS ENCOUNTERED IN TRENCH EXCAVATION SHALL BE REMOVED.

(A) WATER MAIN BEDDING
NOT TO SCALE

THIS DETAIL IS AN "UNCONTROLLED" COPY OF A "CONTROLLED" DOCUMENT. NO REVISION OR MODIFICATION OF THIS DETAIL SHALL BE MADE WHATSOEVER WITHOUT PRIOR WRITTEN APPROVAL FROM CHARLESTON WATER SYSTEM.

Charleston Water System
DOCUMENT NO.: EC-4.3.2-CD-W
REVISION DATE: NOV 1, 2015
DETAIL NO. 1



NOTES:

1. CONTRACTOR WILL PROVIDE ALL MATERIAL SHOWN OR INDICATED, AND INSTALL SERVICES UNDER CWS SUPERVISION.
2. ALL TAPS WILL BE MADE IN ACCORDANCE WITH CPW SPECIFICATIONS AND AWWA GUIDELINES FOR TAPPING THROUGH POLYETHELENE ENCASEMENT.
3. ALL METER BOXES SHALL BE INSTALLED PERPENDICULARLY TO THE RIGHT-OF-WAY LINE OR PROPERTY LINE, AS SHOWN HEREIN.
4. ALL METER BOXES TO BE INSTALLED WITHIN ROAD RIGHTS-OF-WAY UNLESS SPECIFIED OTHERWISE.
5. SETTER FOR 1 1/2" METER TO BE FORD #VBH76-15-44-66-G AND FOR 2" METER SETTER FORD #VBH77-15-44-77-G OR MUELLER #B-2422-2 FOR 1 1/2" OR 2" METERS WITH 15" RISER AND 110 COMPRESSION CONNECTION OR A.Y. MCDONALD 21-615WDGG 660 FOR 1 1/2" METER AND 21-715WDGG 770 FOR 2" METER.

(D) 1 ½" AND 2" WATER SERVICE
NOT TO SCALE

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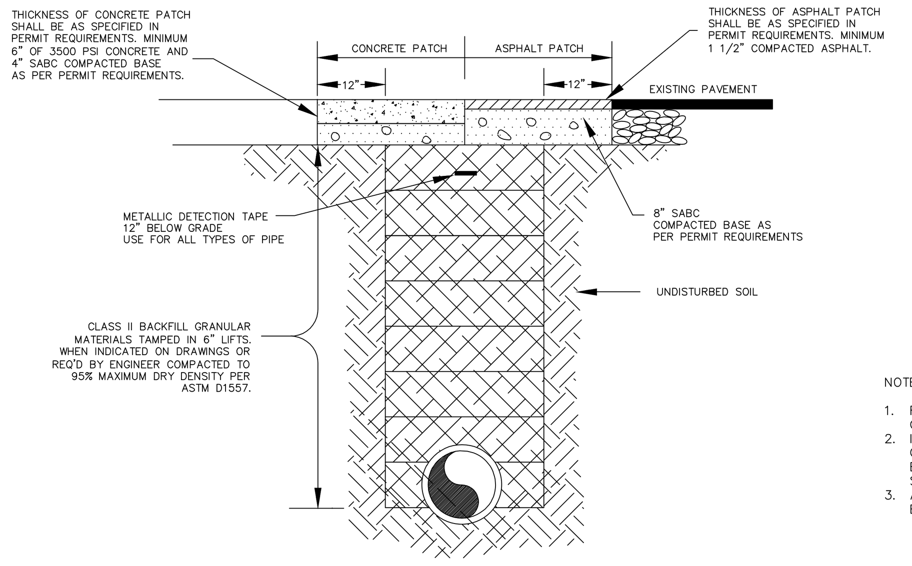
Charleston Water System
DOCUMENT NO.: EC-4.3.2-CD-W
REVISION DATE: NOV 1, 2015
DETAIL NO. 21

NOTE:
THICKNESS OF CONCRETE PATCH SHALL BE AS SPECIFIED IN PERMIT REQUIREMENTS. MINIMUM 6" OF 3500 PSI CONCRETE AND 4" SABC COMPACTED BASE AS PER PERMIT REQUIREMENTS.

NOTE:
THICKNESS OF ASPHALT PATCH SHALL BE AS SPECIFIED IN PERMIT REQUIREMENTS. MINIMUM 1 1/2" COMPACTED ASPHALT.



NOTES:

1. REFER TO SCDOT HIGHWAY DEPARTMENT, CITY, OR COUNTY PERMITS FOR ADDITIONAL REQUIREMENTS.
2. IF UNSUITABLE MATERIAL BENEATH FINAL PIPE GRADE IS ENCOUNTERED, SUCH MATERIAL SHALL BE REMOVED AND REPLACED WITH CRUSHED STONE AND COMPACTED TO PROPER GRADE.
3. ANY DEBRIS ENCOUNTERED IN TRENCH EXCAVATION SHALL BE REMOVED.

(B) MAIN UNDER PAVED DRIVEWAY
NOT TO SCALE

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Charleston Water System
DOCUMENT NO.: EC-4.3.2-CD-W
REVISION DATE: NOV 1, 2015
DETAIL NO. 3

NOTES:

1. THE FOLLOWING CONDITIONS WERE USED TO CALCULATE THE RESTRAINED LENGTHS SHOWN IN THE TABLE:
   - LAYING CONDITION IS TYPE 3
   - SOIL DESIGNATED AS SAND-SILT
   - DEPTH IS 3 FT.
   - DESIGN PRESSURE (TEST) IS 150 P.S.I.
   - SAFETY FACTOR IS 1.5
   - PIPE IS POLYETHYLENE ENCASED

   FOR THE TEE BRANCH AND REDUCER, LENGTHS ARE BASED ON BRANCHING AND REDUCING FROM THE NEXT LARGER SIZE IN THE TABLE. TEE BRANCH LENGTH BASED ON RUN LENGTH TO FIRST JOINT OF 10 FT. DEVIATIONS FROM THESE CONDITIONS MUST BE BASED ON THE ABOVE PARAMETERS.
2. REFER TO CWS MINIMUM STANDARDS FOR APPROVED RESTRAINING METHODS.
3. THE FOLLOWING RESTRAINING GLANDS AND GASKETS ARE APPROVED PRODUCTS:
   FOR DUCTILE IRON PIPE
   - AMERICAN CAST IRON PIPE – FAST GRIP, FLEX-RING, FIELD FLEX-RING, OR LOCK-RING
   - US PIPE – TR FLEX OR FIELD LOK 350 GASKETS
   - GRIFFIN PIPE – SNAP-LOK RESTRAINED JOINT, OR TALON RJ GASKET
   - EBAA – MEGALUG RESTRAINT GLAND
   - FORD – SERIES 1400 RESTRAINT GLAND
   - SIGMA – ONE-LOK SERIES SLD RESTRAINT GLAND
   - MCWANE – SURE STOP 350 RESTRAINT GASKET

   FOR PVC PIPE
   - EBAA MEGALUG SERIES 2000PV
   - FORD SERIES 1500 WILL BE USED ON EXISTING PVC PIPE

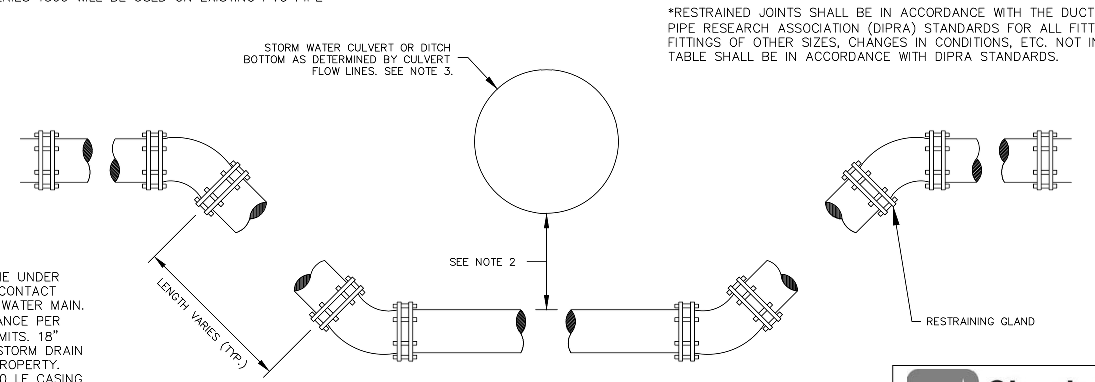
RESTRAINT JOINT TABLE

RESTRAIN ALL JOINTS WITHIN THESE LENGTHS

(IN L.F. EACH SIDE OF THE FITTING)

SIZE	11 1/4°	22 1/2°	45°	90°	TEE BRANCH	DEAD END	REDUCER
4"	2	5	10	24	38	61	44
6"	4	7	14	33	64	85	47
8"	5	9	18	44	91	111	45
10"	6	11	22	52	113	132	46
12"	6	12	25	60	133	155	84
16"	8	16	32	76	177	198	84
20"	9	18	38	91	218	238	83
24"	11	21	43	104	255	277	116

*RESTRAINED JOINTS SHALL BE IN ACCORDANCE WITH THE DUCTILE IRON PIPE RESEARCH ASSOCIATION (DIPRA) STANDARDS FOR ALL FITTINGS. FITTINGS OF OTHER SIZES, CHANGES IN CONDITIONS, ETC. NOT IN THIS TABLE SHALL BE IN ACCORDANCE WITH DIPRA STANDARDS.



NOTES:

1. DO NOT PLACE STONE UNDER CULVERT IN DIRECT CONTACT WITH POLYWRAP ON WATER MAIN.
2. 36" MINIMUM CLEARANCE PER PUBLIC AGENCY PERMITS. 18" CLEARANCE UNDER STORM DRAIN LINES ON PRIVATE PROPERTY.
3. MAIN SHALL BE IN 10 LF CASING WITH SPACERS WHEN UNDER ANY DRAIN LINES GREATER THAN 24" OR A DITCH DRAINING INTO SUCH A STORM DRAIN LINE. NO JOINTS ARE ALLOWED IN CASING.

(C) VERTICAL OFFSET
NOT TO SCALE

THIS DETAIL IS AN "UNCONTROLLED" COPY OF A "CONTROLLED" DOCUMENT. NO REVISION OR MODIFICATION OF THIS DETAIL SHALL BE MADE WHATSOEVER WITHOUT PRIOR WRITTEN APPROVAL FROM CHARLESTON WATER SYSTEM.

Charleston Water System
DOCUMENT NO.: EC-4.3.2-CD-W
REVISION DATE: JAN 1, 2016
DETAIL NO. 6

NOTES FOR WATER SYSTEM: (E)

1. WATER INSTALLATION SHALL BE IN ACCORDANCE WITH "TEN STATES STANDARDS", S.C.D.H.E.C. REGULATIONS, AND CHARLESTON WATER SYSTEM'S "MINIMUM STANDARDS FOR THE DESIGN & CONSTRUCTION OF WATER AND SANITARY SEWER SYSTEMS" AS FOUND AT www.charlestonwater.com. BACKFLOW PREVENTION REQUIREMENTS CAN ALSO BE FOUND AT www.charlestonwater.com.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING ALL TAPS. TAPS REQUIRING A SLEEVE SHALL BE NO CLOSER TO A JOINT THAN 4 FEET.
3. THRUST BLOCKING SHALL BE USED ONLY ON WET TAPS. CONTRACTOR SHALL NOTIFY CWS INSPECTOR A MINIMUM OF 72 HOURS (THREE FULL WORKING DAYS) PRIOR TO MAKING ANY WET TAP.
4. ROUGH GRADING SHALL BE DONE PRIOR TO INSTALLATION OF WATER MAINS.
5. CONTRACTOR SHALL MAINTAIN BETWEEN 36" – 48" COVER OVER TOP OF PIPE.
6. ALL COMPONENTS OF THE PIPING SYSTEM SHALL BE NEW DUCTILE IRON AND ENCLOSED WITH LINEAR LOW-DENSITY 8 MILS BLUE POLYETHYLENE ENCASEMENT.
7. ALL VALVES AND HYDRANTS SHALL OPEN CLOCKWISE, EXCEPT ON THE FORMER NAVAL BASE, WHERE THE VALVES SHALL OPEN COUNTERCLOCKWISE..
8. MEGALUG, FORD SERIES 1400, OR SIGMA ONE-LOK RETAINER GLANDS SHALL BE USED FOR ALL FITTINGS, VALVES. AND HYDRANTS.
9. RESTRAINED LENGTHS SHALL BE IN MULTIPLES OF A FULL LENGTH OF PIPE.
10. USE 45° OR FLATTER BENDS WHEN GOING UNDER RCP AND DO NOT INSTALL VALVES, HYDRANTS, OR SERVICES ON DEEP PIPE SECTIONS.
11. WHERE POSSIBLE, HORIZONTAL WATERLINES SHALL BE DEFLECTED IN LIEU OF USING BENDS. DEFLECTIONS SHALL NOT EXCEED 75% OF MANUFACTURER'S SPECIFICATIONS.
12. WHERE WATER AND SANITARY SEWER LINES CROSS WITHIN 18", THE LINE LAID LAST SHALL HAVE A FULL LENGTH OF PIPE INSTALLED WITH ITS MIDPOINT VERTICALLY IN LINE WITH THE OTHER LINE. THE CROSSING SHALL BE AT NOT LESS THAN A 45° ANGLE.
13. ALL MATERIAL SHALL CONFORM TO CWS SPECIFICATIONS AS TO MANUFACTURER, TYPE, AND DESIGN.
14. DEVELOPER'S ENGINEER SHALL INSPECT PROJECT WEEKLY TO PROVIDE WRITTEN WEEKLY UPDATES TO CWS INSPECTOR AND TO CERTIFY THE CORRECTNESS OF THE WATER PORTION OF CONTRACTOR'S RECORD DRAWINGS.
15. CONTRACTOR INSTALLING THE WATER SYSTEM SHALL BE ON CWS'S "APPROVED CONTRACTORS LIST".
16. COORDINATE INSPECTION OF THE BACKFLOW DEVICES WITH CWS CROSS CONNECTION DEPARTMENT BY CALLING (843) 727-6981. WATER SERVICE SHALL NOT BE TURNED ON UNTIL ALL BACKFLOW DEVICES HAVE PASSED INSPECTION.
17. DEVELOPER SHALL TAKE NECESSARY MEASURES TO PROTECT CWS WATER SYSTEM DURING THE TIME BETWEEN THE COMMISSIONING INSPECTION AND THE 2-YEAR MAINTENANCE BOND INSPECTION.
18. CHARLESTON WATER SYSTEM RESERVES THE RIGHT NOT TO INSTALL WATER METERS IF METER BOXES ARE NOT LOCATED AND ON GRADE IN COMPLIANCE WITH ITS MINIMUM STANDARDS.
19. ALL METER VAULTS AND ASSOCIATED PIPING 3" AND LARGER SHALL BE INSTALLED BY CWS UNLESS APPROVED IN WRITING BY THE CWS WATER DISTRIBUTION ENGINEER.

THIS DETAIL IS AN "UNCONTROLLED" COPY OF A "CONTROLLED" DOCUMENT. NO REVISION OR MODIFICATION OF THIS DETAIL SHALL BE MADE WHATSOEVER WITHOUT PRIOR WRITTEN APPROVAL FROM CHARLESTON WATER SYSTEM.

Charleston Water System
DOCUMENT NO.: EC-4.3.2-CD-W
REVISION DATE: NOV 1, 2015
DETAIL NO. 37

City of Hanahan
Hanahan, South Carolina
STEWARD STREET PARK
HANAHAN
SOUTH CAROLINA

ADC ENGINEERING
1226 YEAMANS HALL ROAD
HANAHAN, SC 29410
843-566-0161
ADCENGINEERING.COM

811 Know what's below. Call before you dig.

DATE: 5/12/2023
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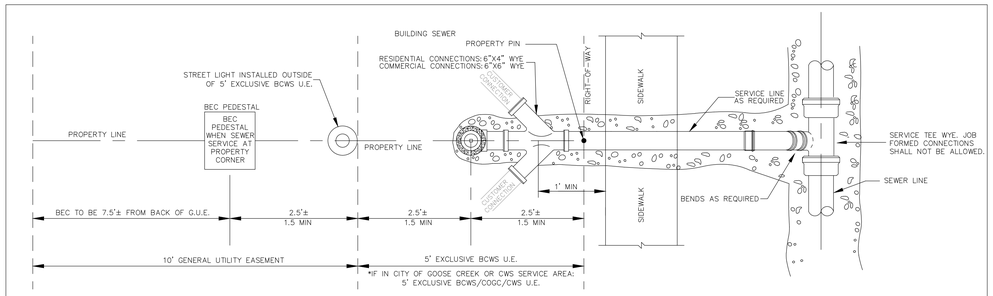
REVISION:

CIVIL DETAILS - WATER - CWS

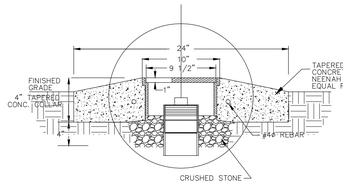
C640

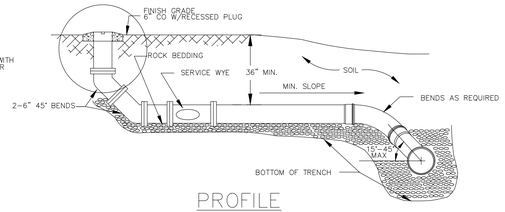
100% CONSTRUCTION DOCUMENTS



PLAN

UTILITY LAYOUT APPROVED BY BCWS AND BEC





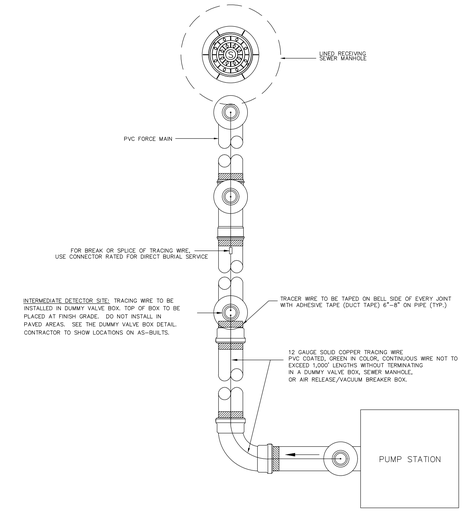
PROFILE

A TYPICAL SERVICE CONNECTION DETAIL

NOT TO SCALE

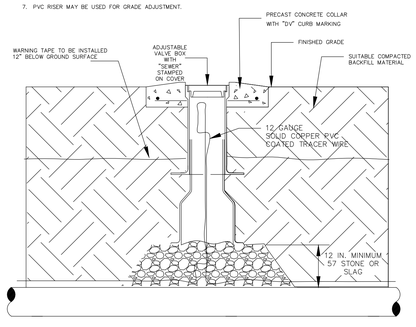
SEWER PANEL 1A

BERKELEY COUNTY WATER AND SANITATION
POTABLE WATER & SANITARY SEWER STANDARDS
REVISED 05/15/20



NOTES:

1. OPEN CUT INSTALLATIONS WILL REQUIRE 12 GAUGE PVC COATED COPPER WIRE.
2. TRENCHLESS INSTALLATIONS WILL REQUIRE FOUR #14 WIRES BEING INSTALLED WITH THE PIPE AND CONNECTED TO THE TRACER WIRE AT BOTH ENDS, OR CAD WELDED TO THE EXISTING IRON PIPE AT BOTH ENDS.
3. CONTRACTOR SHALL INSTALL DUMMY VALVE BOXES AT INTERVALS NO GREATER THAN 1,000 FEET, INCLUDING ONE AT THE DISCHARGE POINT.
4. THE WIRE AND TAPE SHALL MEET BCWS STANDARDS.
5. TRACER WIRE SHALL BE GREEN IN COLOR FOR FORCE MAIN.
6. TRACER WIRE BOX TO BE INSTALLED WITHIN 10' OF THE RECEIVING MANHOLE.
7. PVC RISER MAY BE USED FOR GRADE ADJUSTMENT.



TRACER WIRE BOX DETAIL

NOT TO SCALE

B TRACING WIRE INSTALLATION DETAIL

NOT TO SCALE

SEWER PANEL 6

BERKELEY COUNTY WATER AND SANITATION
POTABLE WATER & SANITARY SEWER STANDARDS
Rev. 05/15/20

SEWER NOTES:

1. SEWER INSTALLATION SHALL BE IN ACCORDANCE WITH "TEN STATES STANDARDS," SC DHEC AND BCWS REGULATIONS.
2. ALL SANITARY SEWER SERVICES SHALL BE LAID ON A MINIMUM SLOPE OF 0.5% AND SHALL BE 6" PVC UNLESS INCIDENCES NOTED IN NOTE NO. 10 OCCUR, OR OTHERWISE SPECIFIED.
3. CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING WITH BCWS AT LEAST 72 HOURS PRIOR TO BEGINNING WORK.
4. CONTRACTOR SHALL VERIFY THE LOCATION AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO BEGINNING WORK. CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES FOUND IN THE FIELD OR ON THE DRAWINGS PRIOR TO BEGINNING OR CONTINUING WORK. ANY DEVIATIONS FROM THE CONSTRUCTION PLANS SHALL NEED TO BE APPROVED IN WRITING BY BCWS.
5. CONNECTION TO EXISTING SEWER SYSTEM SHALL BE MADE IN THE PRESENCE OF BCWS INSPECTOR WITH AT LEAST 72 HOURS ADVANCED NOTICE.
6. CONTRACTOR SHALL PLACE 6" SERVICES AND STUB UP TO EXISTING GRADE. CONCRETE COLLARS SHALL BE PLACED AROUND 6" CLEAN OUT. FOR FUTURE CUSTOMERS THE CONTRACTOR SHALL PLACE 4" CONNECTIONS CAPPED OFF.
7. WATERTIGHT RINGS AND COVERS SHALL BE INSTALLED ON MANHOLES IN SIDEWALK, AREAS AFFECTED BY STREET RUNOFF OR BELOW THE 50 YEAR FLOOD ELEVATION. MANHOLE COVER SHALL BE INSTALLED COMPLETELY WITHIN OR COMPLETELY OUT OF PAVED AREAS (INCLUDING SIDEWALKS).
8. MANHOLES RECEIVING FORCE MAIN DISCHARGE SHALL BE COATED WITH RAVEN 405 LINER OR APPROVED EQUIVALENT AS WELL AS THE NEXT DOWNSTREAM MANHOLE, UNLESS OTHERWISE DIRECTED BY BCWS. ADDITIONAL MANHOLES MAY ALSO BE REQUIRED BASED ON PROXIMITY.
9. ALL DUCTILE IRON PIPES, JOINTS AND FITTINGS SHALL BE LINED WITH PROTECTO 401 CERAMIC EPOXY COATING.
10. SDR-26 PVC OR DR18 C900 IN STEEL CASING SHALL BE USED WHEN:
    - CROSSING BENEATH STORM DRAINAGE PIPE WITH LESS THAN 2' OF CLEARANCE;
    - FLOWABLE FILL USE BASED ON BCWS REVIEW AND APPROVAL.
11. SELECTION OF PIPE MATERIALS SHALL COMPLY WITH THE FOLLOWING:
    - LESS THAN THREE (<3') OF COVER: CLASS 52 DIP;
    - GREATER THAN 3 FEET BUT LESS THAN 15 FEET (>3' BUT <15') IN DEPTH: SDR-26 PVC AND IN ACCORDANCE WITH CROSSING REQUIREMENTS LISTED ABOVE;
    - GREATER THAN 15 FEET BUT LESS THAN 24 FEET (>15' BUT <24') IN DEPTH: DR-18 C900 PVC;
12. SEWER SERVICE CONNECTIONS LOCATED AT DEPTHS GREATER THAN 15' SHALL BE MADE WITH SOLID MOLDED C900 FITTINGS FOR 8" GRAVITY MAINS. P401 LINED DIP TEE TO BE INSTALLED FOR GRAVITY MAINS 10" OR GREATER.
13. CLEAN OUTS SHALL BE INSTALLED WITHIN THE RIGHT-OF-WAY OR GENERAL UTILITY EASEMENT (GUE) AND HAVE A MINIMUM OF 18" SEPARATION FROM SIDEWALKS. INSTALL CLEAN OUTS AT THE COMMON PROPERTY CORNER UNLESS OTHERWISE NOTED ON THE CONSTRUCTION PLANS.
14. CONTRACTOR SHALL KEEP A RED-LINED SET OF THE CONSTRUCTION DRAWINGS ON SITE AT ALL TIMES.
15. UPON COMPLETION OF CONSTRUCTION OF THE SEWER SYSTEM, A MINIMUM 30 DAYS AFTER ALL PIPE HAS BEEN INSTALLED THE FOLLOWING APPROVAL PROCEDURE MUST BE FOLLOWED: FOLLOWED:
    A. THE CONTRACTOR SHALL SCHEDULE ALL REQUIRED TESTS AND INSPECTIONS WITH BCWS AT LEAST 72 HOURS IN ADVANCE.
    B. THE CONTRACTOR SHALL CONDUCT A PRELIMINARY INSPECTION TO LOCATE ANY DEFECTS AND DETERMINE WHEN THE SEWER SYSTEM IS READY FOR TESTS AND FINAL INSPECTION. PRIOR TO INSPECTION, THE SEWER SYSTEM SHALL BE FLUSHED AND CLEANED.
    C. THE ENGINEER SHALL SCHEDULE LOW PRESSURE AIR TEST AND DEFLECTION TEST WITH BCWS. DEFLECTION TEST SHALL BE CONDUCTED PRIOR TO LOW PRESSURE AIR TEST.
    D. THE CONTRACTOR SHALL SUPPLY TO THE OWNER'S ENGINEER AN AS-BUILT SURVEY, INCLUDING THE SERVICE LATERAL INFORMATION. THE LOCATIONS OF WHICH SHALL HAVE BEEN STAKED IN THE FIELD.
    E. A SET OF PRELIMINARY RECORD DRAWINGS SHALL BE PROVIDED TO BCWS INSPECTOR FOR CCTV INSPECTION VIDEO REVIEW.
    F. CCTV INSPECTION VIDEOS SHALL BE SUBMITTED FOR BCWS REVIEW. ANY NECESSARY REPAIRS ARE TO BE COMPLETED PRIOR TO SCHEDULING A FINAL INSPECTION.
    G. THE ENGINEER SHALL SUBMIT THE TEST RESULTS, RECORD DRAWINGS, CONTINUITY TEST CERTIFICATION LETTER AND ALL OTHER REQUIRED DOCUMENTS TO BCWS FOR REVIEW AND APPROVAL.
    H. THE ENGINEER SHALL SCHEDULE A FINAL INSPECTION WITH BCWS AT LEAST 72 HOURS IN ADVANCE.
16. LIMESTONE IS NOT AN APPROVED EMBEDMENT MATERIAL. USE #57 GRANITE, AIR COOLED BLAST FURNACE SLAG OR APPROVED MATERIALS LISTED IN BCWS SPECIFICATIONS.
17. MJ SLEEVES OR APPROVED ADAPTERS SHALL BE USED TO TRANSITION BETWEEN PVC AND DIP. FERNCO OR SIMILAR COUPLINGS ARE NOT ALLOWED.

C

SEWER PANEL 8

BERKELEY COUNTY WATER AND SANITATION
POTABLE WATER & SANITARY SEWER STANDARDS
REVISED 05/15/20

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEERING FIRM ADC ENGINEERING INC. No. 00253

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 14557 CHRISTOPHER B. COX

CITY OF HANAHAN SOUTH CAROLINA

ADC ENGINEERING
1226 YEAMANS HALL ROAD
HANAHAN, SC 29410
843-566-0161
ADCENGINEERING.COM

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DATE: 5/12/2023
ADC PROJECT #: 20381
DESIGNED: WWP/CBC
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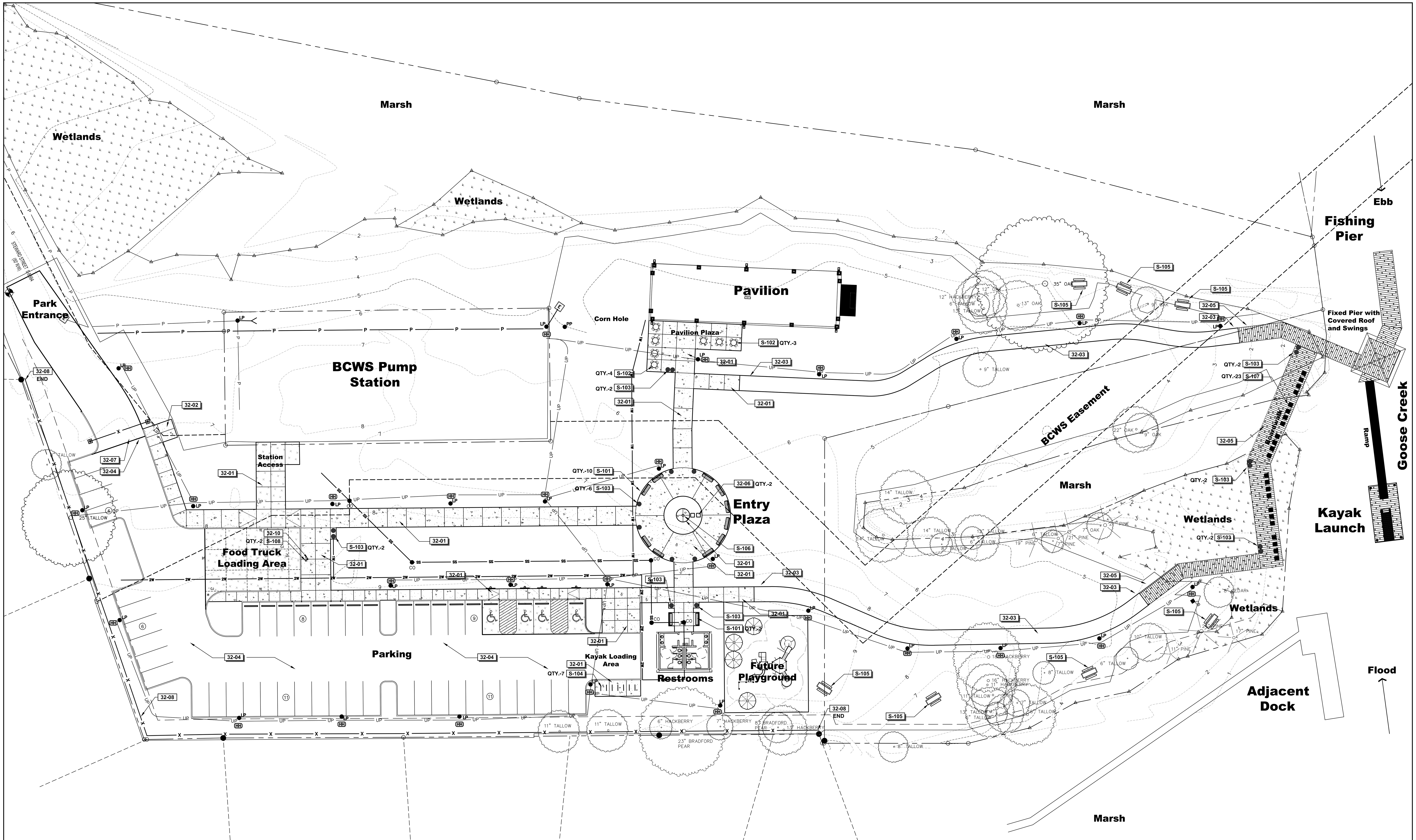
CIVIL DETAILS - SEWER- BCWS

C641

100% CONSTRUCTION DOCUMENTS



GENERAL NOTES

1. THE CONTRACTOR IS ADVISED TO VISIT THE SITE AND VERIFY FIELD CONDITIONS.

2. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE APPLICABLE BUILDING CODES. THE CONTRACTOR SHALL OBTAIN ALL LICENSES AND PERMITS REQUIRED FOR THE PERFORMANCE OF HIS WORK.

3. CONTRACTOR SHALL ASSURE POSITIVE DRAINAGE FROM ALL PLANT BEDS AND NEW CONSTRUCTION.

4. QUANTITIES LISTED ARE AN ESTIMATE FOR THE CONTRACTOR'S CONVENIENCE. CONTRACTOR MUST VERIFY COUNT FROM PLAN. DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT. COMPENSATION BY OWNER SHALL NOT BE IN ORDER FOR MISCALCULATIONS. SUBSTITUTIONS WILL NOT BE PERMITTED WITHOUT WRITTEN APPROVAL OF LANDSCAPE ARCHITECT AND OWNER.

5. EXISTING ECOLOGY AND AESTHETICS WILL OFTEN CAUSE ADJUSTMENT OF THESE PLANS TO FIT SITE. STAKE OUT BY CONTRACTOR AND FIELD ADJUSTMENT BY LANDSCAPE ARCHITECT ARE ABSOLUTELY NECESSARY.

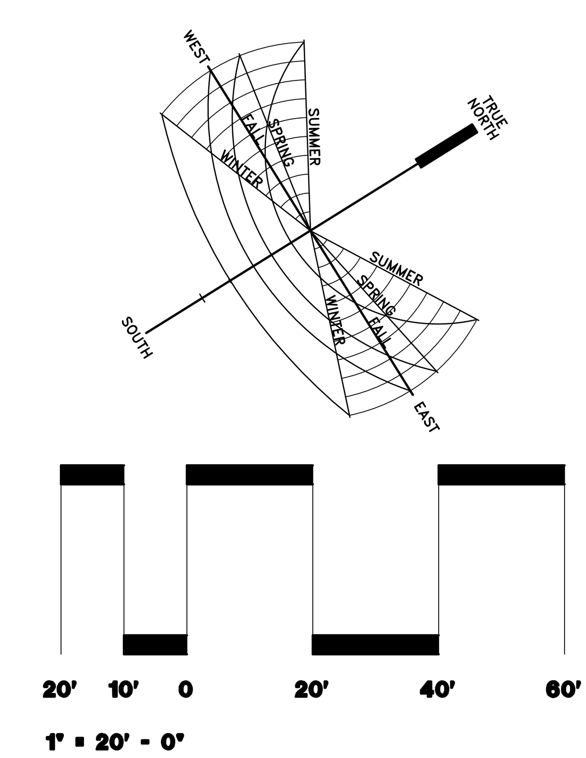
6. THE LOCATION OF ALL ABOVE GROUND AND BELOW GROUND UTILITIES ARE THE RESPONSIBILITY OF THE CONTRACTOR. DAMAGE TO UTILITIES AND PERSONAL INJURY AS A RESULT OF THE FAILURE TO DETERMINE AND/OR RESPECT UTILITY LOCATIONS ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. UTILITY LOCATIONS ARE NOT SHOWN ON THESE PLANS.

32 SITE IMPROVEMENTS SCHEDULE

SYMBOL	DESCRIPTION	DETAIL
32-01	CONCRETE WALK (SEE CIVIL)	
32-02	CONCRETE TRASH PAD	
32-03	PLANTATION MIX PATHWAY – SEE DETAIL	B/L301
32-04	PLANTATION MIX PARKING AREA (SEE CIVIL)	
32-05	BOARDWALK (SEE MARINE ENGINEER)	
32-06	CONCRETE STEPPING STONES (24" SQUARE)	
32-07	VEHICLE GATE – SEE DETAIL	D/L301
32-08	WOOD FENCE – SEE DETAIL	E/L301
32-10	FOOD TRUCK POWER PEDESTAL (SEE ELECTRICAL)	

SITE FURNISHINGS SCHEDULE

SYMBOL	DESCRIPTION	DETAIL
S-101	BENCHES – SEE DETAIL	B/L302
S-102	TABLE AND CHAIR SET – SEE DETAIL	D/L302
S-103	LITTER CAN – SEE DETAIL	C/L302
S-104	BICYCLE RACK – SEE DETAIL	A/L302
S-105	PICNIC TABLE	
S-106	FLAGPOLE – SEE DETAIL	A/L301
S-107	ROCKING CHAIR	
S-108	BOLLARD – SEE DETAIL	C/L301



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Hanahan, South Carolina

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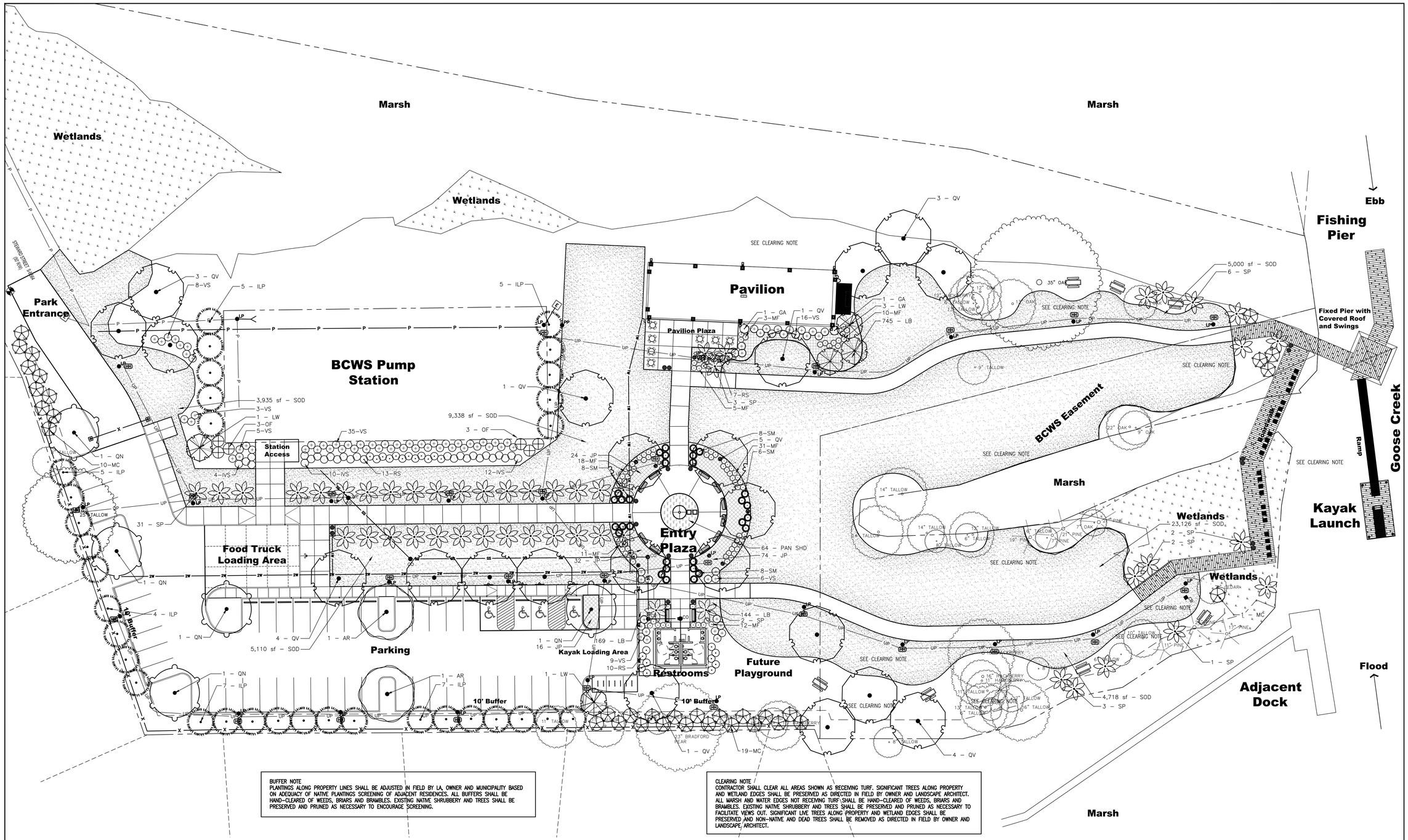
REVISION:	

LANDSCAPE
SITE
PLAN

L-100

100% CONSTRUCTION DOCUMENTS



BUFFER NOTE
PLANTINGS ALONG PROPERTY LINES SHALL BE ADJUSTED IN FIELD BY LA, OWNER AND MUNICIPALITY BASED ON ADEQUACY OF NATIVE PLANTINGS SCREENING OF ADJACENT RESIDENCES. ALL BUFFERS SHALL BE HAND–CLEARED OF WEEDS, BRIARS AND BRAMBLES. EXISTING NATIVE SHRUBBERY AND TREES SHALL BE PRESERVED AND PRUNED AS NECESSARY TO ENCOURAGE SCREENING.

CLEARING NOTE
CONTRACTOR SHALL CLEAR ALL AREAS SHOWN AS RECEIVING TURF. SIGNIFICANT TREES ALONG PROPERTY AND WETLAND EDGES SHALL BE PRESERVED AS DIRECTED IN FIELD BY OWNER AND LANDSCAPE ARCHITECT. ALL MARSH AND WATER EDGES NOT RECEIVING TURF SHALL BE HAND–CLEARED OF WEEDS, BRIARS AND BRAMBLES. EXISTING NATIVE SHRUBBERY AND TREES SHALL BE PRESERVED AND PRUNED AS NECESSARY TO FACILITATE VIEWS OUT. SIGNIFICANT LIVE TREES ALONG PROPERTY AND WETLAND EDGES SHALL BE PRESERVED AND NON–NATIVE AND DEAD TREES SHALL BE REMOVED AS DIRECTED IN FIELD BY OWNER AND LANDSCAPE ARCHITECT.

GENERAL NOTES

1. THE CONTRACTOR IS ADVISED TO VISIT THE SITE AND VERIFY FIELD CONDITIONS.

2. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE APPLICABLE BUILDING CODES. THE CONTRACTOR SHALL OBTAIN ALL LICENSES AND PERMITS REQUIRED FOR THE PERFORMANCE OF HIS WORK.

3. ALL PLANT BEDS AND SHALL BE MULCHED WITH A MINIMUM OF 3" PINESTRAW MULCH. IF DRAWINGS DO NOT SHOW PAVEMENTS, GRASSING OR DRAINAGE STRUCTURES, CONTRACTOR SHALL ASSUME AREA IS TO BE MULCHED. ALL PLANT BEDS SHALL BE TREATED WITH PRE–EMERGENT HERBICIDE. CONTRACTOR SHALL ASSURE POSITIVE DRAINAGE FROM ALL PLANT BEDS AND NEW CONSTRUCTION.

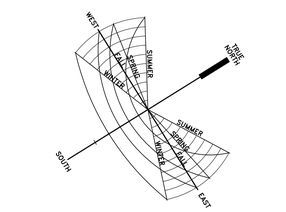
4. QUANTITIES LISTED ARE AN ESTIMATE FOR THE CONTRACTOR'S CONVENIENCE. CONTRACTOR MUST VERIFY COUNT FROM PLAN. DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT. COMPENSATION BY OWNER SHALL NOT BE IN ORDER FOR MISCALCULATIONS. SUBSTITUTIONS WILL NOT BE PERMITTED WITHOUT WRITTEN APPROVAL OF LANDSCAPE ARCHITECT AND OWNER.

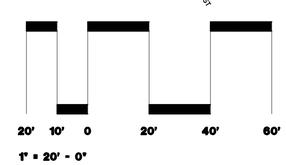
5. EXISTING ECOLOGY AND AESTHETICS WILL OFTEN CAUSE ADJUSTMENT OF THESE PLANS TO FIT SITE. STAKE OUT BY CONTRACTOR AND FIELD ADJUSTMENT BY LANDSCAPE ARCHITECT ARE ABSOLUTELY NECESSARY.

6. ALL PLANT MATERIAL SHALL BE GUARANTEED BY CONTRACTOR FOR A MINIMUM PERIOD OF ONE YEAR FROM DATE OF COMPLETION AND ACCEPTANCE BY OWNER.

7. THE LOCATION OF ALL ABOVE GROUND AND BELOW GROUND UTILITIES ARE THE RESPONSIBILITY OF THE CONTRACTOR. DAMAGE TO UTILITIES AND PERSONAL INJURY AS A RESULT OF THE FAILURE TO DETERMINE AND/OR RESPECT UTILITY LOCATIONS ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. UTILITY LOCATIONS ARE NOT SHOWN ON THESE PLANS.

8. ALL PLANT MATERIAL TO BE INSTALLED WITHIN DRIPLINE OF EXISTING TREES ARE TO BE DUG BY HAND AND NOT USE TILLING EQUIPMENT OR OTHER METHODS WHICH MAY SIGNIFICANTLY HARM TREE ROOTS. THESE TREES WILL ALSO NEED TO BE TREATED BY A CERTIFIED ARBORIST.





City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

ADC ENGINEERING INC. No. 00253

STATE OF SOUTH CAROLINA REGISTERED LANDSCAPE ARCHITECT No. 402 MICHAEL BUTTS

CITY OF HANAHAN SOUTH CAROLINA

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1226 YEAMANS HALL ROAD
HANAHAN, SC 29410
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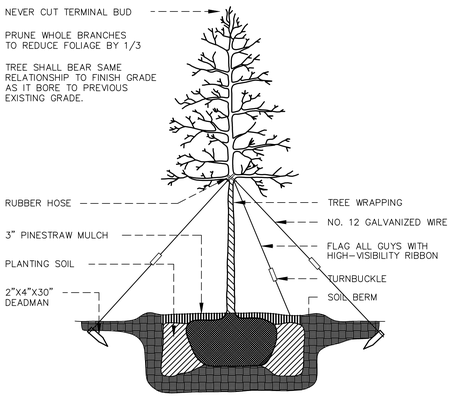
REVISION:	

LANDSCAPE PLANTING PLAN

L-200

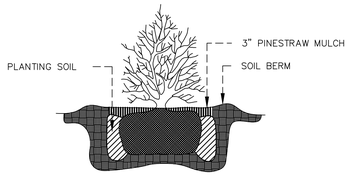
100% CONSTRUCTION DOCUMENTS



DETAIL - TREE PLANTING

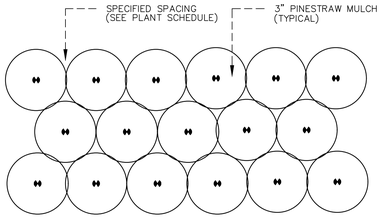
NO SCALE

PLANT SHALL BEAR SAME RELATIONSHIP TO FINISH GRADE AS IT BORE TO PREVIOUS EXISTING GRADE.



DETAIL - SHRUB PLANTING

NO SCALE



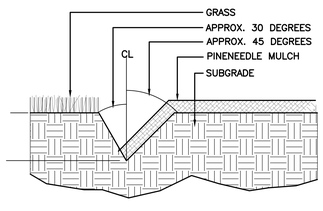
PLANT SHALL BEAR SAME RELATIONSHIP TO FINISH GRADE AS IT BORE TO PREVIOUS EXISTING GRADE.

DETAIL - GROUND COVER PLANTING

NO SCALE

NOTE:

EXCAVATE TRENCH BY HAND WITH SPADE. ADD EXCESS SOIL TO ADJACENT PLANT BED AFTER PULLING BACK EXISTING MULCH. RAKE SOIL AND SMOOTH BEFORE MULCHING.



DETAIL - V TRENCH EDGING

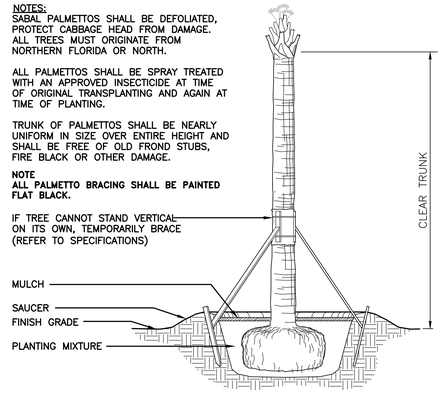
NO SCALE

NOTES:
SABAL PALMETTOS SHALL BE DEFOLIATED, PROTECT CABBAGE HEAD FROM DAMAGE. ALL TREES MUST ORIGINATE FROM NORTHERN FLORIDA OR NORTH.

ALL PALMETTOS SHALL BE SPRAY TREATED WITH AN APPROVED INSECTICIDE AT TIME OF ORIGINAL TRANSPLANTING AND AGAIN AT TIME OF PLANTING.

TRUNK OF PALMETTOS SHALL BE NEARLY UNIFORM IN SIZE OVER ENTIRE HEIGHT AND SHALL BE FREE OF OLD FROND STUBS, FIRE BLACK OR OTHER DAMAGE.

NOTE
ALL PALMETTO BRACING SHALL BE PAINTED FLAT BLACK.



DETAIL - PALMETTO PLANTING

NO SCALE

TREE PROTECTION

A.– THE CONTRACTOR SHALL BE RESPONSIBLE FOR PREVENTING DAMAGE TO EXISTING TREES LOCATED ALONG ACCESS AND HAUL ROADS, AND ADJACENT TO, OR WITHIN BUILDING CONSTRUCTION SITES AND MATERIAL AND EQUIPMENT STORAGE AREAS. THOSE TREES TO BE SAVED SHALL BE FLAGGED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

B.– CONTRACTOR WILL PROVIDE NECESSARY BARRICADES AND FENCING SO AS TO DIVERT AND DIRECT VEHICULAR AND PEDESTRIAN TRAFFIC AWAY FROM TREES. THE BARRICADES AND FENCING TYPE SHALL BE AS SHOWN ON THE CIVIL CONSTRUCTION DOCUMENTS.

C.– MATERIALS SHALL NOT BE STORED, NOR VEHICLES PARKED WITHIN THE DRIP–LINE OF THE TREES UNLESS AUTHORIZED BY LANDSCAPE ARCHITECT OR OWNER.

D.– VEHICLES AND EQUIPMENT SHALL NOT BE DRIVEN OVER EXPOSED ROOTS AND ROADS SHALL NOT BE LOCATED WITHIN THE DRIP–LINE OF TREES UNLESS APPROVAL IS OBTAINED FROM THE LANDSCAPE ARCHITECT.

E.– ALL TREES INTENDED TO BE SAVED WHICH HAVE BEEN DAMAGED DUE TO CONSTRUCTION PRACTICES, SHALL BE INSPECTED AND TREATED BY A CERTIFIED ARBORIST AT THE CONTRACTOR'S EXPENSE.

F.– NO CUTTING OR FILLING OF EXISTING GRADE, TRENCHING, OR PRUNING SHALL OCCUR UNLESS SPECIFICALLY DIRECTED BY THE CONSTRUCTION DOCUMENTS, OR THE WRITTEN CONSENT OF THE LANDSCAPE ARCHITECT AND OWNER.

G.– NO BURNING OF TRASH IS ALLOWED ON SITE.

TREE MAINTENANCE

FERTILIZATION
FERTILIZE THE DRIP–LINE OF ALL TREES WITH A BALANCED FERTILIZER AT THE RATE OF 2 POUNDS OF NITROGEN PER 1000 SQUARE FEET. FERTILIZATION SHALL BE BY THE "DEEP ROOT FEEDING" METHOD AND SHALL BE APPLIED DURING SPRING AND FALL BY A CERTIFIED ARBORIST.

INSECT AND DISEASE CONTROL
ALL TREES SHALL BE INSPECTED ON A SEMI–ANNUAL BASIS, DURING CONSTRUCTION, FOR INSECT AND DISEASE INFESTATION. ANY NOTED INFESTATIONS SHALL BE TREATED WITH AN APPROVED PESTICIDE AS PER MANUFACTURER RECOMMENDATIONS.

PRUNING
TREES SHALL BE INSPECTED, BEFORE AND AFTER CONSTRUCTION, BY A CERTIFIED ARBORIST AND PROPERLY PRUNED AS REQUIRED. ALL WEAK GROWTH SHALL BE REMOVED. ALL BRANCHES OVER 1" DIAMETER SHALL BE REMOVED BY THE DOUBLE CUT METHOD AND TREATED AS NECESSARY TO PREVENT INFECTION. NEVER TOP OR SHEAR EXISTING TREES.

SOIL
THE EXISTING SOIL SHALL BE TESTED BY A QUALIFIED SOILS LABORATORY. SOIL AMENDMENTS SHALL BE ADDED AS DIRECTED BY THE LABORATORY TO ENSURE THE PROPER SOIL PH.

GENERAL NOTES

1. THE CONTRACTOR IS ADVISED TO VISIT THE SITE AND VERIFY FIELD CONDITIONS.

2. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE APPLICABLE BUILDING CODES. THE CONTRACTOR SHALL OBTAIN ALL LICENSES AND PERMITS REQUIRED FOR THE PERFORMANCE OF HIS WORK.

3. ALL PLANT BEDS AND SHALL BE MULCHED WITH A MINIMUM OF 3" PINESTRAW MULCH. IF DRAWINGS DO NOT SHOW PAVEMENTS, GRASSING OR DRAINAGE STRUCTURES, CONTRACTOR SHALL ASSUME AREA IS TO BE MULCHED. ALL PLANT BEDS SHALL BE TREATED WITH PRE–EMERGENT HERBICIDE. CONTRACTOR SHALL ASSURE POSITIVE DRAINAGE FROM ALL PLANT BEDS AND NEW CONSTRUCTION.

4. QUANTITIES LISTED ARE AN ESTIMATE FOR THE CONTRACTOR'S CONVENIENCE. CONTRACTOR MUST VERIFY COUNT FROM PLAN. DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT. COMPENSATION BY OWNER SHALL NOT BE IN ORDER FOR MISCALCULATIONS. SUBSTITUTIONS WILL NOT BE PERMITTED WITHOUT WRITTEN APPROVAL OF LANDSCAPE ARCHITECT AND OWNER.

5. EXISTING ECOLOGY AND AESTHETICS WILL OFTEN CAUSE ADJUSTMENT OF THESE PLANS TO FIT SITE. STAKE OUT BY CONTRACTOR AND FIELD ADJUSTMENT BY LANDSCAPE ARCHITECT ARE ABSOLUTELY NECESSARY.

6. ALL PLANT MATERIAL SHALL BE GUARANTEED BY CONTRACTOR FOR A MINIMUM PERIOD OF ONE YEAR FROM DATE OF COMPLETION AND ACCEPTANCE BY OWNER.

7. THE LOCATION OF ALL ABOVE GROUND AND BELOW GROUND UTILITIES ARE THE RESPONSIBILITY OF THE CONTRACTOR. DAMAGE TO UTILITIES AND PERSONAL INJURY AS A RESULT OF THE FAILURE TO DETERMINE AND/OR RESPECT UTILITY LOCATIONS ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. UTILITY LOCATIONS ARE NOT SHOWN ON THESE PLANS.

8. ALL PLANT MATERIAL TO BE INSTALLED WITHIN DRIPLINE OF EXISTING TREES ARE TO BE DUG BY HAND AND NOT USE TILLING EQUIPMENT OR OTHER METHODS WHICH MAY SIGNIFICANTLY HARM TREE ROOTS. THESE TREES WILL ALSO NEED TO BE TREATED BY A CERTIFIED ARBORIST.

PLANT SCHEDULE

TREES	CODE	BOTANICAL / COMMON NAME	CONTAINER	HEIGHT	CALIPER	WIDTH	QTY
	AR	ACER RUBRUM 'BLAZE' / BLAZE RED MAPLE	B&B/CONT.	3.0–3.5" CAL.	12" HT. MIN.		2
	ILP	ILEX OPACA 'EAST PALATKA' / AMERICAN HOLLY	CONTAINER	2" CAL. MIN.	8' HT. MIN.	FULL TO GROUND	33
	LW	LAGERSTROEMIA X 'NATCHEZ' / WHITE CRAPE MYRTLE	CONTAINER	2" CAL. MIN.	8'–10' HT.	MULTI–TRUNK	5
	QN	QUERCUS NUTTALLII / NUTTALL OAK	B&B/CONT.	3.0–3.5" CAL.	12" HT. MIN.		5
	QV	QUERCUS VIRGINIANA / SOUTHERN LIVE OAK	B&B/CONT.	3.0–3.5" CAL.	12" HT. MIN.		22
	SP	SABAL PALMETTO / PALMETTO	B&B		12–15' HT.	BOOTED, MATCH HEAD HEIGHTS	50
SHRUBS	CODE	BOTANICAL / COMMON NAME	CONTAINER	HEIGHT	SPACING	WIDTH	QTY
	GA	GARDENIA JASMINOIDES 'AUGUST BEAUTY' / GARDENIA	7 GAL	CONTAINER	3–4' HT		2
	IVS	ILEX VOMITORIA 'STOKES DWARF' / DWARF YAUPON	3 GAL	12–15" SP.			26
	MF	MUHLENBERGIA CAPILLARIS / SWEETGRASS	1 GAL.	CONTAINER	18" MIN. HT.	FULL CONTAINER	90
	MC	MYRICA CERIFERA / WAX MYRTLE	7 GAL	CONTAINER	3–4' HT		34
	OF	OSMANTHUS FRAGRANS / TEA OLIVE	7 GAL	CONTAINER	5–6' HT.		6
	RS	RHAPHIOLEPIS INDICA 'CLARA' TM / CLARA INDIAN HAWTHORNE	3 GAL	CONTAINER	18–24" SP.		30
	SM	SABAL MINOR / DWARF PALMETTO	3 GAL	CONTAINER	18–24" HT		30
	VS	VIBURNUM SUSPENSUM / SANDANKWA VIBURNUM	3 GAL	CONTAINER	18–24" HT		83
GROUND COVERS	CODE	BOTANICAL / COMMON NAME	CONTAINER	SIZE	SPACING		
	SOD	CYNODON DACTYLON 'TIFTUFF' / TIF TUFF BERMUDAGRASS SOD	SOD				51,227 SF
	JP	JUNIPERUS DAVURICA 'PARSONII' / PARSON'S JUNIPER	1 GAL		@36" O.C.		146
	LB	LIRIOPE MUSCARI 'BIG BLUE' / BIG BLUE LILYTURF	4"POT		@12" O.C.		1,058
	PAN SHD	PANICUM VIRGATUM 'SHENANDOAH' / SHENANDOAH SWITCH GRASS	1 GAL		@24" O.C.		64

LANDSCAPE PLANT MATERIAL SHALL BE #1 QUALITY, AND MEET OR EXCEED ANLA STANDARDS.
LANDSCAPE ARCHITECT SHALL REVIEW ALL PLANT MATERIAL PRIOR TO INSTALLATION, CONTACT LANDSCAPE ARCHITECT 48 HOURS PRIOR TO DELIVERY TO SCHEDULE PLANT REVIEW ON SITE.
LANDSCAPE ARCHITECT/ OWNER RESERVES THE RIGHT TO REJECT ANY PLANT MATERIAL DEEMED UNFIT AND DOES NOT MEET THE HIGHEST STANDARDS.

CONTAINER SIZES GIVEN ARE FOR GENERAL INFORMATION PURPOSES ONLY. PLANTS SHALL BE INSTALLED PER SIZE (CALIPER, HEIGHT, WIDTH) SPECIFICATION, NOT BY CONTAINER SIZE.

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

SOUTH CAROLINA ADC ENGINEERING INC. No. 00253 CERTIFICATE OF AUTHORIZATION

STATE OF SOUTH CAROLINA REGISTERED LANDSCAPE ARCHITECT No. 402 MICHAEL BRUTTI

CITY OF HANAHAN SOUTH CAROLINA

ADC ENGINEERING
1226 YEAMANS HALL ROAD
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843-566-0161
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DATE: 5/12/2023
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CHECKED: CBC/WWP
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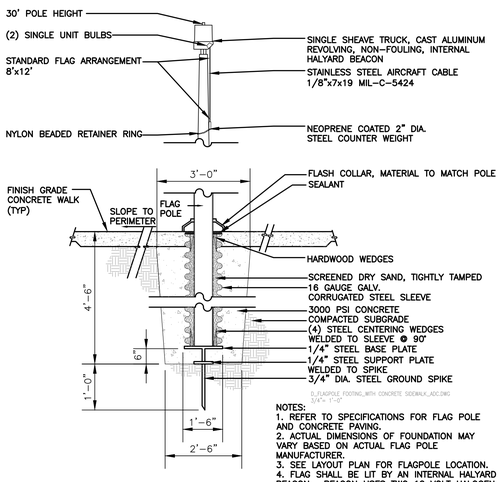
REVISION:

LANDSCAPE PLANTING DETAILS

L-300

100% CONSTRUCTION DOCUMENTS

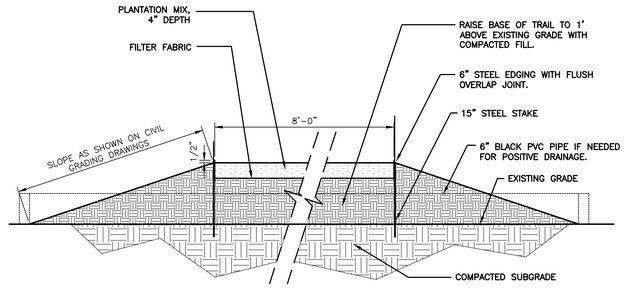


NOTES:
1. REFER TO SPECIFICATIONS FOR FLAG POLE AND CONCRETE PAVING.
2. ACTUAL DIMENSIONS OF FOUNDATION MAY VARY BASED ON ACTUAL FLAG POLE MANUFACTURER.
3. SEE LAYOUT PLAN FOR FLAGPOLE LOCATION.
4. FLAG SHALL BE LIT BY AN INTERNAL HALYARD BEACON. BEACON USES TWO 12 VOLT HALOGEN BULBS.

A DETAIL - FLAGPOLE
NOT TO SCALE

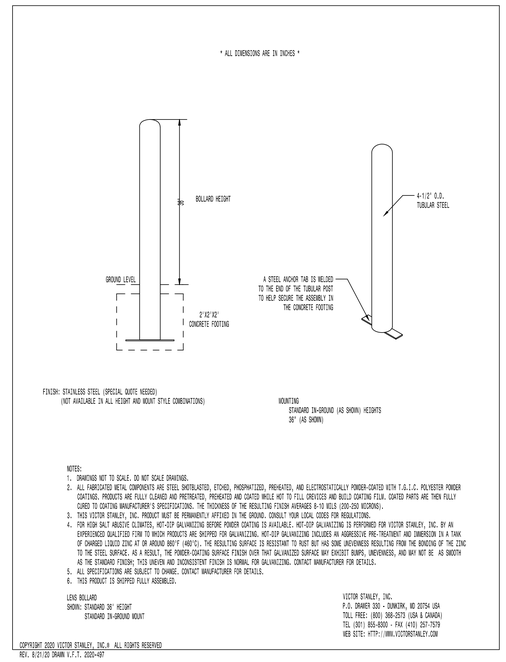
NOTES:
1. 6" STEEL EDGING AVAILABLE FROM BORDER CONCEPTS, INC. CHARLOTTE, NC www.borderconcepts.com, 704-541-5509 OR APPROVED EQUAL.

2. PLANTATION MIX PRE-MIXED OFF SIGHT TO BE 50%-GRANITE SCREENINGS & 50%-789 STONE. COMPACT IN 2 LIFTS.

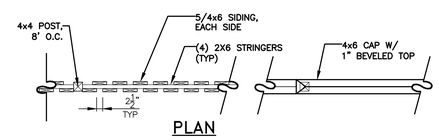


SECTION - PLANTATION MIX PATH

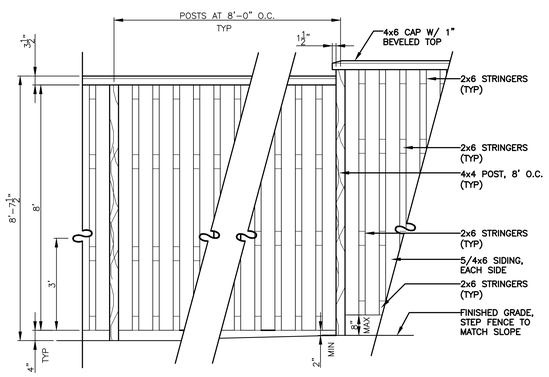
B DETAIL - PLANTATION MIX PATHWAY
NOT TO SCALE



C DETAIL - BOLLARD
NOT TO SCALE

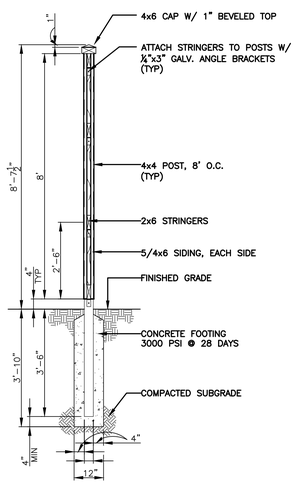


PLAN



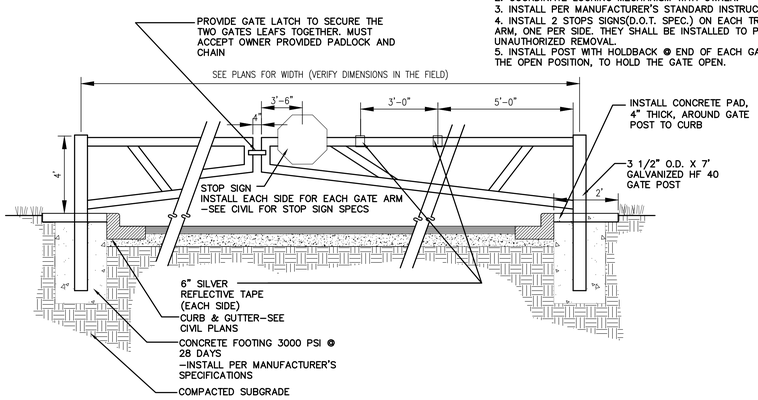
NOTES:
1. ALL POSTS SHALL BE SOUTHERN YELLOW PINE NO.2 TREATED FOR GROUND CONTACT.
2. ALL OTHER LUMBER SHALL BE PRESSURE TREATED SOUTHERN YELLOW PINE.
3. ALL WOOD SHALL BE LEFT NATURAL.
4. ALL FASTENERS SHALL BE HOT DIPPED GALVANIZED.

ELEVATION



SECTION

GENERAL NOTES:
1.GATE BY HOOVER FENCE, MODEL: V-SERIES TUBULAR BARRIER GATE (4' HIGH X 32' WIDE ALUMINUM DOUBLE TUBULAR); OR APPROVED EQUAL. WWW.HOOVERFENCE.COM
2. COORDINATE LOCKING MECHANISM WITH OWNER.
3. INSTALL PER MANUFACTURER'S STANDARD INSTRUCTIONS.
4. INSTALL 2 STOPS SIGNS(D.O.T. SPEC.) ON EACH TRAFFIC ARM, ONE PER SIDE. THEY SHALL BE INSTALLED TO PREVENT UNAUTHORIZED REMOVAL.
5. INSTALL POST WITH HOLDBACK @ END OF EACH GATE, IN THE OPEN POSITION, TO HOLD THE GATE OPEN.



D DETAIL - VEHICLE GATE
NOT TO SCALE

E DETAIL - WOOD FENCE
NOT TO SCALE

City of Hanahan
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STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

ADC ENGINEERING INC. No. 00253 — SOUTH CAROLINA

STATE OF SOUTH CAROLINA — REGISTERED LANDSCAPE ARCHITECT No. 402 — MICHAEL BUTTS

ADC ENGINEERING
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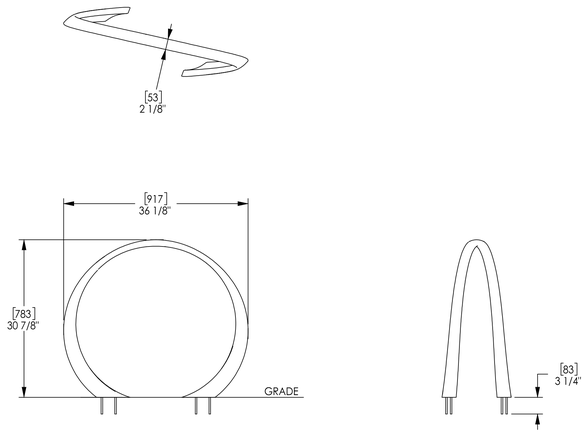
LANDSCAPE
SITE
DETAILS

L-301

100% CONSTRUCTION DOCUMENTS

Loop Bike Rack
Product Drawing
www.landscapeforms.com
Date: 2/2/2018
Ph: 800.521.2546

(4) 5/16-18 UNC-2A FULLY THREADED RODS,
4" LENGTH, INCLUDED



Drawing: AE100-02
Dimensions are in inches [mm]
U.S. Patent No. D754,032

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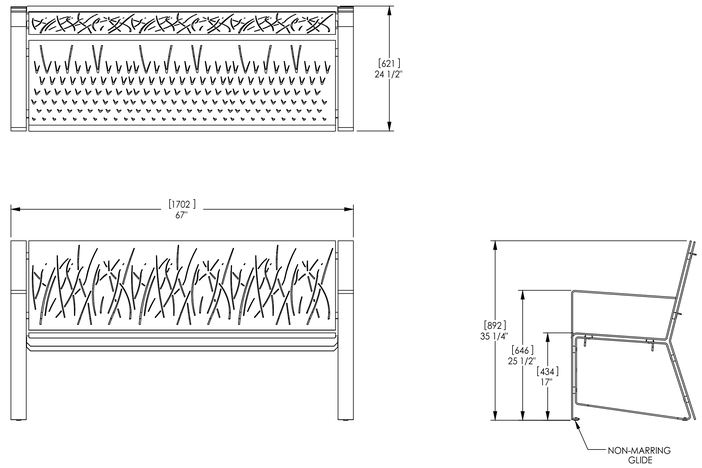
A DETAIL - BICYCLE RACK
NOT TO SCALE

Lakeside® Backed Bench, Grass Pattern, Freestanding/Surface Mount
Product Drawing
www.landscapeforms.com
Date: 11/8/2019
Ph: 800.521.2546



Drawing: LS606-01
Dimensions are in inches [mm]
U.S. Patent Nos.: D529,736; D536,549

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B DETAIL - BENCH
NOT TO SCALE

Lakeside® Top Opening Litter Receptacle, Freestanding / Surface Mount, Grass Side Panel
Product Drawing
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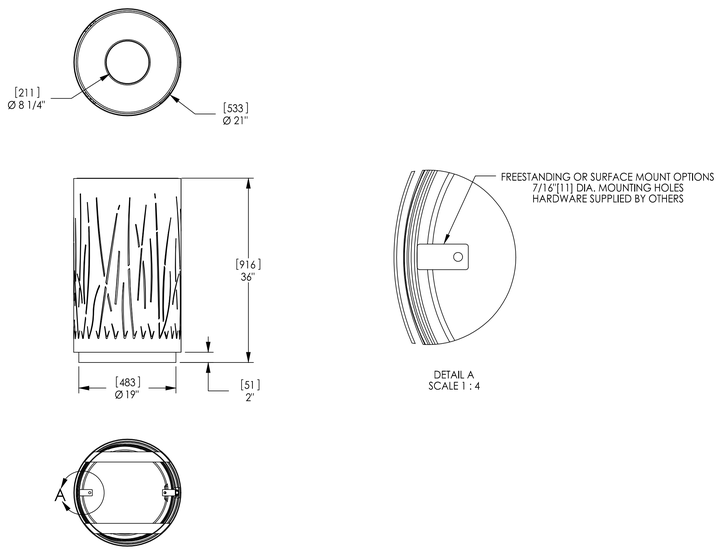

Drawing: LS601-02
Dimensions are in inches [mm]
U.S. Patent No.: D543,330

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C DETAIL - GRASS LITTER CAN
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Mingle® Table, Backed 4 seat, Freestanding, Perf
Product Drawing
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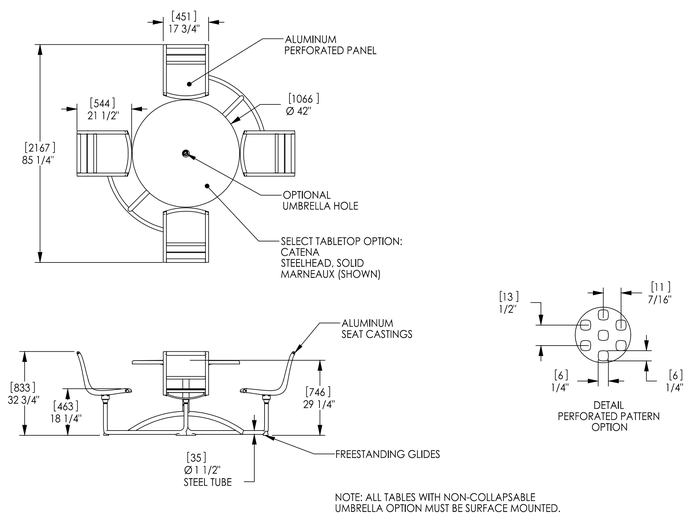

NOTE: ALL TABLES WITH NON-COLLAPSABLE
UMBRELLA OPTION MUST BE SURFACE MOUNTED.

Drawing: MG614-01
Dimensions are in inches [mm]
U.S. Patent Nos.: D513,566; D542,060

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D DETAIL - TABLE AND CHAIR SET
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Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

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STATE OF SOUTH CAROLINA REGISTERED LANDSCAPE ARCHITECT No. 402 MICHAEL BRUTTI

CITY OF HANAHAN SOUTH CAROLINA

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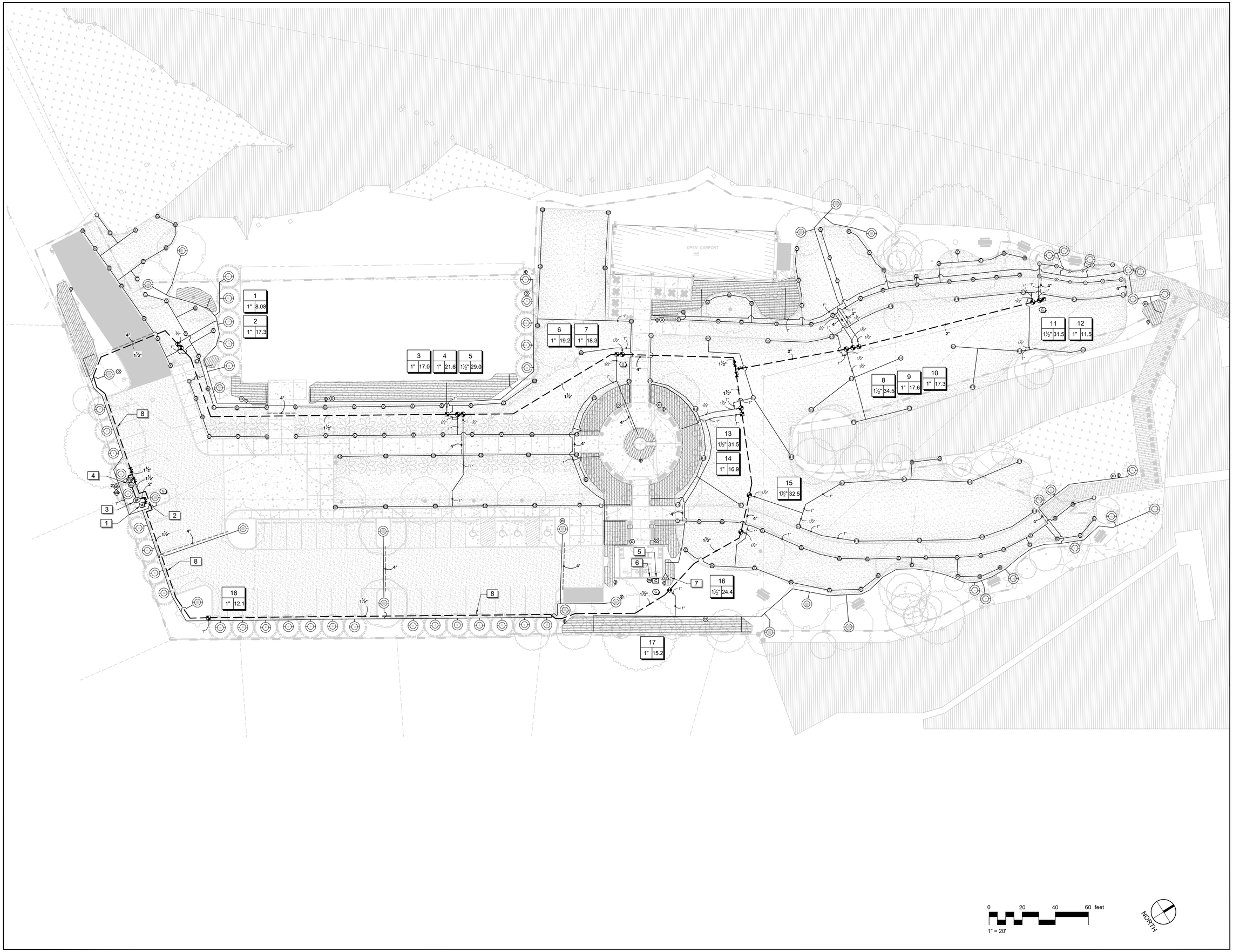
DETAILS

L-302

100% CONSTRUCTION DOCUMENTS



City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

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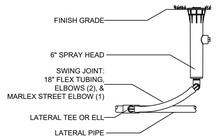
REVISION:	

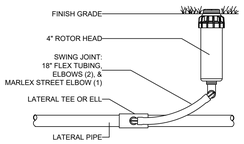
IRRIGATION PLAN

IR-100

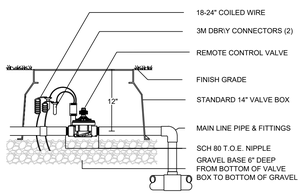
100% CONSTRUCTION DOCUMENTS



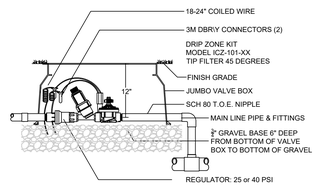
1 6" SPRAY BODY
NTS



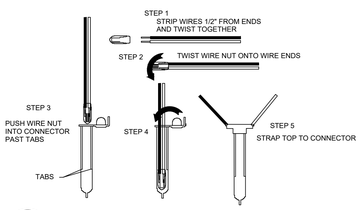
2 3/4" INLET ROTOR
NTS



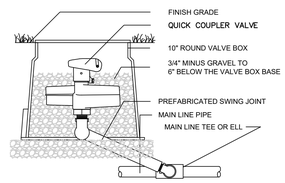
3 ELECTRIC CONTROL VALVE
NTS



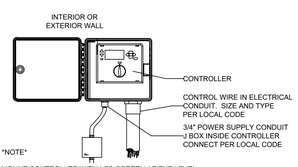
4 DRIP CONTROL ZONE
NTS



5 WIRE CONNECTION 3M-DBR6-Y
NTS

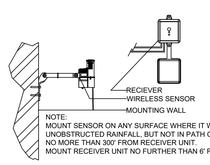


6 QUICK COUPLER VALVE
NTS



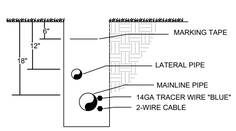
MOUNT CONTROLLER WITH LCD SCREEN AT EYE LEVEL.
CONTROLLER SHALL BE HARD-WIRED TO GROUNDED 110
or 220 VAC SOURCE.

7 WALL MOUNT CONTROLLER
NTS

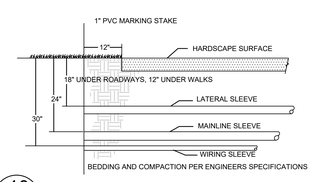


NOTE:
MOUNT SENSOR ON ANY SURFACE WHERE IT WILL BE EXPOSED TO
UNOBSTRUCTED RAINFALL, BUT NOT IN PATH OF SPRINKLER SPRAY,
NO MORE THAN 300' FROM RECEIVER UNIT.
MOUNT RECEIVER UNIT NO FURTHER THAN 6' FROM CONTROLLER.

8 WIRELESS RAIN SENSOR
NTS



9 TRENCH, PIPE AND WIRE
NTS



10 SLEEVING
NTS

GENERAL NOTES

1. ALL TRENCHING TO BE OUTSIDE OF TREE DRIP LINE
2. MAINLINE TO HAVE MINIMUM OF 18" OF COVER AND A MINIMUM OF 18" OFF OF THE HARDSCAPE
3. LATERALS TO HAVE MINIMUM OF 12" OF COVER AND A MINIMUM OF 12" OFF OF THE HARDSCAPE
4. NO ROCKS, BOULDERS OR SHARP OBJECTS TO BE IN TRENCH BACKFILL
5. ALL PIPE TO BE INSTALLED AS PER MANUFACTURES SPECIFICATIONS
6. SPRINKLERS AND RELATED EQUIPMENT TO BE INSTALLED AS PER DETAILS
7. TWO WIRE CONTROL WIRE TO BE 14 GA UL 2 CONDUCTOR, JACKETED AND APPROVED BY 2-WIRE CONTROLLER MANUFACTURER
8. ALL 2-WIRE CONTROL WIRE TO HAVE 14GA "BLUE" TRACER WIRE FROM THE CONTROLLER TO ALL CONTROL VALVES. TRACER WIRE TO HAVE A 24" LOOP LOCATED IN EACH CONTROL VALVE AND ISOLATION VALVE BOXES.
9. WIRE SPLICES TO BE DONE AS PER DETAILS
10. ALL WIRE SPLICES OUTSIDE OF CONTROL VALVE BOX TO BE IN 10" VALVE BOX
11. TWO WIRE CONDUCTORS TO BE COLOR CODED
12. CONTRACTOR SHALL INSTALL MANUFACTURES GROUNDING EQUIPMENT ON BOTH THE POWER AND OUTPUT SIDES OF CONTROLLER, ALL GROUNDING POINTS TO BE INSTALLED AS PER PLANS AND DETAILS
13. AT EACH VALVE AND CHANGE IN MAINLINE DIRECTION CONTRACTOR TO INSTALL A 30" LOOP OF EXTRA WIRE
14. SPRINKLERS ARE TO BE ADJUSTED TO AVOID OVER-SPRAY INTO NON-IRRIGATED AREAS
15. ELECTRIC CONTROL VALVES ARE TO BE INSTALLED IN VALVE BOXES AS FOLLOWS
    14" RECTANGULAR MINIMUM FOR EACH ELECTRIC CONTROL VALVE
    JUMBO VALVE BOX FOR DRIP ZONE KITS
16. SPRINKLERS TO BE INSTALLED 12" FROM FOUNDATIONS AND 2" FROM HARDSCAPE
17. CONTRACTOR TO ADD RISER EXTENSIONS TO SPRINKLERS IF REQUIRED TO MAINTAIN PROPER COVERAGE
18. ALL PIPING TO BE FLUSHED PRIOR TO INSTALLATION OF SPRINKLERS
19. ALL VALVES, QUICK COUPLER VALVES, WIRE SPLICES TO BE IN LANDSCAPED BEDS WHEREVER POSSIBLE
20. CONTRACTOR IS RESPONSIBLE FOR OBTAINING PROPER COVERAGE OF AREA TO BE IRRIGATED, MAKE ADJUSTMENTS AS NECESSARY
21. CONTRACTOR SHALL EXERCISE CARE NOT TO DAMAGE EXISTING UTILITIES REPAIRING ANY DAMAGES AT HIS OWN COST
22. PLAN IS DIAGRAMMATIC TO IMPROVE CLARITY ALL IRRIGATION EQUIPMENT TO BE INSTALLED WITHIN PROPERTY LINES AND LANDSCAPED AREAS
23. ANY DISCREPANCIES BETWEEN THE PLAN AND THE SITE TO BE REFERRED TO THE OWNERS REPRESENTATIVE PRIOR TO CONSTRUCTION
24. CONTRACTOR TO PROVIDE 1 YEAR WARRANTEE OF ALL PRODUCTS AND WORKMANSHIP TO INCLUDE WINTERIZATION AND SPRING START-UP
25. CONTRACTOR TO PROVIDE OWNER AND OR LANDSCAPE ARCHITECT RECORD DRAWING PRIOR TO SUBSTANTIAL COMPLETION
26. INSTALLATION OF IRRIGATION SLEEVES IS THE IRRIGATION CONTRACTORS RESPONSIBILITY IRRIGATION CONTRACTOR TO COORDINATE WITH GENERAL CONTRACTOR SLEEVE INSTALLATION PRIOR TO PAVEMENT INSTALLATION
27. CLEANUP AND DISPOSE OF ALL DEBRIS, WASTE AND EXCESS CONSTRUCTION MATERIALS LEAVE AREA NEAT, CLEAN AND READY FOR OWNERS USE PROVIDE CLEAN PAVEMENT SURFACES INCLUDING AREAS OF PUBLIC R.O.W.

TWO WIRE CONTROL SYSTEM NOTES

1. ALL WIRE SPLICE CONNECTORS TO BE 3M DBY-6 OR BETTER.
2. ALL GROUNDING POINTS TO HAVE LXIVMSD LIGHTNING ARRESTOR INSTALLED INLINE AS PER MANUFACTURER'S REQUIREMENTS AND INSTALLED AS PER DETAIL.
3. ALL CONTROL SYSTEM PRODUCTS TO BE INSTALLED AND OPERATED AS PER THE MANUFACTURER'S RECOMMENDATIONS AND OR REQUIREMENTS.
4. IRRIGATION CONTRACTOR IS RESPONSIBLE FOR OBTAINING 2-WIRE INSTALLATION AND PROGRAMMING TRAINING PRIOR TO PROJECT START, PROVIDE CERTIFICATE OF COMPLETION OF THE TRAINING AS PART OF THE SUBMITTAL PROCESS.
5. IRRIGATION CONTRACTOR IS RESPONSIBLE FOR TRAINING OWNERS STAFF, AS NEEDED, ON THE OPERATION AND MAINTENANCE OF THE CONTROL SYSTEM.
6. IRRIGATION CONTRACTOR IS RESPONSIBLE FOR COMPLETE PROGRAMMING AND OPERATION OF THE CONTROL SYSTEM FOR 6 MONTHS FROM THE DAY THE CONTROLLER BECOMES FUNCTIONAL. CONTRACTOR TO PROVIDE THE OWNERS REPRESENTATIVE A COMPUTER SPREAD SHEET THAT SHOWS EACH PROGRAM, OPERATIONAL DAYS AND RUN TIMES PER ZONE.

DRIP ZONE NOTES

1. IT IS IRRIGATION CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT EACH PLANT IS WITHIN THE DRIPLINE WETTED PATTERN ON NO LESS THAN 2 SIDES.
2. DRIPLINE TO BE LAID OUT AND INSTALLED AS DETAIL EXAMPLES.
3. DRIPLINE TO BE INSTALLED IN GRID FASHION WITH TUBING ON 18" CENTERS, ELBOWS AND TEES ARE TO BE USED FOR CHANGES IN DIRECTION, LOOPING OF DRIPLINE IS NOT ACCEPTABLE.
4. DRIPLINE IS TO BE INSTALLED, TESTED AND INSPECTED TO ENSURE EACH EMITTER FUNCTIONS PROPERLY PRIOR TO COVERING WITH MULCH.
5. ALL DRIPLINE SUPPLY PIPING TO BE CL 200 PVC.
6. ALL PIPING WITHIN A DRIP ZONE THAT IS UNDER THE HARDSCAPE TO BE CL 200 PVC.
7. DRIPLINE TO BE STAKED DOWN EVERY 3' AND WITHIN 1' OF ALL FITTING OUTLETS.
8. ALL FLUSH VALVES ARE TO BE INSPECTED FOR PROPER OPERATION.
9. IRRIGATION CONTRACTOR TO MEET WITH DRIP COMPONENT MANUFACTURERS REPRESENTATIVE AND OWNER'S REPRESENTATIVE ON SITE PRIOR TO CONSTRUCTION TO REVIEW DRIP COMPONENT CONSTRUCTION, OPERATION AND MAINTENANCE.

CONTROLLER INSTALLATION NOTES

1. IRRIGATION CONTRACTOR TO COORDINATE EXACT LOCATION OF CONTROLLER WITH OWNER'S REPRESENTATIVE.
2. PROVIDE 120VAC 20 AMP POWER TO JUNCTION BOX AT CONTROLLER LOCATION.
3. IRRIGATION CONTRACTOR TO HARD WIRE CONTROLLER TO POWER SUPPLY AS PER PREVAILING CODE.
4. CONTROLLER TO BE SECURELY ATTACHED TO THE WALL USING METALLIC FASTENERS MADE FOR WALL TYPE.
5. ALL IRRIGATION CONTROL WIRE ABOVE GRADE TO BE ENCASED IN PVC ELECTRICAL CONDUIT.
6. IRRIGATION CONTRACTOR IS RESPONSIBLE FOR ALL POTENTIAL WALL PENETRATIONS AND THE SEALING OF THOSE PENETRATIONS.
7. CONTROLLER TO BE GROUNDED AS PER MANUFACTURERS RECOMMENDATIONS.

REFERENCE NOTES SCHEDULE

SYMBOL	DESCRIPTION
1	Irrigation system water source to be the existing 2" meter. System requirements are 35 gpm at a static pressure of 75 psi. Verify available flow and static pressure prior to construction.
2	Replumb the existing backflow preventer. Install a 2" tee and gate valve to irrigation backflow. Reconnect domestic backflow to existing piping to the building. All pipe from meter thru backflow to be either Type L copper or galvanized.
3	Provide and install a HDPE insulated backflow enclosure on a concrete pad as per plan detail and enclosure manufacturers instructions.
4	Install Master Valve(MV) and Flow Sensor(FS) as per plan detail and manufacturers instructions. Centerline of both components to be 12" below FG.
5	Coordinate the exact location of the controller on the back of the restroom building. Provide 120v 20 amp power to the controller. Install controller as per plan notes, details and manufacturers instructions.
6	Install Cell Data Cartridge in controller as per manufacturers instructions. Connect to City of Hanahan Parks Rain Bird IQ4 remote access software. See Rain bird IQ4 Notes for futher requirements.
7	Coordinate the exact location of the Rain Freeze sensor with the owners representative. Install and program as per plan detail and manufacturers instructions.
8	Pipe location is diagrammatic. Install all pipe and control wire as per plan notes and details.

VALVE SCHEDULE

NUMBER	MODEL	SIZE	TYPE	GPM	PRECIP
1	Rain Bird XCZ-100-PRB-COM	1"	Area for Dripline	8.08	1.34 in/h
2	Rain Bird PEB-IVM	1"	Turf Rotary	17.29	0.4 in/h
3	Rain Bird XCZ-100-PRB-COM	1"	Area for Dripline	16.96	1.16 in/h
4	Rain Bird PEB-IVM	1"	Turf Rotary	21.57	0.39 in/h
5	Rain Bird PEB-IVM	1-1/2"	Turf Rotary	29.02	0.53 in/h
6	Rain Bird XCZ-100-PRB-COM	1"	Area for Dripline	19.16	1.25 in/h
7	Rain Bird PEB-IVM	1"	Turf Rotary	18.34	0.32 in/h
8	Rain Bird PEB-IVM	1-1/2"	Turf Rotor	34.50	0.54 in/h
9	Rain Bird PEB-IVM	1"	Turf Rotary	17.56	0.36 in/h
10	Rain Bird XCZ-100-PRB-COM	1"	Area for Dripline	17.26	1.22 in/h
11	Rain Bird PEB-IVM	1-1/2"	Turf Rotor	31.50	0.6 in/h
12	Rain Bird PEB-IVM	1"	Turf Spray	11.54	1.72 in/h
13	Rain Bird PEB-IVM	1-1/2"	Turf Rotor	31.50	0.63 in/h
14	Rain Bird XCZ-100-PRB-COM	1"	Area for Dripline	16.87	1.3 in/h
15	Rain Bird PEB-IVM	1-1/2"	Turf Rotor	32.54	0.57 in/h
16	Rain Bird PEB-IVM	1-1/2"	Turf Rotary	24.39	0.47 in/h
17	Rain Bird XCZ-100-PRB-COM	1"	Area for Dripline	15.15	1.18 in/h
18	Rain Bird XCZ-100-PRB-COM	1"	Drip Emitter	12.12	1.19 in/h

CRITICAL ANALYSIS

Generated:	2022-02-21 13:30
P.O.C. NUMBER: 01	
Water Source Information:	Existing Water Meter.
FLOW AVAILABLE	
Water Meter Size:	2"
Flow Available	70.55 GPM
PRESSURE AVAILABLE	
Static Pressure at POC:	93.00 PSI
Elevation Change:	5.00 ft
Service Line Size:	2"
Length of Service Line:	20 ft
Pressure Available:	89.00 psi
DESIGN ANALYSIS	
Maximum Station Flow:	34.5 GPM
Flow Available at POC:	70.55 GPM
Residual Flow Available:	36.05 GPM
Pressure Req. at Critical Station:	53.0 PSI
Loss for Fittings:	0.32 PSI
Loss for Main Line:	3.22 PSI
Loss for POC to Valve Elevation:	0 PSI
Loss for Backflow:	12.1 PSI
Loss for Master Valve:	1.18 PSI
Loss for Water Meter:	0.9 PSI
Critical Station Pressure at POC:	70.72 PSI
Pressure Available:	89 PSI
Residual Pressure Available:	18.28 PSI

CONTRACTOR'S QUALIFICATION REQUIREMENTS

1. IRRIGATION CONTRACTOR TO BE STATE LICENSED, IF REQUIRED, AND A IRRIGATION ASSOCIATION CERTIFIED IRRIGATION CONTRACTOR IN GOOD STANDING. PROVIDE CIC CERTIFICATE WITH SUBMITTALS.
2. CONTRACTOR MUST HAVE COMPLETED THE MANUFACTURERS 2-WIRE CONSTRUCTION TRAINING COURSE AND PROVIDE CERTIFICATE OF COMPLETION AS PART OF THE SUBMITTALS.
3. CONTRACTOR MUST HAVE COMPLETED THE MANUFACTURERS 2-WIRE CONTROLLER PROGRAMMING COURSE AND PROVIDE CERTIFICATE OF COMPLETION AS PART OF THE SUBMITTALS.
4. CONTRACTOR THAT CANNOT PROVIDE ITEMS 1 AND 2 ABOVE SHOULD NOT BE ALLOWED TO CONSTRUCT THE IRRIGATION SYSTEM.

RAIN BIRD IQ4 REMOTE ACCESS NOTES

1. PROVIDE 3 YEAR SUBSCRIPTION, FOR THE OWNER, TO THE RAIN BIRD IQ4 REMOTE ACCESS CLOUD BASED SYSTEM.
2. PROVIDE 3 YEAR CELL MODEM DATA PLAN FOR IQ4 ACCESS.
2. FULLY SET UP IQ4 TO ACCESS THE CONTROLLER AND ALLOW FOR ALL CONTROL SYSTEM ALERTS, CONTROLLER PROGRAMING, FLOW MANAGMENT, AUTOMATED ET/WEATHER DOWNLOAD, AND PROGRAM SET UP.
3. PROVIDE A MINIMUM OF 4 HOURS OF RAIN BIRD IQ4 MANUFACTURERS TRAINING FOR THE OWNERS REPRESENTATIVES.

IRRIGATION SCHEDULE

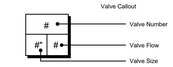
SYMBOL	MANUFACTURER/MODEL/DESCRIPTION
4 5 6 15 16 17	Hunter PROS-06-PRS30-CV adjustable arc Turf Spray, 30 psi regulated 6" Pop-Up. With factory installed Drain Check Valve. Co-molded wiper seal with UV Resistant Material.
T	Hunter MP Corner PROS-06-PRS40-CV Turf Rotator, 6" pop-up with factory installed check valve, pressure regulated to 40 psi, MP Rotator nozzle. T=Turquoise adj arc 45-105.
LST SST RST	Hunter MP Strip PROS-06-PRS40-CV Turf Rotator, 6" pop-up with factory installed check valve, pressure regulated to 40 psi, MP Rotator nozzle. LST=Ivory left strip, SST=Brown side strip, RST=Copper right strip.
M L O	Hunter MP1000 PROS-06-PRS40-CV Turf Rotator, 6" pop-up with check valve, pressure regulated to 40 psi. MP Rotator nozzle. M=Maroon adj arc 90 to 210, L=Light Blue 210 to 270 arc, O=Olive 360 arc.
K Q R	Hunter MP2000 PROS-06-PRS40-CV Turf Rotator, 6" pop-up with factory installed check valve, pressure regulated to 40 psi, MP Rotator nozzle. K=Black adj arc 90-210, G=Green adj arc 210-270, R=Red 360 arc.
B Y A	Hunter MP3000 PROS-06-PRS40-CV Turf Rotator, 6" pop-up with factory installed check valve, pressure regulated to 40 psi, MP Rotator nozzle. B=Blue adj arc 90-210, Y=Yellow adj arc 210-270, A=Gray 360 arc.
LB	Hunter MP3500 PROS-06-PRS40-CV Turf Rotator, 6" Pop-up with factory installed check valve, pressure regulated to 40 psi, MP Rotator nozzle. LB=light brown adjustable arc, 90-210.

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION
1.0	Hunter PGP-04-PRB Turf Rotor, 4" Pop-Up. Adjustable to Full Circle. Pressure Regulating Body.
2.0	Hunter PGP-04-PRB Turf Rotor, 4" Pop-Up. Adjustable to Full Circle. Pressure Regulating Body.
2.5	Hunter PGP-04-PRB Turf Rotor, 4" Pop-Up. Adjustable to Full Circle. Pressure Regulating Body.
4.0	Hunter PGP-04-PRB Turf Rotor, 4" Pop-Up. Adjustable to Full Circle. Pressure Regulating Body.
8.0	Hunter PGP-04-PRB Turf Rotor, 4" Pop-Up. Adjustable to Full Circle. Pressure Regulating Body.

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION
	Rain Bird XCZ-100-PRB-COM Wide Flow Drip Control Kit for Commercial Applications. 1" Ball Valve with 1" PESB Valve and 1" Pressure Regulating 40psi Quick-Check Basket Filter. 0.3 GPM-20 GPM
P	Hunter PLD-BV Manual flush/shut off valve, barbed insert. Typically installed in 10" box, with adequate blank tubing to extend valve out of valve box. Use with HDL or other 3/4" dripline.
D	Hunter ECO-ID ECO-ID: 1/2" FPT connection with 12-60 PSI operating pressure. Specify with Hunter SJ swing joint.
	Drip Tree Ring Rain Bird XFCV-06-12 inline drip tubing installed as per plans Drip Tree Ring details.
	Area to Receive Dripline Rain Bird XFCV-06-12 XFCV xOn-Surface Landscape Dripline with a Heavy-Duty 3.5 psi Check Valve. 0.6 GPH emitters at 12" O.C. Dripline laterals spaced at 12" apart, with emitters offset for triangular pattern. Great for elevation change. Specify XF insert fittings.

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION
	Rain Bird PEB-IVM 1", 1-1/2", 2" Plastic Industrial Valves. Low Flow Operating Capability, Globe Configuration. With IVM-SOL
	Hunter HQ-44LRC-AW Quick coupler valve, yellow rubber locking cover, red brass and stainless steel, with 1" NPT inlet, 2-piece body. Acme Key with Anti-Rotation Wings.
	Nibco T-113 Class 125 bronze gate shut off valve with wheel handle, same size as mainline pipe diameter at valve location. Size Range - 1/4" - 3"
MV	Buckner-Superior 3300 1-1/2" Normally Open Brass Master Valve, 12V DC solenoid to operate with Rain Bird IVM control system.
BF	Febco 825Y 1-1/2" Reduced Pressure Backflow Preventer
C	Rain Bird ESPLXIVM 60 Station, 2-Wire Controller, (1) ESPLXIVM 60-Station, Indoor/Outdoor, Plastic Wall-Mount Cabinet.
CM	Rain Bird IQ4G-USA IQ NCC 4G Cellular Cartridge.
MD	Rain Bird LXIVMOUT Field Decoder for Two-Wire system. Install in valve box for valve. Operates one non-rainbird valve. Use line surge protection as per manufacturer's directions.
SD	Rain Bird LXIVMSEN (2) Sensor Device interfacing flow and/or weather sensors and controller.
R	Rain Bird WR2-RFS Wireless Rain/Freeze Sensor.
FS	Creative Sensor Technology FSI-T15-001 1.5" (40mm) PVC tee type flow sensor w/socket ends, custom mounting tee and ultra lightweight impeller enhances low flow measurement. 2 wire digital output compatible w/all irrigation controllers. Flow range 1.8-108 GPM.
G	2-Wire Grounding Point Install as per plan detail and manufacturers instructions.
M	Water Meter 2" Existing Water Meter.
	Irrigation Lateral Line: PVC Class 200 SDR 21
	Irrigation Mainline: PVC Class 200 SDR 21
	Pipe Sleeve: PVC Schedule 40

Valve Callout



City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

ADC ENGINEERING
1226 YEAMANS HALL ROAD
HANAHAN, SC 29410
843-566-0161
ADCENGINEERING.COM

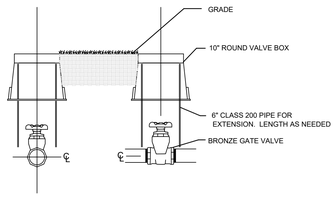
811 Know what's below. Call before you dig.

DATE: 5/12/2023
ADC PROJECT #: 20381
DESIGNED: MDC
CHECKED: MDC
DRAWN: MDC
REVISION:

IRRIGATION SCHEDULES, NOTES AND DETAILS

IR-101

100% CONSTRUCTION DOCUMENTS



11 ISOLATION VALVE DETAIL
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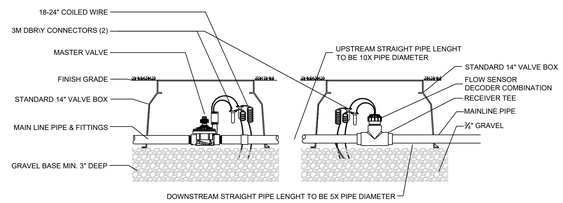
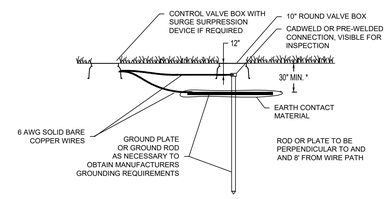


12 MASTER VALVE FLOW SENSOR
NTS

SIDE VIEW



13 TWO WIRE GROUNDING POINT DETAIL
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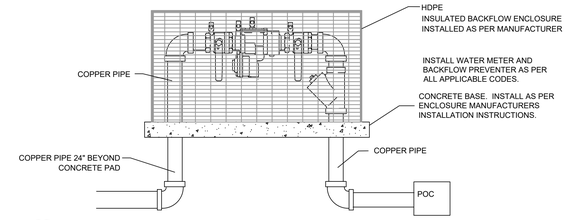

14 RPZ BACKFLOW PREVENTER WITH ENCLOSURE
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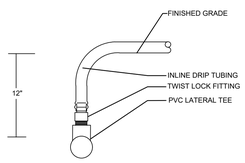
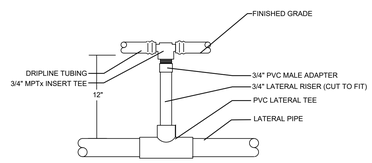
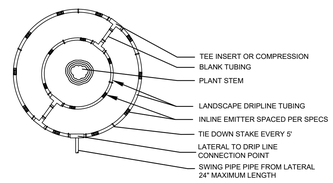


15 START CONNECTION LATERAL TO DRIPLINE
NTS

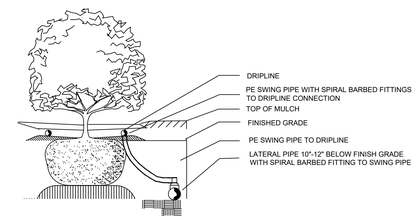


16 START CONNECTION LATERAL TO DRIPLINE
NTS (WITH PVC RISER)

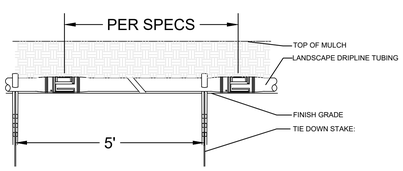


NOTE:
GENERAL DRIPLINE RING SPACING FOR NEW TREES :
2 1/2" TO 3" TREES INSTALL DRIP RING 12" AND 24" OFF TRUNK.
3 1/2" TO 4" TREES INSTALL DRIP RING 18" AND 36" OFF TRUNK.
IF SOIL INTAKE RATES ARE FASTER THAN AVERAGE DECREASE RING SPACING.
IF SOIL INTAKE RATES ARE SLOWER THAN AVERAGE INCREASE RING SPACING.

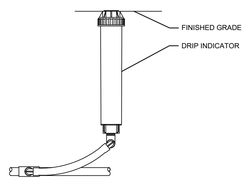
17 TREE DRIP RING
NTS



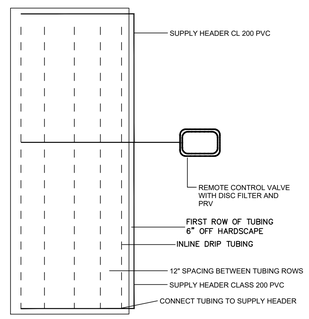
18 TREE DRIP RING TO LATERAL CONNECTION
NTS



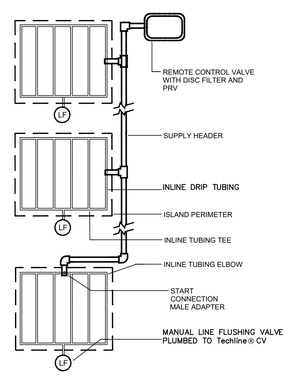
19 DRIPLINE ON GRADE WITH MULCH COVER
NTS



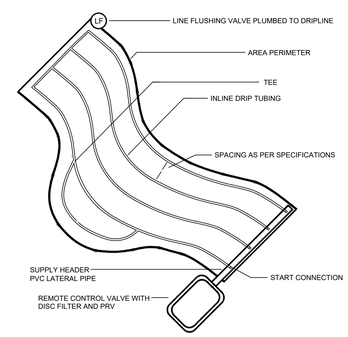
20 DRIP INDICATOR
NTS



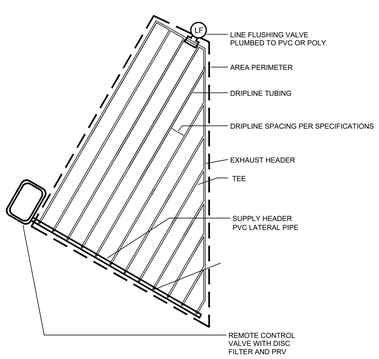
21 INLINE DRIP TUBING FOR SHRUBS
NTS



22 ISLAND LAYOUT
NTS



23 IRREGULAR AREA
NTS



24 IRREGULAR AREA
NTS

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

ADC ENGINEERING
1226 YEAMANS HALL ROAD
HANAHAN, SC 29410
843-566-0161
ADCENGINEERING.COM

811 Know what's below. Call before you dig.

DATE: 5/12/2023
ADC PROJECT #: 20381
DESIGNED: MDC
CHECKED: MDC
DRAWN: MDC
REVISION:

IRRIGATION DETAILS

IR-102

100% CONSTRUCTION DOCUMENTS

FIXED PIER/BOARDWALK GENERAL CONSTRUCTION AND MATERIAL NOTES:

1. CONTRACTOR SHALL VISIT THE SITE AND MAKE HIMSELF FAMILIAR WITH ALL SITE CONDITIONS PRIOR TO BIDDING.

2. CONTRACTOR SHALL REVIEW THE PLANS AND NOTIFY THE ENGINEER IMMEDIATELY IF HE FINDS ANY DISCREPANCIES, ERRORS, OR OMISSIONS, – OR IF HE NEEDS ADDITIONAL INFORMATION FOR PROPER LAYOUT AND CONSTRUCTION OF THE PROJECT.

3. THE CONTRACTOR SHALL HAVE THE POSITIONING AND LAYOUT OF THE PIER APPROVED BY THE OWNER PRIOR TO THE INSTALLATION OF THE PILES.

4. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROVIDING AN AS–BUILT SURVEY FOLLOWING CONSTRUCTION OF THE PIER, PIERHEAD, DOCK AND BULKHEAD.

5. CONTRACTOR SHALL BE RESPONSIBLE FOR CULLING DOWNGRADES AND UNSUITABLE LUMBER AND TIMBER ON DELIVERY – NO WANE ALLOWED IN THE PROJECT. IF DOWNGRADES OR WANE MATERIAL IS USED IN CONSTRUCTION WHICH RESULTS IN POOR APPEARANCE OR WEAKENED STRUCTURAL INTEGRITY, THE ENGINEER MAY REQUIRE THE OFF–QUALITY MEMBERS TO BE REMOVED AND REPLACED WITH SUITABLE MATERIAL AT THE CONTRACTOR'S EXPENSE.

6. ALL CUTS, HOLES, AND ABRASIONS ON THE SURFACE OF ANY LUMBER OR TIMBER MEMBERS SHALL BE FIELD–TREATED WITH KOPPERS 50 (COPPER NAPTHENATE), OR OTHER – ONLY AS APPROVED BY THE ENGINEER. FIELD TREATMENT SHALL COMPLY WITH REQUIREMENTS OF AWPA STANDARD P–8, AND M4 (LATEST ISSUE).

7. ALL TREATED WOOD PRODUCTS SHALL BE HANDLED AND FIELD–FABRICATED IN ACCORDANCE WITH AWPA STANDARD M4 (LATEST ISSUE) FOR THE CARE OF PRESERVATIVE TREATED WOOD PRODUCTS.

8. ALL LUMBER / TIMBER USED IN CONSTRUCTION SHALL BEAR THE INK–STAMPED GRADE MARK (TO DENOTE THE SPECIFIED LUMBER GRADE) – AND INK–STAMPED AND/OR PLASTIC END TAG QUALITY MARK (TO DENOTE PRESSURE–TREATMENT). GRADE AND QUALITY MARKS SHALL BE OF AN APPROVED AGENCY (SPIB, TP, AWPA, ETC) IN ACCORDANCE WITH THE SPECIFIED STANDARDS.

9. CONTRACTOR SHALL PROVIDE THE ENGINEER WITH LUMBER GRADE AND PRESERVATIVE TREATMENT CERTIFICATIONS ON EACH SIZE AND LOAD. TREATER SHALL BE CERTIFIED IN ACCORDANCE WITH STANDARDS OF AWPA LATEST ISSUE. LUMBER / TIMBER THAT IS SUSPECTE3D OF BEING OFF–GRADE AND/OR OFF–QUALITY MAY BE REQUIRED TO BE GRADED/TESTED BY AN INDEPENDENT INSPECTION OR TESTING LABORATORY. ANY LUMBER / TIMBER FOUND TO NOT MEET THE REQUIRED SPECIFICATIONS MAY BE REQUIRED TO BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE.

10. ALL TIMBER PILES FOR THIS FIXED PIER WALKWAY SHALL HAVE MIN. 9" BUTT DIAMETER AND THE COVERED PIERHEAD SHALL HAVE A MIN. 10" BUTT DIAMETER; PILE LENGTHS, LOCATIONS AND SIZES SHALL BE AS SHOWN ON THE TIMBER PILE TABLE AND PILE LAYOUT PLAN ON SHEET MA6.

11. TIMBER PILES SHALL BE TREATED TO 2.5 PCF–CCA AND SHALL CONFORM TO ASTM D25 SPECIFICATIONS (STANDARD SPECIFICATION FOR ROUND TIMBER PILES).

12. CONTRACTOR TO INSPECT PILES UPON DELIVERY. DO NOT DROP PILES ON DELIVERY OR ON INSTALLATION. ALL SUBSTANDARD OR DAMAGED PILES SHALL BE RETURNED.

13. ALL TIMBER PILES TO BE DRIVEN TIP END DOWN.

14. ALL 3"X10" JOISTS SHALL BE EQUALLY SPACED AT A MAXIMUM OF 20.5" O.C SPACING.

15. TOE–NAIL ALL JOISTS TO SPLIT PILE CAP USING TWO (2) 16D STAINLESS STEEL (TYPE 316) RING–SHANK NAILS AT EACH JOIST–TO–PILE CAP CONNECTION.

16. IF USED, LAP SPLICE BOLTED CONNECTIONS SHALL BE MADE WITH GALVANIZED BOLTS WITH NUT AND OVERSIZED WASHER AS SPECIFIED ON THIS DRAWING SHEET AND AS SHOWN ON DETAILS THROUGHOUT THESE PLANS.

17. NAIL ALL SPLICES WITH 16D STAINLESS STEEL (TYPE 316) RING–SHANK NAILS BEFORE BOLTING.

18. DECKING SHALL BE INSTALLED USING 316 STAINLESS STEEL DECK SCREWS – 2 SCREWS PER DECK BOARD AT EACH JOIST. SCREWS TO BE ALIGNED OVER CENTER OF JOIST. DECK BOARD SPACING TO BE UNIFORM. MAX. SPACING ON DECK BOARDS IS 1/4". DO NOT COUNTERSINK DECK FASTENERS. (SEE DECKING INSTALLATION DETAIL ON THIS SHEET).

19. WHEN CULLING DOWNGRADES AND WANE FROM LUMBER USED FOR DECKING IT IS PREFERRED TO LET THE BEST SIDE FACE UPWARD FOR BETTER APPEARANCE RATHER THAN TURNING THE "CUP" SIDE DOWN (BARK SIDE UP).

20. 4" X 6" RAIL POSTS TO BE BOLTED TO FRAMING USING TWO (2) 5/8" DIAMETER GALVANIZED THRU–BOLTS W/ NUT AND OGEE WASHER. TWO (2) BOLTS ON EACH POST.

21. 2" X 6" UPPER RAILS AND BOTTOM RAILS SHALL BE NAILED WITH (MIN) TWO (2) 316 SS RING–SHANK NAILS INTO EACH FRAMING SUPPORT MEMBER (RAIL POST / SPLICE BLOCK). (TYPICAL)

22. ALL FRAMING MEMBERS SHALL BE S4S, (SURFACED FOUR SIDES), OR ROUGH–SAWN AS NOTED ON THE LUMBER / TIMBER TABLE ON THIS SHEET.

23. SPLIT PILE CAPS SHALL BE 4" X 10", NO. 2 GRADE (MIN), TREATED TO 0.60 PCF–CCA.

24. JOISTS FOR THE BOARDWALK AND PIERHEAD STRUCTURES SHALL BE 3" X 10", MIN. NO. 1 GRADE, TREATED TO 0.60 PCF–CCA

25. ALL ROOFING FRAMING (ROOF HEADERS, ROOF BEAMS, ROOF RAFTERS AND ROOF BATTENS) SHALL BE NO. 2 GRADE (MIN), TREATED TO 0.60 PCF–CCA AND SIZED AS SPECIFIED WITHIN THIS SET OF PLANS.

26. ROOF COLUMNS SHALL BE 10"X10", NO. 1 GRADE (MIN), TREATED TO 0.60 PCF–CCA.

27. ROOFING MATERIAL SHALL BE 5V CRIMPED METAL ROOF. ROOF COLOR SHALL BE AS DIRECTED BY THE OWNER.

28. CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT ALL TREATED LUMBER/TIMBER USED IN THE PROJECT SHALL BE ALLOWED TO DRY ADEQUATELY, PRIOR TO INSTALLATION IN THE PROJECT, TO ENSURE FIXITY OF THE PRESERVATIVE TREATMENT CHEMICALS WITH THE WOOD FIBER AND TO ENSURE DIMENSIONAL STABILITY OF THE MATERIAL. IF NECESSARY, CONTRACTOR SHALL STACK–DRY LUMBER TO ENSURE THAT MOISTURE CONTENT OF THE MATERIAL HAS REACHED EQUILIBRIUM WITH TYPICAL ATMOSPHERIC CONDITIONS.

29. NAILS GUNS NOT ALLOWED IN HANDRAIL CONSTRUCTION.

30. ALL FASTENERS SHALL BE OF THE SIZE AND TYPE SHOWN ON THESE PLANS. ALL GALVANIZED FASTENERS, BOLTS, NUTS, WASHERS, SCREWS, AND NAILS SHALL BE HOT–DIPPED GALVANIZED TO MEET THE REQUIREMENTS OF ASTM A153. ALL STAINLESS STEEL BOLTS, NUTS, WASHERS, SCREWS, AND NAILS SHALL BE STAINLESS STEEL TYPE 316. ALL NAILS USED FOR THE PROJECT SHALL BE STAINLESS STEEL (TYPE 316) RING–SHANK.

31. THE CONTRACTOR SHALL INSTALL ELECTRICAL AND WATER SERVICES AND FIXTURES TO THE PIER AND PIERHEAD AS DIRECTED BY THE MEP OR OWNER. ALL SERVICES AND FIXTURES SHALL BE SIZED FOR THEIR INTENDED USES.

32. INSTALL HOT DIPPED GALVANIZED (HDG) HURRICANE STRAPS (SIMPSON "H8", OR APPROVED EQUAL) AT ALL JOIST TO SPLIT PILE CAP AND ROOF HEADER TO ROOF JOIST CONNECTIONS IN ADDITION TO TOE–NAILING.

33. DESIGN LOAD FOR THE TIMBER PIER STRUCTURE DECKING: 90 PSF LIVE LOAD

ALUMINUM GANGWAY NOTES:

1. ALUMINUM GANGWAYS SHALL BE MANUFACTURED BY GATOR/CMI OF SANFORD, FLORIDA, OR APPROVED EQUAL. SHOP DRAWINGS AND ENGINEERING CALCULATIONS SHALL ALSO BE REQUIRED. SEE NOTE #7 BELOW.

2. GANGWAY SHALL BE DESIGNED STRUCTURALLY FOR COMBINED DEAD LOAD (DL) + LIVE LOAD (LL). DEAD LOAD SHALL BE AS DETERMINED BY THE ALUMINUM GANGWAY MANUFACTURER, LIVE LOAD (LL) SHALL BE 50 PSF. DL + LL SHALL BE APPLIED VERTICALLY FOR STRUCTURAL DESIGN.

3. ALLOWABLE DEFLECTION OF GANGWAY DUE TO COMBINED DL + LL (AS SPECIFIED ABOVE) SHALL BE L/240.

4. ALL STRUCTURAL MEMBERS OF THE ALUMINUM GANGWAY SHALL BE SIZED AS DETERMINED NECESSARY BY THE MANUFACTURER TO MEET LOADING REQUIREMENTS.

5. METAL FOR GANGWAY STRUCTURE SHALL BE 6061–T6 ALUMINUM ALLOY. METAL FOR ALUMINUM DECKING AND HANDRAILS SHALL BE 6063–T6 ALUMINUM ALLOY. BOTH 6061–T6 AND 6063–T6 SHALL BE EXTRUDED IN ACCORDANCE WITH APPLICABLE SECTIONS OF FEDERAL SPECIFICATION QQ–A–200.

6. STAINLESS STEEL BOLTS, NUTS, WASHERS AND SCREWS WHERE USED SHALL BE TYPE 316.

7. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND ENGINEERING CALCULATIONS ON GANGWAY FROM MANUFACTURER FOR APPROVAL BY THE ENGINEER. FOUR COPIES OF SHOP DRAWINGS AND ENGINEERING CALCULATIONS SHALL BE SUBMITTED TO THE ENGINEER. ALLOW 7 DAYS FOR SHOP DRAWING AND ENGINEERING CALCULATION REVIEW.

8. HANDRAIL SYSTEM SHALL BE FULLY WELDED AT ALL CONNECTION POINTS TO THE GANGWAY FRAME SUCH AS TO CREATE A RIGID TRUSS–LIKE STRUCTURE ONCE INSTALLED.

9. ALUMINUM GANGWAY FABRICATOR SHALL INSTALL ACCESSIBLE GRAB RAILS (HANDRAILS) AT A HEIGHT OF 34" TO THE CENTER OF THE RAIL (MAX.) ALONG BOTH SIDES OF THE ALUMINUM GANGWAY. THE ACCESSIBLE HANDRAIL SHALL BE 11/4" (MIN.) DIAMETER TO 11/2" (MAX.) DIAMETER. THE ACCESSIBLE HANDRAIL SHALL BE OFFSET FROM THE PRIMARY GANGWAY HANDRAIL SYSTEM TO ALLOW FOR 11/2" CLEAR SPACING FROM BETWEEN THE ACCESSIBLE HANDRAIL AND THE PRIMARY GANGWAY HANDRAIL SYSTEM.

10. GANGWAYS SHALL INCLUDE VERTICAL PICKETS ALONG THE ENTIRE LENGTH (BOTH SIDES). CENTER–TO–CENTER SPACING OF THE VERTICAL PICKETS SHALL BE 4" MAX. GANGWAY MANUFACTURER SHALL PROVIDE DETAILS ON VERTICAL PICKETS IN SHOP DRAWINGS. SEE DETAILS AND NOTES THIS SHEET FOR MORE INFORMATION.

11. ALL WELDS SHALL MEET THE REQUIREMENTS OF THE AMERICAN WELDING SOCIETY (D1.2 STRUCTURAL WELDING CODE–ALUMINUM).

12. ALL WELDS SHALL BE CLEAN AND SHALL BE MADE IN A NEAT MANNER TO RESULT IN A HIGH–QUALITY AESTHETICALLY ACCEPTABLE WELD. FABRICATOR SHALL BE RESPONSIBLE FOR REMOVING AND REPLACING ANY OFF–QUALITY WELDS THAT MAY RESULT FROM POOR WORKMANSHIP. FABRICATOR SHALL BE RESPONSIBLE FOR REMOVING ALL SHARP EDGES FROM WELDS OR ALUMINUM MEMBERS THAT MAY PRESENT A HAZARD TO USERS.

FLOATING DOCK FABRICATION AND CONSTRUCTION NOTES:

1. CONTRACTOR/FABRICATOR SHALL REVIEW THE PLANS AND SHALL NOTIFY THE ENGINEER IMMEDIATELY IF HE FINDS ANY DISCREPANCIES, ERRORS, OR OMISSIONS. IF ANY DISCREPANCIES ARE FOUND BETWEEN WHAT IS SHOWN ON THE DRAWINGS AND ACTUAL CONDITIONS/MATERIALS/SPACINGS/DIMENSIONS, ETC. PRIOR TO OR DURING FABRICATION, HE SHALL NOTIFY THE ENGINEER IMMEDIATELY. DO NOT FABRICATE ANY PART OF THE PROJECT BASED ON AN ASSUMPTION OR SPECULATION OF DESIGN INTENT.

2. CONTRACTOR AND/OR FABRICATOR SHALL NOTIFY ENGINEER OF ANY CIRCUMSTANCES THAT WILL MAKE SUBSTANTIVE AND OR ECONOMIC CHANGES IN THE STRUCTURE.

3. THERE SHALL BE NO CHANGE OR DEVIATION FROM THESE DESIGN PLANS UNLESS PRIOR APPROVAL IS GIVEN BY THE ENGINEER.

4. PILE GUIDE SHALL INTERNAL MOLDED HDPE AND SIZED FOR THE PILE SIZE AND TYPE.

5. ALL STAINLESS STEEL HARDWARE; BOLTS, NUTS, WASHERS, AND SCREWS SHALL BE ALLOY TYPE 316.

6. HEAVY–DUTY VINYL BUMPERS SHALL BE INSTALLED AROUND THE ENTIRE FLOATING DOCK PERIMETER. INSTALL HEAVY–DUTY VINYL CORNER BUMPERS ON ALL OUTSIDE EXPOSED CORNERS.

7. PILES FOR THE NEW FLOATING DOCK SHALL BE LOCATED AS SHOWN ON THE PLANS. REFER TO PILE TABLE ON SHEET M105 AND M106 FOR PILE LENGTH, SIZE AND SPECIFICATION REQUIREMENTS.

8. ALL PILES FOR THE NEW FLOATING DOCKS SHALL BE ROUND TIMBER PILES.

9. DOCK FENDERING SHALL BE INSTALLED AROUND THE ENTIRE PERIMETER OF THE FLOATING DOCK UNITS. FENDERING SHALL BE 2" x 10" PRESSURE TREATED SOUTHERN YELLOW PINE MEMBERS.

10. FLOATS SHALL BE CONSTRUCTED OF THICK–WALLED ROTATIONALLY MOLDED POLYETHYLENE THAT ENCAPSULATES EXPANDED POLYSTYRENE FOAM. SIZES ARE SHOWN FOR REFERENCE ONLY AND SHALL BE DETERMINED BY THE DOCK CONSTRUCTOR.

11. DECKING SHALL BE PRESSURE TREATED SOUTHERN YELLOW PINE. ALL DECKING SHALL BE FASTENED TO ALL STRUCTURAL SUPPORT MEMBERS USING STAINLESS STEEL (TYPE 316) SCREWS. COUNTER–SINK THE SCREW HEADS SO IT IS FLUSH WITH THE DECKING SURFACE AS TO PREVENT HAZARDS DUE TO EXPOSED SCREW HEADS. ALL DECKING SHALL BE SPACED 1/8" BETWEEN DECKING MEMBERS TO ALLOW FOR PROPER DRAINAGE.

12. PILE GUIDES FOR FLOATING DOCKS SHALL ALLOW FREE MOVEMENT OF THE DOCK, WHILE MINIMIZING DAMAGE DUE TO NORMAL DOCK MOVEMENT CAUSED BY CURRENT, BOAT WAKES, WATER FLUCTUATION AND SEASONAL WINDS.

13. FOR FLOATATION, DOCKS SHALL BE DESIGNED TO WITHSTAND A MINIMUM UNIFORM LIVE LOAD OF 30 POUNDS PER SQUARE FOOT APPLIED VERTICALLY. THE FLOATATION SHALL BE SIZED AND LOCATED TO SATISFY ALL OF THE FOLLOWING CONDITIONS:
   1. MINIMUM FREEBOARD OF 19 INCHES (MAXIMUM 20 INCHES) UNDER DEAD LOAD ONLY.
   2. MINIMUM FREEBOARD OF 9 INCHES UNDER COMBINED DEAD LOAD AND LIVE LOAD.
   3. MINIMUM FREEBOARD OF 9 INCHES UNDER DEAD LOAD PLUS CONCENTRATED LIVE LOAD OF 400 POUNDS APPLIED VERTICALLY AT ANY LOCATION ON THE DOCK SURFACE.

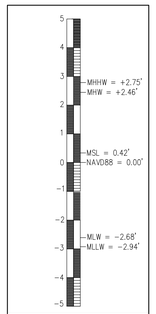
14. CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING PROPER ALIGNMENT AND STRAIGHTNESS OF THE FLOATING DOCK SYSTEM.

15. FABRICATOR SHALL BE RESPONSIBLE FOR REMOVING ALL SHARP EDGES FROM ALL DOCK COMPONENTS THAT HAVE BEEN CREATED BY OR AS RESULT OF THE CONSTRUCTION PROCESS SUCH AS CUTTING, DRILLING, ETC. ANY SHARP EDGES AND/OR CORNERS THAT ARE POTENTIALLY HAZARDOUS TO DOCK USERS THAT MAY BE A RESULT OF THE CONSTRUCTION PROCESS SHALL ALSO BE SANDED SMOOTH.

16. ALL FASTENERS SHALL BE OF THE SIZE AND TYPE SHOWN ON THESE PLANS. ALL GALVANIZED FASTENERS, BOLTS, NUTS, WASHERS, SCREWS, AND NAILS SHALL BE HOT–DIPPED GALVANIZED TO MEET THE REQUIREMENTS OF ASTM A153. ALL STAINLESS STEEL BOLTS, NUTS, WASHERS, SCREWS, AND NAILS SHALL BE STAINLESS STEEL TYPE 316. ALL NAILS USED FOR THE PROJECT SHALL BE STAINLESS STEEL (TYPE 316) RING–SHANK.

PILE BENT/PILE TABLE

PILE BENT #	BOARDWALK WIDTH	NUMBER OF PILES/PILE BENT	PILE SIZE	PILE LENGTH	MIN. EMBEDMENT
PB01	8 FT	2	10" BUTT	40 FT	30 FT
PB02	8 FT	2	10" BUTT	40 FT	30 FT
PB03	8 FT	2	10" BUTT	40 FT	30 FT
PB04	8 FT	2	10" BUTT	40 FT	30 FT
PB05	8 FT	2	10" BUTT	40 FT	30 FT
PB06	8 FT	2	10" BUTT	40 FT	30 FT
PB07	8 FT	2	10" BUTT	40 FT	30 FT
PB08	8 FT	2	10" BUTT	40 FT	30 FT
PB09	12 FT	3	10" BUTT	40 FT	30 FT
PB10	12 FT	3	10" BUTT	40 FT	30 FT
PB11	12 FT	3	10" BUTT	40 FT	30 FT
PB12	12 FT	3	10" BUTT	40 FT	30 FT
PB13	12 FT	3	10" BUTT	40 FT	30 FT
PB14	12 FT	3	10" BUTT	40 FT	30 FT
PB15	12 FT	3	10" BUTT	40 FT	30 FT
PB16	12 FT	3	10" BUTT	40 FT	30 FT
PB17	12 FT	3	10" BUTT	40 FT	30 FT
PB18	12 FT	3	10" BUTT	40 FT	30 FT
PB19	12 FT	3	10" BUTT	40 FT	30 FT
PB20	12 FT	3	10" BUTT	40 FT	30 FT
PB21	12 FT	3	10" BUTT	40 FT	30 FT
PB22	8 FT	2	10" BUTT	40 FT	30 FT
PB23	8 FT	2	10" BUTT	40 FT	30 FT
PB24	8 FT	2	10" BUTT	40 FT	30 FT
PB25	8 FT	2	10" BUTT	40 FT	30 FT
PB26	8 FT	2	10" BUTT	40 FT	30 FT
PB27	8 FT	2	10" BUTT	40 FT	30 FT
PB28	8 FT	2	10" BUTT	40 FT	30 FT
PB29	8 FT	2	10" BUTT	40 FT	30 FT
PB30	PIERHEAD	3	10" BUTT	40 FT	30 FT
PB31	PIERHEAD	3	10" BUTT	40 FT	30 FT
PB32	PIERHEAD	3	10" BUTT	40 FT	30 FT
PB33	GANGWAY PLATFORM	2	10" BUTT	40 FT	30 FT
PB34	10 FT	2	10" BUTT	40 FT	30 FT
PB35	10 FT	2	10" BUTT	40 FT	30 FT
PB36	10 FT	2	10" BUTT	40 FT	30 FT
PB37	10 FT	2	10" BUTT	40 FT	30 FT
PB38	10 FT	2	10" BUTT	40 FT	30 FT



TIDAL BENCH MARK DATUM RELATIONSHIPS
STATION ID: 8664541
NAME: YEAMANS HALL, GOOSE CREEK, SC
DATED: 06.28.2004
NOAA CHART: 11524
USGS QUAD: NORTH CHARLESTON

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

SOUTH CAROLINA
JON GUERRY TAYLOR & ASSOCIATES, INC.
NO. 3671
CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA PROFESSIONAL ENGINEER
No. 22003
05.12.2023
CHRISTOPHER W. MOORE

CITY OF HANAHAN SOUTH CAROLINA EST. 1973

ADC ENGINEERING
1226 YEAMANS HALL ROAD
HANAHAN, SC 29410
843-566-0161
ADCENGINEERING.COM

Jon Guerry Taylor & Associates, Inc.
CIVIL, WATERFRONT AND MARINE PLANNERS & ENGINEERS
P.O. BOX 1902, MOUNT PLEASANT, SOUTH CAROLINA 29465
PHONE: 843.884.6415; FAX: 843.884.4026
EMAIL: INFO@JGTINC.COM; WEB: WWW.JGTINC.COM

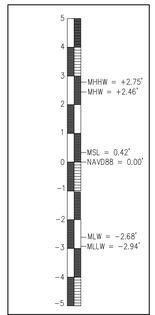
811 Know what's below. Call before you dig.

DATE: 05.12.2023
ADC PROJECT #: 20381
DESIGNED: CWM
CHECKED: CWM
DRAWN: CWM
REVISION:

BOARDWALK, PIER AND FLOATING DOCK NOTES

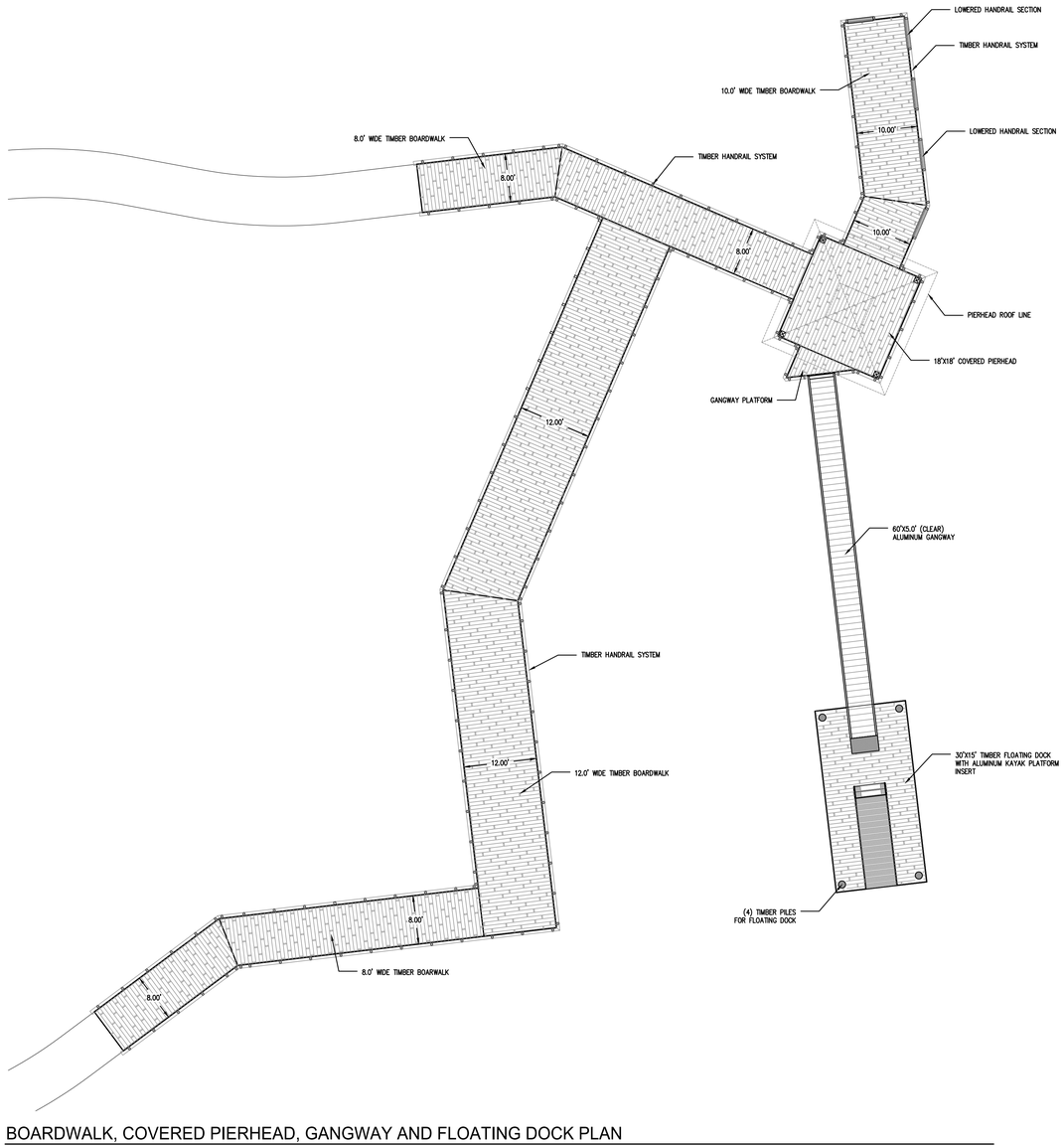
M100

100% CONSTRUCTION DOCUMENTS



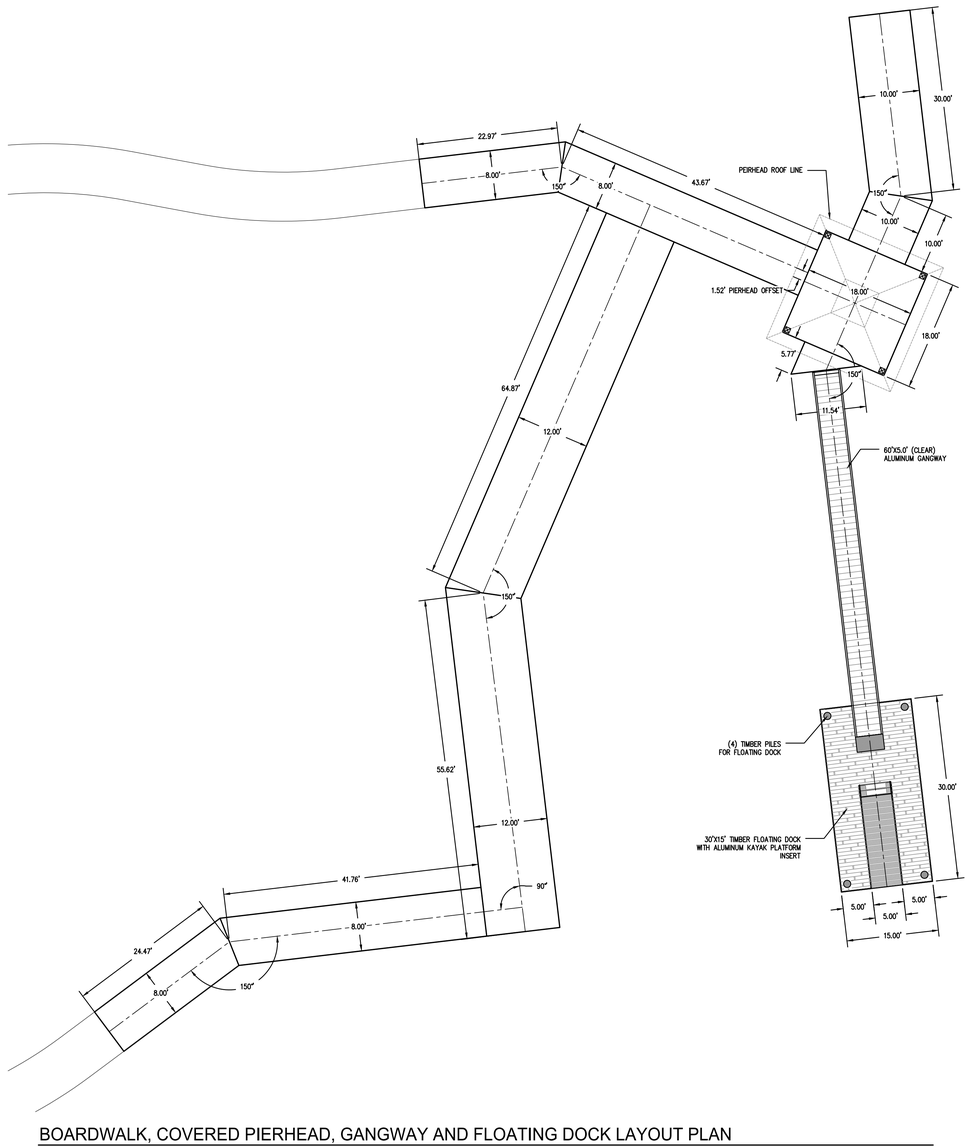
TIDAL BENCH MARK DATUM RELATIONSHIPS
STATION ID: 8664541
NAME: YEAMANS HALL, GOOSE CREEK, SC
DATED: 06.28.2004
NOAA CHART: 11524
USGS QUAD: NORTH CHARLESTON

NOTE:
ALL ELEVATIONS ARE REFERENCED TO NAVD88



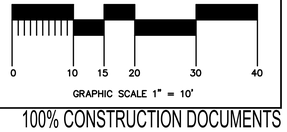
BOARDWALK, COVERED PIERHEAD, GANGWAY AND FLOATING DOCK PLAN

SCALE - 1"=10'



BOARDWALK, COVERED PIERHEAD, GANGWAY AND FLOATING DOCK LAYOUT PLAN

SCALE - 1"=10'



City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

SOUTH CAROLINA
JON GUERRY TAYLOR & ASSOCIATES, INC.
NO. 3671
CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA
PROFESSIONAL ENGINEER
No. 22003
05.12.2023
CHRISTOPHER W. MOORE

CITY OF HANAHAN
SOUTH CAROLINA
Since 1973

ADC ENGINEERING
1226 YEAMANS HALL ROAD
HANAHAN, SC 29410
843-566-0161
ADCENGINEERING.COM

Jon Guerry Taylor & Associates, Inc.
CIVIL, WATERFRONT AND MARINE PLANNERS & ENGINEERS
P.O. BOX 1082, MOUNT PLEASANT, SOUTH CAROLINA 29465
PHONE: 843.884.6415; FAX: 843.884.4026
EMAIL: INFO@JGTINC.COM; WEB: WWW.JGTINC.COM

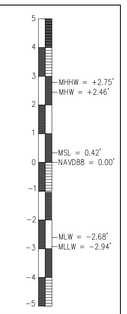
811 Know what's below. Call before you dig.

DATE:	05/12/2023
ADC PROJECT #:	20381
DESIGNED:	CWM
CHECKED:	CWM
DRAWN:	CWM
REVISION:	

BOARDWALK, & FLOATING DOCK LAYOUT PLAN

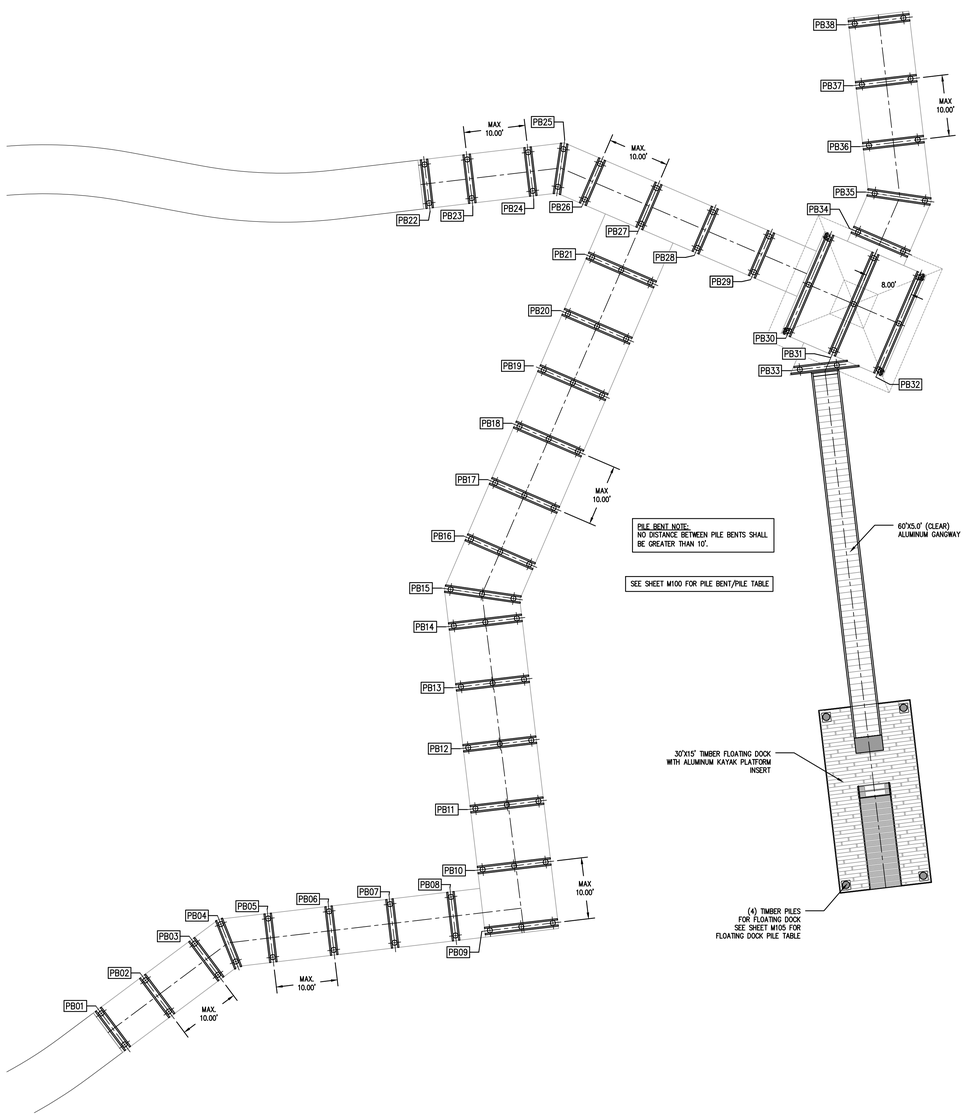
M101

100% CONSTRUCTION DOCUMENTS



TIDAL BENCH MARK DATUM RELATIONSHIPS
STATION ID: 8664541
NAME: YEAMANS HALL, GOOSE CREEK, SC
DATED: 06.28.2004
NOAA CHART: 11524
USGS QUAD: NORTH CHARLESTON

NOTE:
ALL ELEVATIONS ARE REFERENCED TO NAVD88



PILE BENT NOTE:
NO DISTANCE BETWEEN PILE BENTS SHALL BE GREATER THAN 10'.

SEE SHEET M100 FOR PILE BENT/PILE TABLE

BOARDWALK PILE BENT LAYOUT PLAN

SCALE - 1"=10'

BOARDWALK JOIST SCHEDULE:

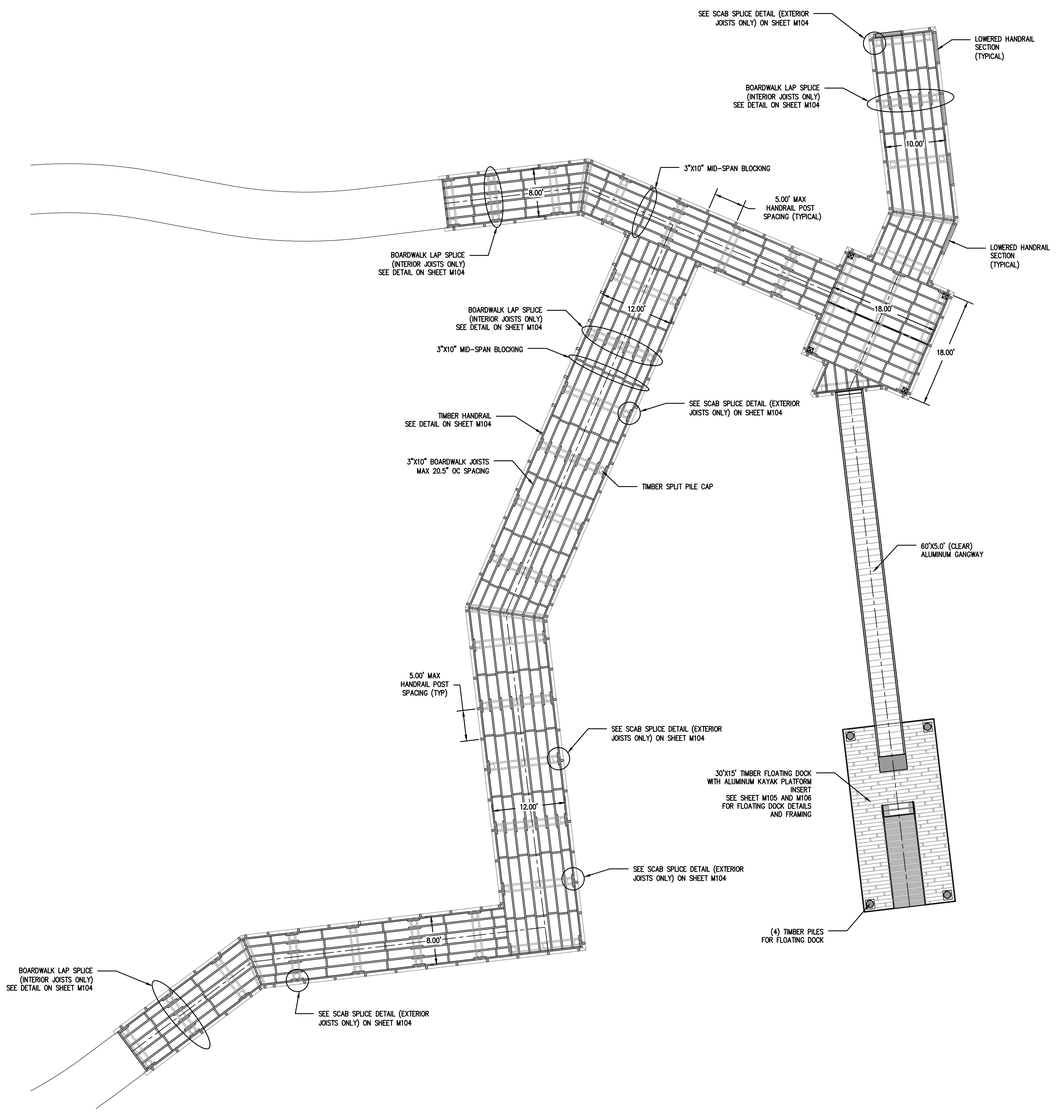
8.0' WIDE BOARDWALK:
SIX (6) 3"X10" JOISTS EVENLY SPACED AT A MAXIMUM 20.5" OC

10.0' WIDE BOARDWALK:
SEVEN (7) 3"X10" JOISTS EVENLY SPACED AT A MAXIMUM 20.5" OC

12.0' WIDE BOARDWALK:
EIGHT (8) 3"X10" JOISTS, EVENLY SPACED AT A MAXIMUM 20.5" OC

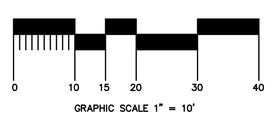
PIERHEAD:
ELEVEN (11) 3"X10" JOISTS, EVENLY SPACED AT A MAXIMUM 20.5" OC

EXTERIOR AND INTERIOR JOISTS ARE INCLUDED IN THE JOIST COUNT FOR EACH BOARDWALK WIDTH.



BOARDWALK FRAMING LAYOUT PLAN

SCALE - 1"=10'



100% CONSTRUCTION DOCUMENTS

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

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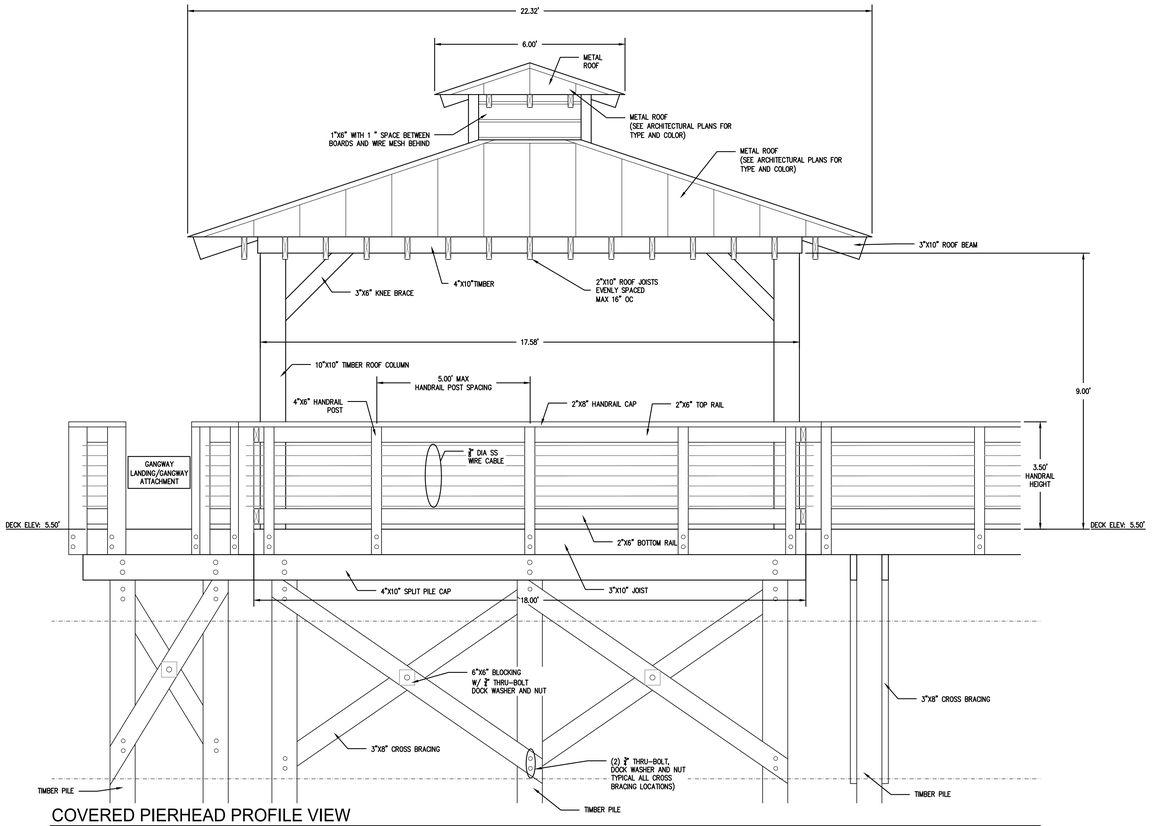
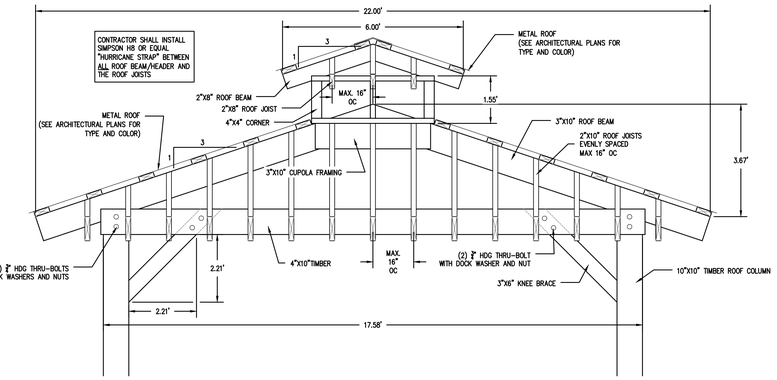
PILE BENT & FRAMING LAYOUT PLAN

M102



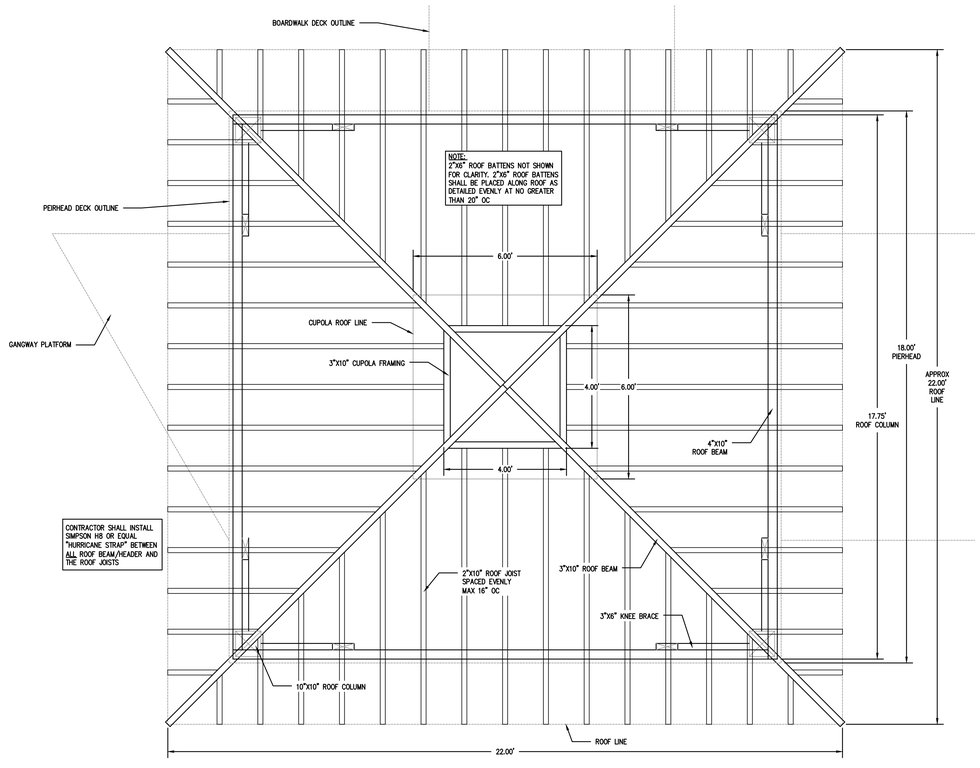
COVERED PIERHEAD PROFILE VIEW

SCALE - 1"=2'



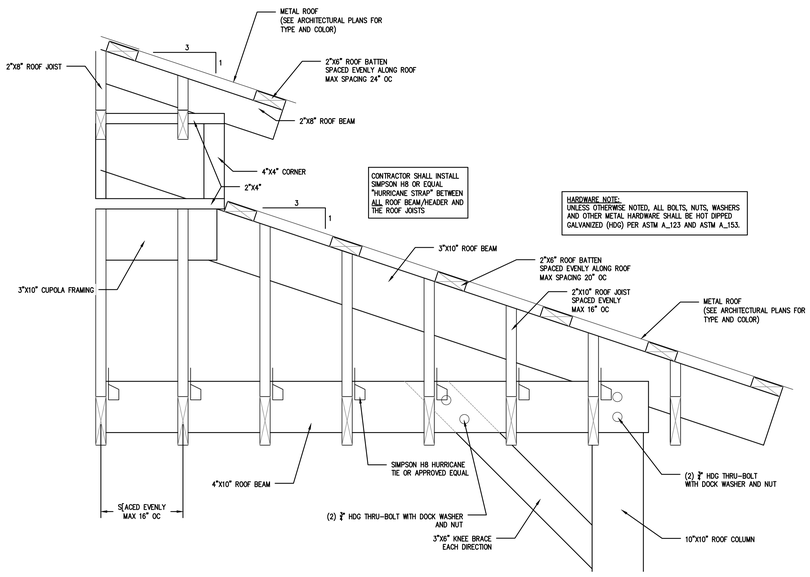
COVERED PIERHEAD ROOF FRAMING DETAIL - PROFILE VIEW

SCALE - 1"=2'



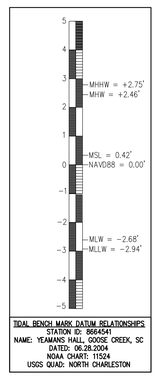
COVERED PIERHEAD ROOF FRAMING DETAIL - PLAN VIEW

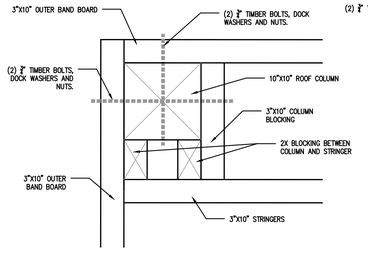
SCALE - 1"=2'



COVERED PIERHEAD ROOF CORNER FRAMING DETAIL

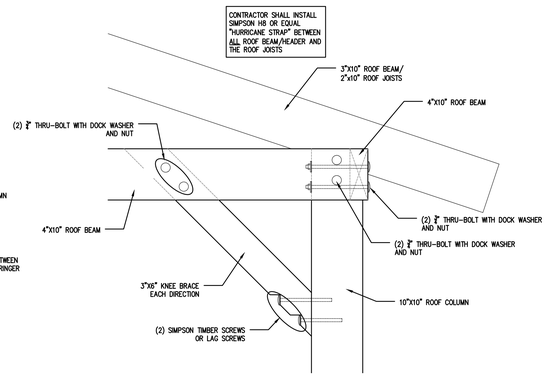
SCALE - NTS





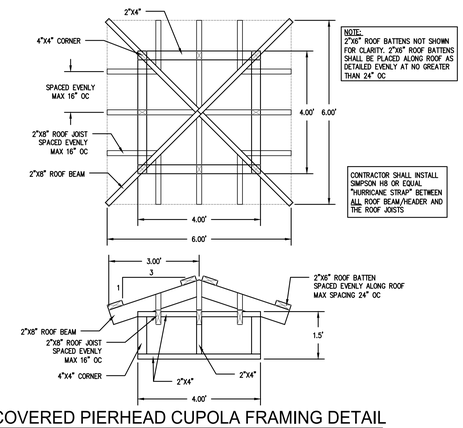
ROOF COLUMN/DECK CONNECTION CORNER

SCALE - NTS



COVERED PIERHEAD ROOF KNEE BRACE DETAIL

SCALE - NTS



COVERED PIERHEAD CUPOLA FRAMING DETAIL

SCALE - NTS

100% CONSTRUCTION DOCUMENTS

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

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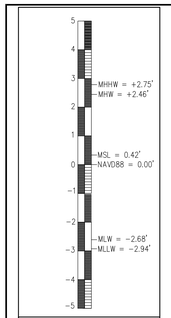
COVERED PIERHEAD FRAMING PLAN & DETAILS

M103



TIDAL BENCH MARK DATUM RELATIONSHIPS
STATION ID: 8664541
NAME: YEAMANS HALL GOOSE CREEK, SC
DATED: 06.28.2004
NOAA CHART: 11524
USGS QUAD: NORTH CHARLESTON

CROSS BRACING NOTE:
CROSS BRACING SHALL BE INSTALLED AT ALL PILE BENTS WITH A HEIGHT OF 6.0' OR GREATER OFF THE EXISTING GROUND.

NOTE:
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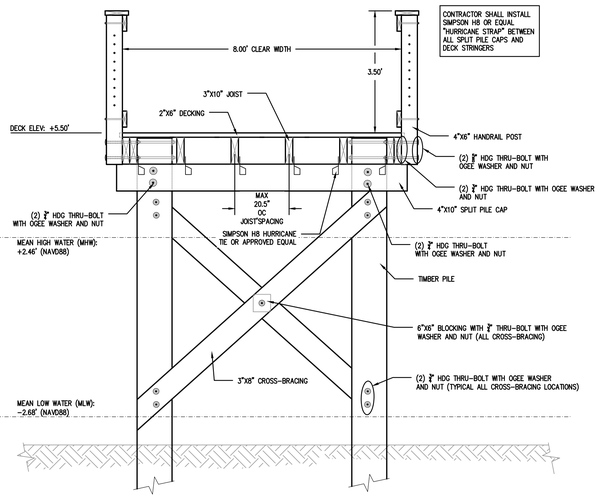
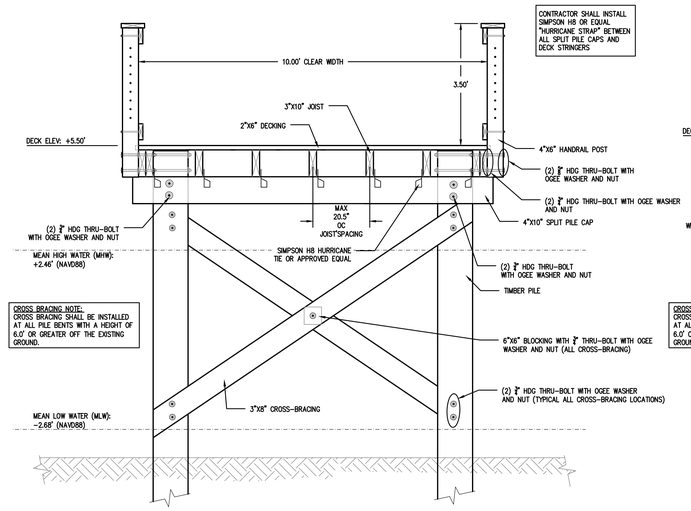


8.0' WIDE BOARDWALK SECTION

SCALE - NTS



10.0' WIDE BOARDWALK SECTION

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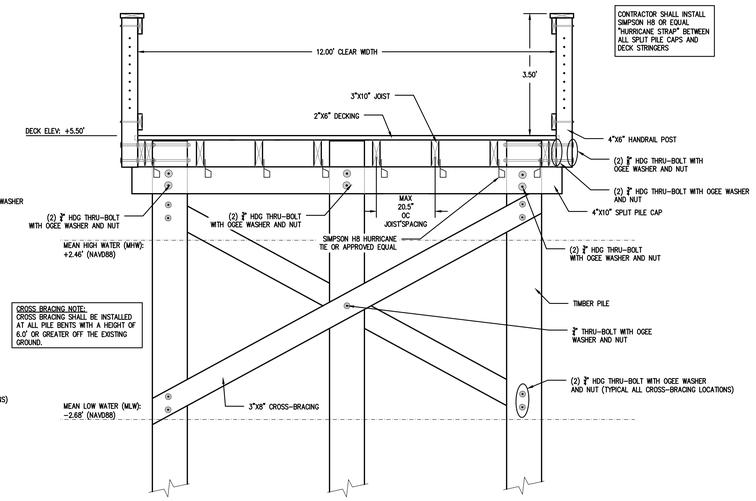
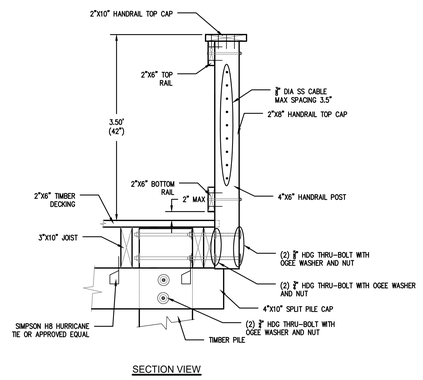
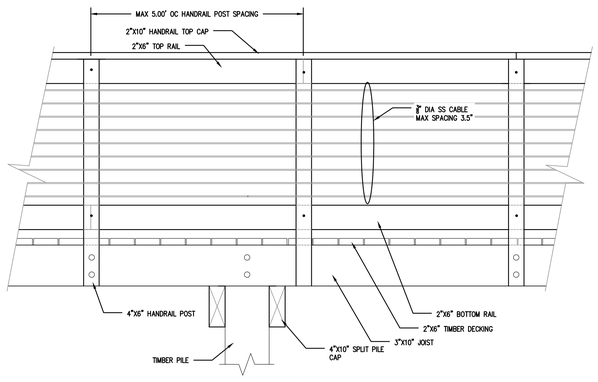


12.0' WIDE BOARDWALK SECTION

SCALE - NTS



SECTION VIEW



PROFILE VIEW

TYPICAL HANDRAIL SECTION AND DETAIL

SCALE - NTS

CABLE RAIL NOTES:

1. INTERMEDIATE CABLE RAILS (INFILL) FOR THE HANDRAIL SYSTEM SHALL BE ¼" DIAMETER, 1 X 19-TYPE STAINLESS STEEL (TYPE 316) CABLES AS MANUFACTURED/SUPPLIED BY: JOHNSON ARCHITECTURAL HARDWARE (C.S. JOHNSON COMPANY, INC.), OR EQUAL – ONLY AS APPROVED BY THE ENGINEER. MORE INFORMATION AND ILLUSTRATIONS FOR PRODUCTS AND INSTALLATION REQUIREMENTS CAN BE FOUND AT THE WEBSITE: www.csjohnson.com
(CONTRACTOR IS RESPONSIBLE FOR FOLLOWING ALL MANUFACTURER GUIDELINES FOR THE PROPER INSTALLATION, ATTACHMENT, AND TENSIONING OF THE CABLE RAIL SYSTEM).

2. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER INSTALLATION OF ¼" DIA. STAINLESS STEEL CABLE RAILS TO ENSURE PROPER TIGHTNESS OF INDIVIDUAL CABLES AND TO PROVIDE SECURE ATTACHMENT TO THE SUPPORTING RAIL POSTS. CABLE RAILS SHALL BE INSTALLED PER MANUFACTURER'S GUIDELINES AND ADEQUATE CABLE LENGTHS SHALL BE USED WHICH WILL ALLOW FOR FUTURE TIGHTENING/ADJUSTMENTS OF THE CABLE RAIL SYSTEM. TERMINATION CONNECTIONS/TURNBUCKLES SHALL BE PROVIDED AND UTILIZED BY THE CONTRACTOR FOR THIS PURPOSE. FOR THE CONTRACTOR'S REFERENCE AND CONVENIENCE, THE FOLLOWING SUPPLIER OF THE CABLE RAIL SYSTEM IS PROVIDED: **CHARLESTON'S RIGGING & MARINE**, LOCATED IN CHARLESTON, SC. CONTRACTOR MAY USE OTHER SUPPLIER OF HIS/HER CHOICE PROVIDED THAT MATERIAL AND INSTALLATION REQUIREMENTS ARE SATISFIED. PRIOR APPROVAL MUST BE GIVEN BY THE ENGINEER FOR ANY PROPOSED ALTERNATE BRAND/SUPPLIER FOR THE STAINLESS STEEL CABLE RAIL SYSTEM.

3. CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT CABLE RAIL SPACING DOES NOT EXCEED 4" ON CENTER.

4. CONTRACTOR SHALL USE "DECK TOGGLE WITH CLASSIC TURNBUCKLE" (END CONNECTOR AND TURNBUCKLE) FOR END-OF-RUN TERMINATIONS (MAX. 40 FT. PER RUN). THE "DECK TOGGLE WITH CLASSIC TURNBUCKLE" TERMINAL SHALL BE ATTACHED BY USE OF TWO (2) ⅜" DIA. SS (TYPE 316) THROUGH-BOLT CONNECTIONS AT EACH CABLE (DECK TOGGLE TURNBUCKLE) TERMINATION LOCATION. THROUGH-BOLT SHALL HAVE SMOOTH (DOME HEAD). USE WASHERS ON BOTH ENDS AND NYLOCK NUTS. DO **NOT** USE LAG-SCREWS OR OTHER SCREWS FOR THIS ATTACHMENT; THROUGH-BOLT ONLY.

5. MAXIMUM RUN ON ANY CABLE RAIL SHALL BE 40 FT.

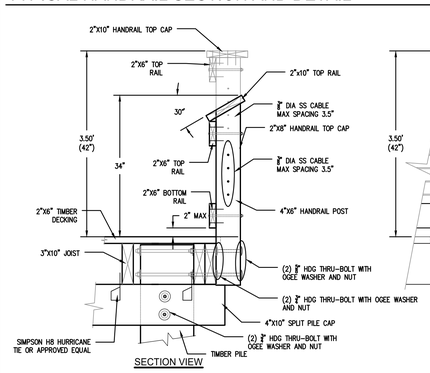
6. CONTRACTOR SHALL TIGHTEN EACH CABLE RAILS TO 350 LBS. TENSION IN EACH CABLE – PER MANUFACTURE'S SPECIFICATIONS. CONTRACTOR SHALL BE RESPONSIBLE FOR USING TENSIONING TOOL AS RECOMMENDED BY THE MANUFACTURER TO ENSURE THAT PROPER TENSIONING IN CABLE IS ACHIEVED.

7. MAX. ALLOWABLE SPACING FOR ALL 4" X 6" TIMBER RAIL POSTS SHALL BE 5 FT. O.C.

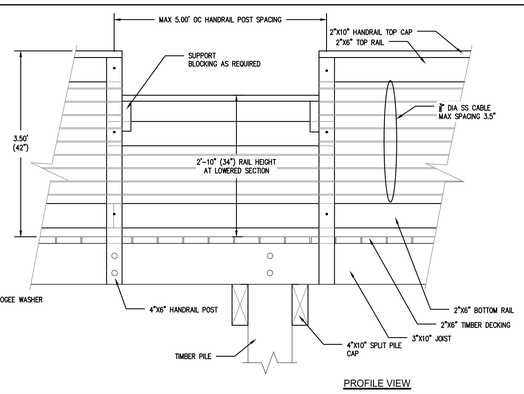
BOARDWALK & PIERHEAD LUMBER / TIMBER SPECIFICATION TABLE

MEMBER / LOCATION	SIZE OF MEMBER	GRADE	PRESERVATIVE TREATMENT SECIFICATION	USE CATEGORY	GENERAL COMMODITY CLASSIFICATION AND SPECIFICATION	SPECIFIC END USE COMMODITY CLASSIFICATION	SPECIES	SURFACE TEXTURE
CROSS-BRACING	3" X 8" (BOARDWALK) 3" X 8" (PIERHEAD)	NO. 1 "MARINE GRADE"	2.5 PCF-CCA	UC5B	N/A	MARINE (SALT WATER)	SOUTHERN PINE	S4S
SPLIT PILE CAP	4" X 10"	NO. 2	0.60 PCF-CCA	UC4B	N/A	MARINE OUT OF WATER; SALT WATER SPLASH, ABOVE GROUND	SOUTHERN PINE	S4S
JOISTS & BLOCKING	3" X 10"	NO. 1	0.60 PCF-CCA	UC4B	N/A	MARINE OUT OF WATER; SALT WATER SPLASH, ABOVE GROUND	SOUTHERN PINE	S4S
DECKING	2" X 6"	NO. 1	0.31 PCF-CA	UC4B	N/A	MARINE OUT OF WATER; SALT WATER SPLASH, ABOVE GROUND	SOUTHERN PINE	S4S
HANDRAIL COMPONENTS: "RAILS" 2" X 6" NO. 2; "RAIL CAP" 2" X 8" NO. 1 PRIME; "RAIL POSTS" 4" X 6" NO. 2			0.31 PCF-CA	UC4B	N/A	MARINE OUT OF WATER; SALT WATER SPLASH, ABOVE GROUND	SOUTHERN PINE	S4S
ROOF COLUMN	10" X 10"	NO. 1	0.60 PCF-CCA	UC4B	N/A	MARINE OUT OF WATER; SALT WATER SPLASH, ABOVE GROUND	SOUTHERN PINE	S4S
ROOF BEAMS; ROOF JOISTS/ BRACING	3" X 10"; 2" X 10"	NO. 2	0.60 PCF-CCA	UC4B	N/A	MARINE OUT OF WATER; SALT WATER SPLASH, ABOVE GROUND	SOUTHERN PINE	S4S
ROOF BATTENS	2" X 6"	NO. 2	0.31 PCF-CA	UC4B	N/A	MARINE OUT OF WATER; SALT WATER SPLASH, ABOVE GROUND	SOUTHERN PINE	S4S

LUMBER QUALITY NOTE:
CONTRACTOR SHALL TAKE SPECIAL CARE IN CULLING LUMBER THAT IS TO BE USED FOR NEW PIER AND HANDRAILS CONSTRUCTION. NO WANE OR DOWNGRADES WILL BE ALLOWED IN CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT NO MEMBERS WITH ROUNDED, BARK-EDGES, KNOT-HOLES, OR OTHER OFF-QUALITY DEFECTS ARE ALLOWED IN THE RAIL POSTS, HORIZONTAL TOP AND BOTTOM RAILS, DECKING OR OTHER VISIBLE PORTIONS OR COMPONENTS OF THE PROJECT.



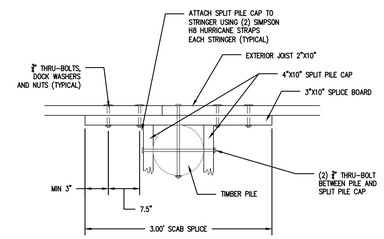
SECTION VIEW



PROFILE VIEW

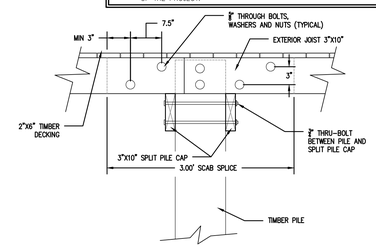
TYPICAL HANDRAIL SECTION AND DETAIL

SCALE - NTS



BUTT SPLICE DETAIL-PLAN VIEW

SCALE - NTS



SCAB SPLICE DETAIL-PROFILE VIEW

SCALE - NTS

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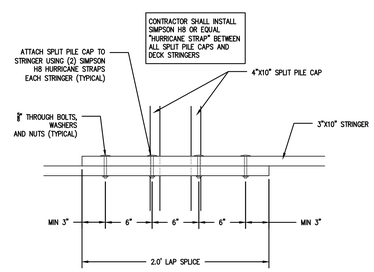
PIERHEAD:
ELEVEN (11) 3"X10" JOISTS, EVENLY SPACED AT A MAXIMUM 20.5" OC

EXTERIOR AND INTERIOR JOISTS ARE INCLUDED IN THE JOIST COUNT FOR EACH BOARDWALK WIDTH.

HARDWARE NOTE:
UNLESS OTHERWISE NOTED, ALL BOLTS, NUTS, WASHERS AND OTHER METAL HARDWARE SHALL BE HOT DIPPED GALVANIZED (HDG) PER ASTM A_123 AND ASTM A_153.



LAP SPLICE DETAIL-PLAN VIEW

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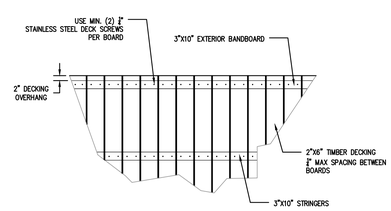

DECKING DETAIL

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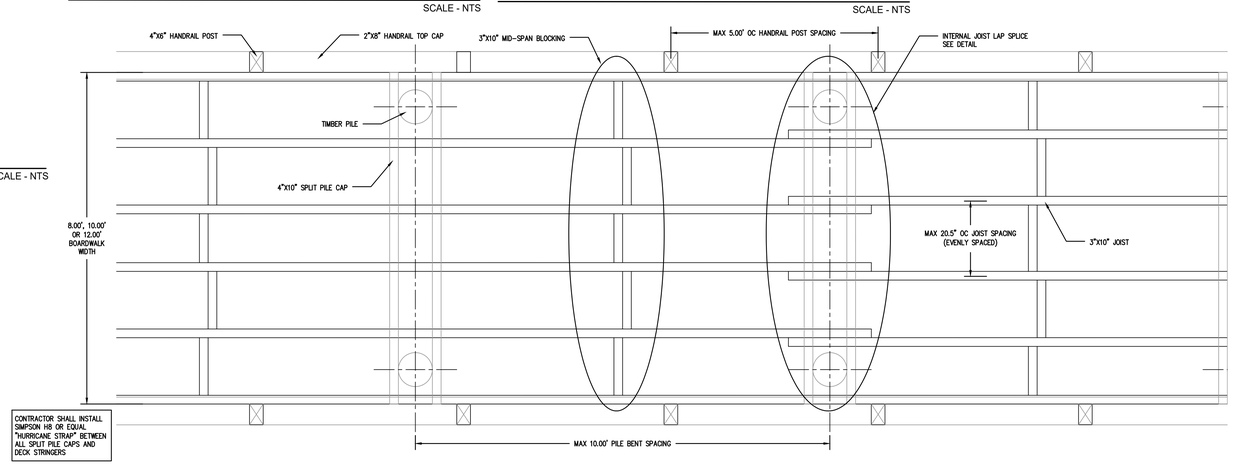

TYPICAL BOARDWALK FRAMING PLAN

SCALE - NTS

100% CONSTRUCTION DOCUMENTS

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

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BOARDWALK FRAMING PLAN & DETAILS

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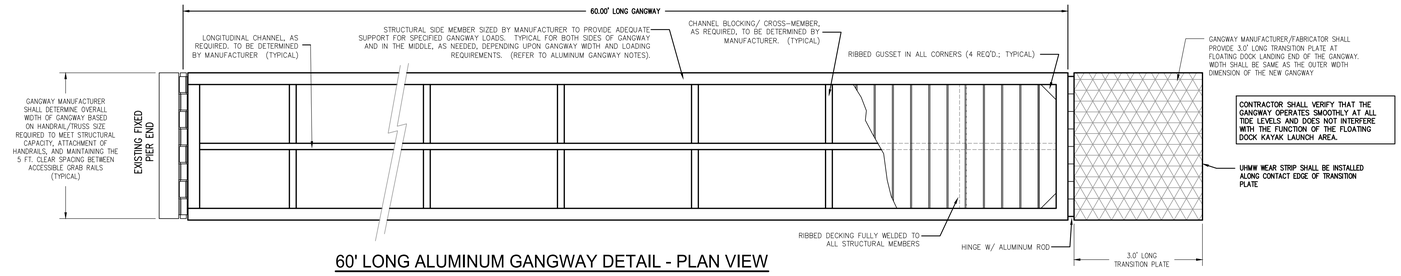
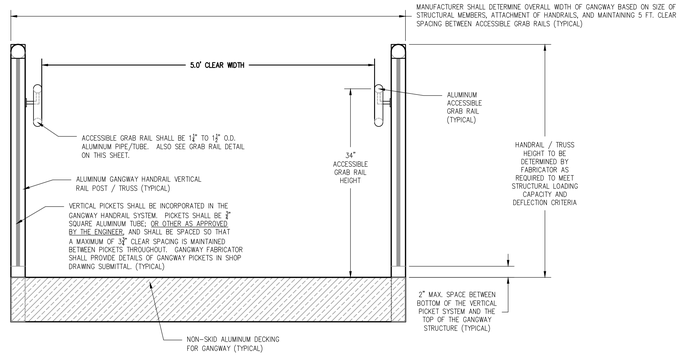
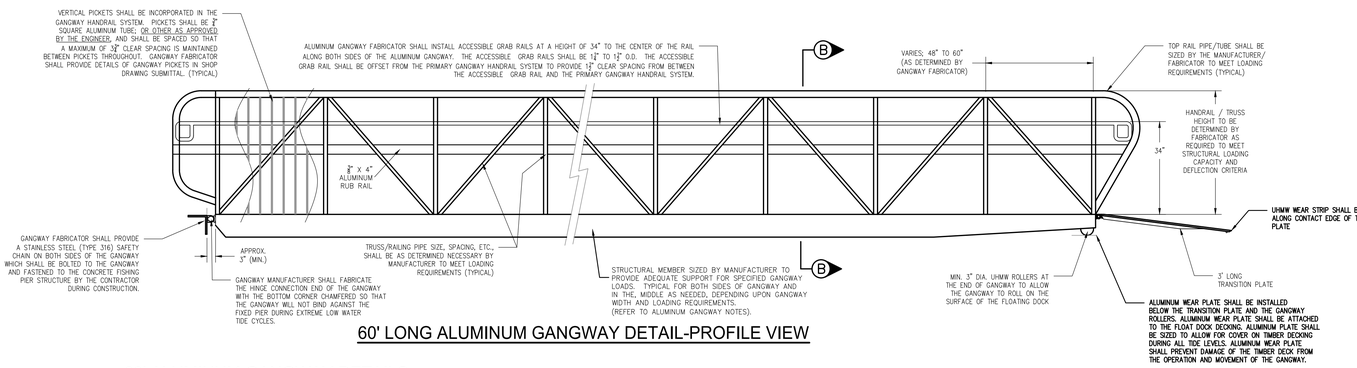


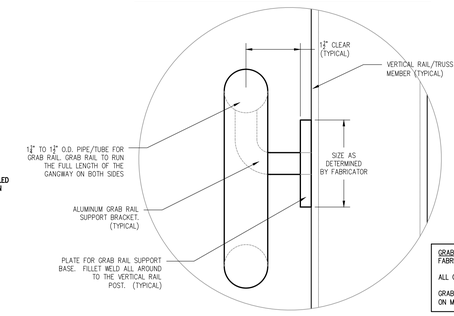
60' LONG ALUMINUM GANGWAY DETAIL - PLAN VIEW



SECTION B-B ALUMINUM GANGWAY



60' LONG ALUMINUM GANGWAY DETAIL-PROFILE VIEW



GRAB RAIL NOTES:
FABRICATOR SHALL INSTALL GRAB RAIL SUPPORT BRACKET AT EACH VERTICAL RAIL POST.

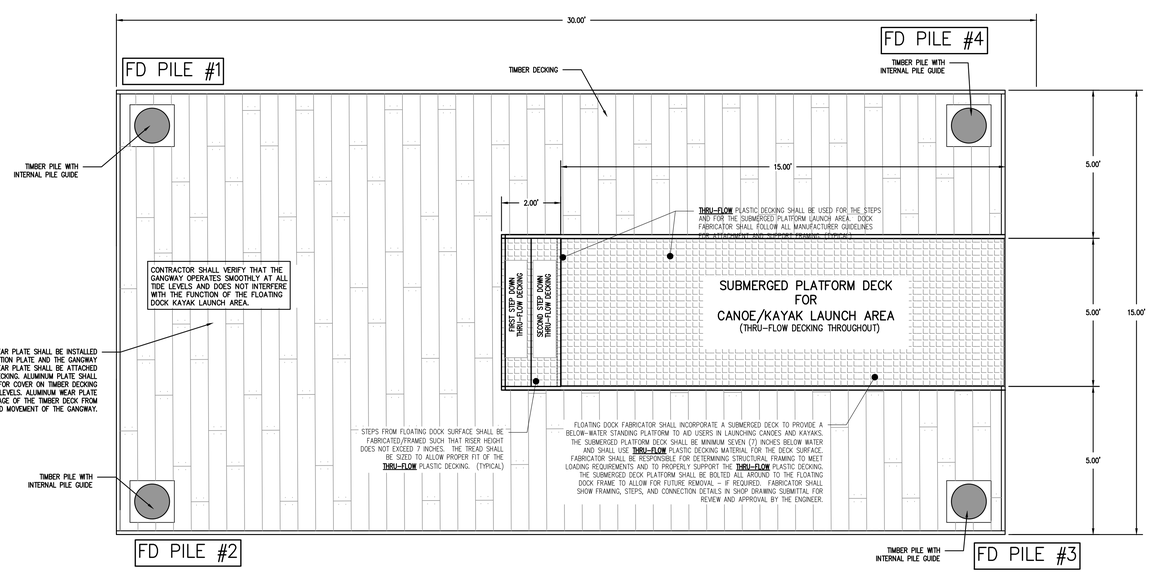
ALL GRAB RAIL COMPONENTS SHALL BE FULLY WELDED BY FABRICATOR TO ENSURE PROPER CONNECTIONS.

GRAB RAIL BRACKET SHOWN HERE FOR REPRESENTATION PURPOSES. ACTUAL BRACKET MAY VARY DEPENDING ON MANUFACTURER'S PRODUCT AVAILABILITY.

GRAB RAIL SECTION DETAIL

60' ALUMINUM GANGWAY DETAILS

SCALE - NTS



FLOATING DOCK TIMBER PILE TABLE			
PILE #	BUTT DIA	PILE LENGTH	TOP ELEV.
FD PILE #1	MIN 10"	55 FT	14.5' (NAVD88)
FD PILE #2	MIN 10"	55 FT	14.5' (NAVD88)
FD PILE #3	MIN 10"	55 FT	14.5' (NAVD88)
FD PILE #4	MIN 10"	55 FT	14.5' (NAVD88)

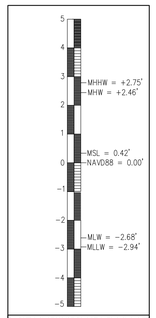
TIMBER PILE NOTE:
ALL TIMBER PILES FOR THE NEW FLOATING DOCK SHALL BE MIN. 10" BUTT DIA. SYP, AND SHALL CONFORM TO REQUIRE- MENTS OF ASTM D25. ALL PILES SHALL BE TREATED TO 2.5 PCF-CCA AND SHALL BE A MINIMUM OF THE LENGTH SPECIFIED ABOVE.

THRU-FLOW DECKING NOTE:
THE THRU-FLOW DECKING MATERIAL USED FOR THE SUBMERGED CANOE/KAYAK LAUNCH PLATFORM AND THE STEPS SHALL BE MADE UP OF FIBER-GLASS REINFORCED POLYPROPYLENE PLASTIC – AND MANUFACTURED BY THRU-FLOW, INC. THE THRU-FLOW DECKING SHALL BE 12" X 60" X 1.2" IN SIZE AND SHALL BE GRAY IN COLOR.

THE SUPPORTING ALUMINUM FRAME STRUCTURE FOR THE THRU-FLOW DECKING SHALL BE ABLE TO SUPPORT 100 PSF LIVE LOAD AND THE SUPPORT STRINGER SPACING SHALL BE MADE TO FIT WITH THE THRU-FLOW DECKING MANUFACTURER'S GUIDELINES TO SUPPORT THIS 100 PSF LOAD.

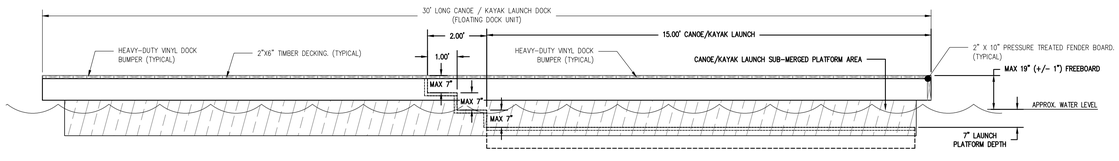
FABRICATOR SHALL INSTALL THE THRU-FLOW DECKING PER THE MANUFACTURER GUIDELINES AND USING ONLY STAINLESS STEEL (TYPE 316) FASTENERS, OR APPROVED EQUAL.

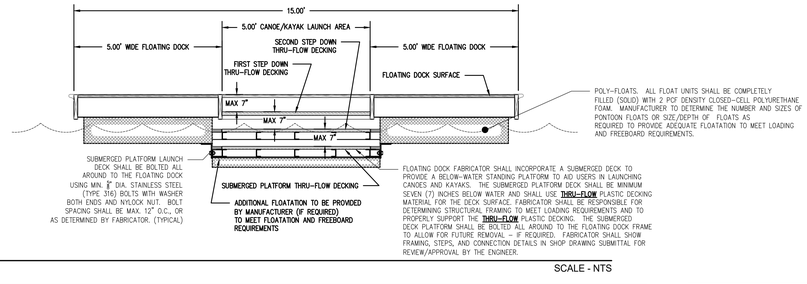
FABRICATOR SHALL PROVIDE LAYOUT PLAN, MATERIAL SIZES, AND DETAILS FOR SUBMERGED PLATFORM FRAMING AND STEPS, AND ENGINEERING CALCULATIONS WITH THE SHOP DRAWING SUBMITTAL.



TIDAL BENCH MARK DATUM RELATIONSHIPS
STATION ID: 8664541
NAME: YEAMANS HALL, COOSE CREEK, SC
DATED: 06.28.2004
NOAA CHART: 11524
USGS QUAD: NORTH CHARLESTON

NOTE:
ALL ELEVATIONS ARE REFERENCED TO NAVD88





30'X15' FLOATING DOCK/KAYAK LAUCH DETAILS

SCALE - NTS

100% CONSTRUCTION DOCUMENTS

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION
JON GUERRY TAYLOR & ASSOCIATES, INC
NO. 3671

SOUTH CAROLINA PROFESSIONAL ENGINEER
No. 22003
05.12.2023
CHRISTOPHER W. MOORE

CITY OF HANAHAN SOUTH CAROLINA EST. 1978

ADC ENGINEERING
1226 YEAMANS HALL ROAD
HANAHAN, SC 29410
843-566-0161
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Jon Guerry Taylor & Associates, Inc.
CIVIL, WATERFRONT AND MARINE PLANNERS & ENGINEERS
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PHONE: 843.884.6415; FAX: 843.884.4026
EMAIL: INFO@JGTINC.COM; WEB: WWW.JGTINC.COM

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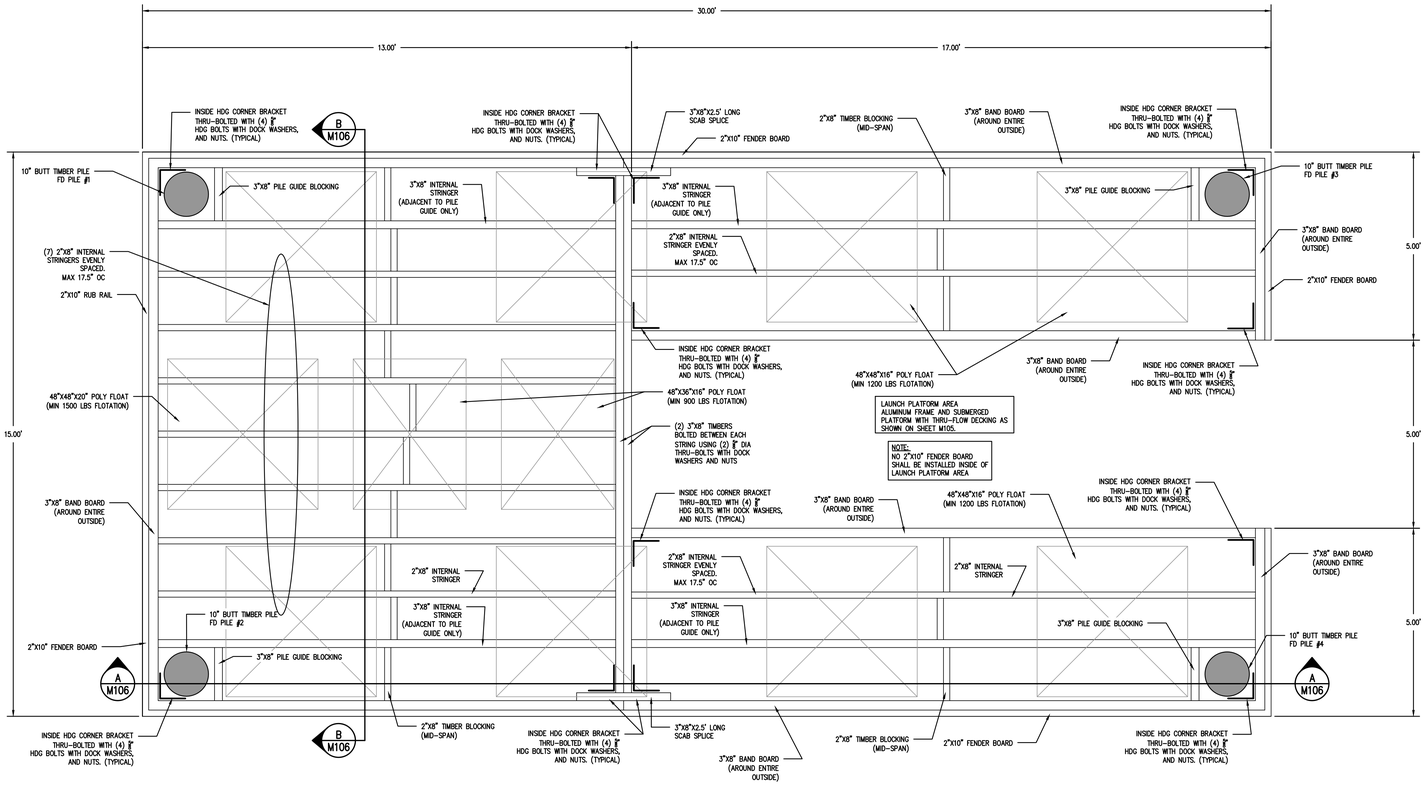
DATE: 05/12/2023
ADC PROJECT #: 20381
DESIGNED: CWM
CHECKED: CWM
DRAWN: CWM
REVISION:

GANGWAY / FLOATING DOCK PLAN & DETAILS

M105



30'X15' FLOATING DOCK/KAYAK LAUCH FRAIMING PLAN

SCALE - NTS

FLOATING DOCK TIMBER PILE TABLE			
PILE #	BUTT DIA	PILE LENGTH	TOP ELEV.
FD PILE #1	MIN 10"	55 FT	14.5' (NAVD88)
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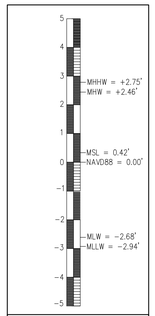
TIMBER PILE NOTE:
ALL TIMBER PILES FOR THE NEW FLOATING DOCK SHALL BE MIN. 10" BUTT DIA, SYP, AND SHALL CONFORM TO REQUIREMENTS OF ASTM D25. ALL PILES SHALL BE TREATED TO 2.5 PCF-CCA AND SHALL BE A MINIMUM OF THE LENGTH SPECIFIED ABOVE.

FLOATING DOCK LUMBER / TIMBER TABLE

MEMBER/ LOCATION	SIZE OF MEMBER	GRADE	PRESERVATIVE TREATMENT SPECIFICATION	USE CATEGORY	SPECIFIC END USE COMMODITY CLASSIFICATION	SPECIES	SURFACE TEXTURE
TIMBER DOCK PILING	MIN 10" BUTT, 50 FT LONG	ASTM D25 (ROUND PILING)	2.5 PCF-CCA	UC5A, UC5B, OR UC5C	MARINE (SALT WATER)	SOUTHERN PINE	ROUND PILING
STRINGERS & BLOCKING	2"X8" & 3"X8" (AS NOTED)	NO. 2	0.60 PCF-CCA	UC4B	MARINE OUT OF WATER; SALT WATER SPLASH, NOT IN GROUND CONTACT	SOUTHERN PINE	S4S
FENDERING	2"X10"	NO. 2	0.60 PCF-CCA	UC4B	MARINE OUT OF WATER; SALT WATER SPLASH, NOT IN GROUND CONTACT	SOUTHERN PINE	S4S
DECKING	2"X6"	NO. 1	0.31 PCF-CA	UC4B	MARINE OUT OF WATER; SALT WATER SPLASH, NOT IN GROUND CONTACT	SOUTHERN PINE	S4S
FLOAT CONNECTION BOARDS	2"X6"	NO. 2	0.60 PCF-CCA	UC4B	MARINE OUT OF WATER; SALT WATER SPLASH, NOT IN GROUND CONTACT	SOUTHERN PINE	S4S

LUMBER QUALITY NOTE:
CONTRACTOR SHALL TAKE SPECIAL CARE IN CULLING LUMBER THAT IS TO BE USED FOR NEW BULKHEAD CONSTRUCTION. NO WANE OR DOWNGRADES WILL BE ALLOWED IN CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT NO MEMBERS WITH ROUNDED, BARK-EDGES, KNOT-HOLES, OR OTHER OFF-QUALITY DEFECTS ARE ALLOWED IN THE VISIBLE PORTIONS OR COMPONENTS OF THE PROJECT.



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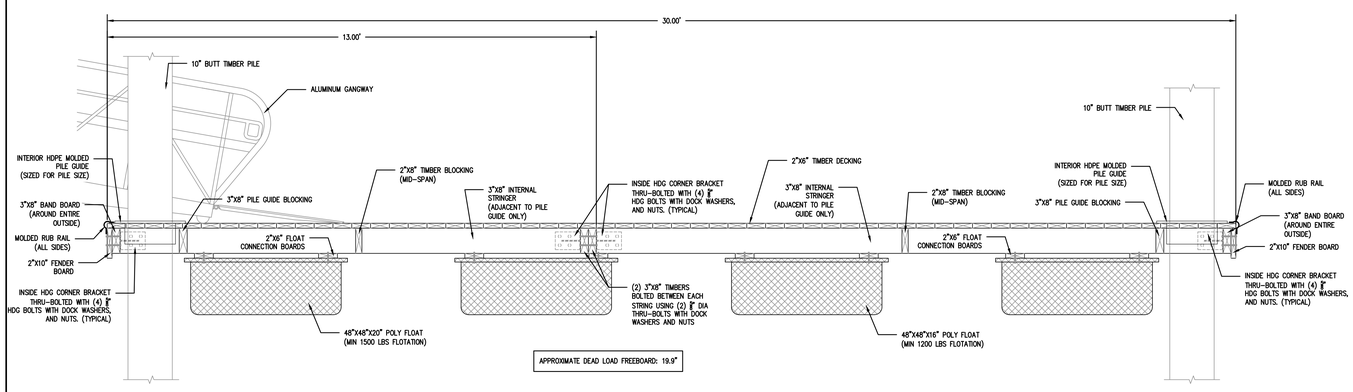
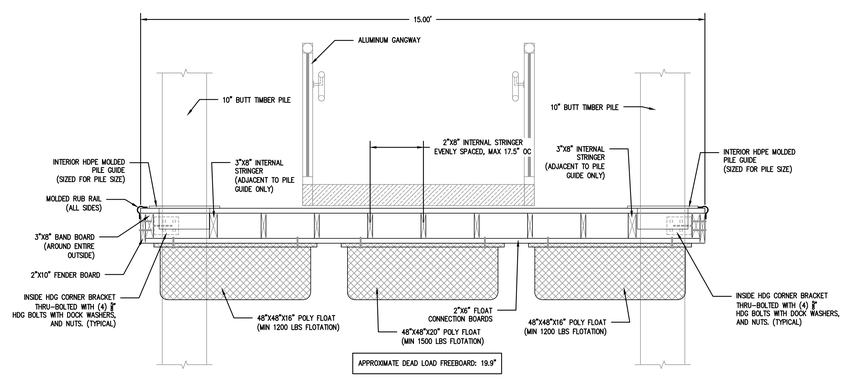


SECTION A M106



SECTION B M106

30'X15' FLOATING DOCK/KAYAK LAUCH FRAMING SECTION DETAILS

SCALE - NTS

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK

HANAHAN
SOUTH CAROLINA

SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION
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DATE:	05/12/2023
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DESIGNED:	CWM
CHECKED:	CWM
DRAWN:	CWM
REVISION:	

FLOATING DOCK FRAMING & DETAILS

M106

100% CONSTRUCTION DOCUMENTS

STEWARD STREET PARK RENOVATIONS

5920 STEWARD ST
HANAHAN, SC 29410

IBC 2021 EDITION - CODE MATRIX

TYPE II-B	NS	NON-SPRINKLERED	SINGLE STORY BUILDING

APPLICABLE CODES

INTERNATIONAL BUILDING CODE	2021 EDITION
INTERNATIONAL EXISTING BUILDING CODE	2021 EDITION
INTERNATIONAL PLUMBING CODE	2021 EDITION
INTERNATIONAL MECHANICAL CODE	2021 EDITION
INTERNATIONAL GAS CODE	2021 EDITION
INTERNATIONAL FIRE PREVENTION CODE	2021 EDITION
INTERNATIONAL ENERGY CONSERVATION CODE	2009 EDITION
NATIONAL ELECTRIC CODE - NFPA 70	2017 EDITION
HANDICAP ACCESSIBILITY ICC/ANSI A117.1	2017 EDITION

SEISMIC ZONE
SEISMIC DESIGN CATEGORY 'D'
RISK CATEGORY 'II' (TABLE 1604.5)

WIND SPEED AND PRESSURE
144 MPH, EXPOSURE "B"

CHAPTER 16 REQUIRED INSPECTIONS
SEE STRUCTURAL

CHAPTER 17 REQUIRED INSPECTIONS
SEE STRUCTURAL

LIFE SAFETY SYSTEMS

EMERGENCY LIGHTING	Y	Y/N	(1008)
MANUAL FIRE ALARM SYSTEM	Y	Y/N	(907.2)
SMOKE DETECTORS	Y	Y/N	
DRAFTSTOPPING	Y	Y/N	(718 - EXISTING)
SMOKE BARRIERS	N	Y/N	(709)
FIRE EXTINQUISHERS	Y	Y/N	(906)

USE AND OCCUPANCY CLASSIFICATION (CHAPTER 3, 303.1)	STAGES PLATFORMS, AND TECHINCAL PRODUCTION AREA (CH. 4, 410)	IBC ALLOWABLE BLDG. HEIGHT (CHAPTER 5, TABLE 504.3 & 506.2)	(ZONING CODE HEIGHT)	ACTUAL BLDG. HEIGHT	ALLOWABLE AREA (SF)	ACTUAL BUILDING AREA (SF)	MEZZANINES (505)	SEPARATED OCCUPANCIES (508.4)	LAUNDRY ROOMS OVER 100 SF (509)	STRUCTURAL FRAME (CHAPTER 6, TABLE 601-FIRE RESISTANCE RATINGS)	EXTERIOR BEARING WALLS	INTERIOR BEARING WALLS	EXTERIOR NON-BEARING WALL	INTERIOR NON-BEARING WALLS	FLOOR CONSTRUCTION	ROOF CONSTRUCTION	EXTERIOR WALLS X<5 FEET FROM FIRE SEPARATION DISTANCE (TABLE 705.5 - RATINGS REQ./FIRE SEPARATION)	EXTERIOR WALLS 5 ≤X <10 FEET BASED ON FIRE SEPARATION DISTANCE	EXTERIOR WALLS 10 ≤X <30 FEET BASED ON FIRE SEPARATION DISTANCE	EXTERIOR WALLS X≥30 FEET BASED ON FIRE SEPARATION DISTANCE	FIRE WALLS-706 (CHAPTER 7)	FIRE BARRIERS - 707	FIRE PARTITIONS - 708	SMOKE BARRIERS - 709	SMOKE PARTITIONS - 710	SHAFT ENCLOSURES - 713	OPENING PROTECTION - TABLE 716.1	STAIRWAYS - 1009.3	CORR. FIRE RATING - TABLE 1020.2 (CH. 10)
ASSEMBLY GROUP A-3	N/A	55 FT	--	15'-3"	9,500	3,000	(4.)	1 HR (4.)	0 HR (1.)	0 HR (2.)	0 HR	0 HR	0 HR	0 HR	0 HR	0-HR	1 HR	1 HR	0 HR	0 HR	3HR	2 HR	1 HR	1 HR	0 HR	2 HR	0 HR	1 HR	0 HR (3.)
UTILITY GROUP U		2 FLR			8,500	534	(4.)	(4.)	(1.)	(2.)	0 HR	0 HR	0 HR	0 HR	0 HR	0-HR	1 HR	1 HR	0 HR	0 HR	3HR	1 HR	1 HR	1 HR	0 HR	2 HR	0 HR	1 HR	0 HR (3.)

MATRIX NOTES
(1.) PER TABLE 508.4
(2.) UNLESS REQUIRED TO BE 2 HOUR BY SECTION 704.10
(3.) NO RATING REQUIRED, FULLY SPRINKLER
(4.) NOT APPLICABLE
(5.) SEE LIFE SAFETY PLAN FOR ROOM BY ROOM OCCUPANCY

CHAPTER 8

TABLE 803.13 (ABBREVIATED) INTERIOR WALL AND CEILING FINISH REQUIREMENTS

	SPRINKLERED			NON-SPRINKLERED					
	REQ'D	ACTUAL	OK, COMMENT OR N/A	REQ'D		ACTUAL		OK, COMMENT OR N/A	
				A-3	U	A-3	U	A-3	U
EXIT ENCLOSURES AND EXIT PASSAGEWAYS	--	--	--	A	NR	A	NR	OK	OK
CORRIDORS	--	--	--	A	NR	A	NR	OK	OK
ROOMS AND ENCLOSED SPACES	--	--	--	C	NR	C	NR	OK	OK
FLOOR COVERING CORRIDORS & EXITS SECTION 804.4.2	--	--	--	CLASS II		CLASS II MIN		OK	

INTERIOR FINISH NOTES (SUB NOTES TO TABLE 803.13)

A. CLASS C INTERIOR FINISH MATERIALS SHALL BE PERMITTED FOR WAINSCOTTING OR PANELING OF NOT MORE THAN 1,000 SQ FT OF APPLIED SURFACE AREA IN THE GRADE LOBBY WHERE APPLIED DIRECTLY TO A NONCOMBUSTIBLE BASE OR OVER FURRING STRIPS APPLIED TO A NONCOMBUSTIBLE BASE AND FIREBLOCKED AS REQUIRED BY SECTION 803.15.1

B. IN OTHER THAN GROUP I-2 OCCUPANCIES IN BUILDINGS LESS THAN THREE STORIES ABOVE GRADE PLANE OF OTHER THAN GROUP I-3, CLASS B INTERIOR FINISH FOR NONSPRINKLERED BUILDINGS AND CLASS C INTERIOR FINISH FOR SPRINKLERED BUILDINGS SHALL BE PERMITTED IN INTERIOR EXIT STAIRWAYS AND RAMPS.

C. REQUIREMENTS FOR ROOMS AND ENCLOSED SPACES SHALL BE BASED UPON SPACES ENCLOSED BY PARTITIONS. WHERE A FIRE-RESISTANCE RATING IS REQUIRED FOR STRUCTURAL ELEMENTS, THE ENCLOSING PARTITIONS SHALL EXTEND FROM THE FLOOR TO THE CEILING. PARTITIONS THAT DO NOT COMPLY WITH THIS SHALL BE CONSIDERED ENCLOSING SPACES AND THE ROOMS OR SPACES ON BOTH SIDES SHALL BE CONSIDERED ONE. IN DETERMINING THE APPLICABLE REQUIREMENTS FOR ROOMS AND ENCLOSED SPACES, THE SPECIFIC OCCUPANCY THEREOF SHALL BE THE GOVERNING FACTOR REGARDLESS OF THE GROUP CLASSIFICATION OF THE BUILDING OR STRUCTURE.

SECTION 803
CLASS A: FLAME SPREAD 0-25, SMOKE DEVELOPED 0-450
CLASS B: FLAME SPREAD 26-75, SMOKE DEVELOPED 0-450
CLASS C: FLAME SPREAD 76-200, SMOKE DEVELOPED 0-450

CHAPTER 9

				REMARKS
903 AUTOMATIC SPRINKLER SYSTEM	FULLY SPRINKLERED			SHELL CONSTRUCTION
904 ALTERNATE AUTOMATIC FIRE EXTINGUISHING SYSTEM	N/A			N/A
905 STANDPIPES	N/A			N/A
906 PORTABLE FIRE EXTINGUISHERS	CLASS A, 1,500 SF/A	ORDINARY HAZARD (1) 2A-10B-C EXTINGUISHER / 3,000 SF. 75' MAX TRAVEL DISTANCE TO EXTINGUISHER	3,534/3,000 SF= 2	2 PROVIDED
907 FIRE ALARMS AND DETECTION SYSTEMS	PER 907.2.1			SHELL CONSTRUCTION
912 FIRE DEPARTMENT CONNECTIONS	SEE CIVIL			

CHAPTER 10

TABLE 1004.5 (ABBREVIATED) MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT FOR FUNCTIONS IN THIS FACILITY

FUNCTION OF SPACE	TOTAL AREA	FLOOR AREA IN SQ. FT. PER OCCUPANT RATIO	SUB-TOTAL OF OCCUPANT LOAD (SEE LIFE SAFETY PLAN FOR ROOM-BY-ROOM OCCUPANCY)
ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	--	300 GROSS	--
ASSEMBLY WITH FIXED SEATS	--	PER SECTION 1004.6	--
ASSEMBLY WITHOUT FIXED SEATS			
CONCENTRATED (CHAIRS ONLY-NOT FIXED)	--	7 NET	--
STANDING SPACE	--	5 NET	--
UNCONCETRATED (TABLES AND CHAIRS)	3,000	15 NET	200
BUSINESS	--	150 GROSS	--
DAYCARE	--	35 NET	--
EDUCATION-CLASSROOM AREA	--	20 NET	--
KITCHENS	--	200 GROSS	--
STAGES AND PLATFORMS	--	15 NET	--
SUPPORT AREA	--	200 GROSS	--
STORAGE (WAREHOUSE)	--	500 GROSS	--
TOTAL OCCUPANCY LOAD			200

GENERAL PROVISIONS

EGRESS WIDTH PER OCCUPANT	PER SECTION 1005 - .3 STAIRS/.2 OTHER
ELEVATOR	PER SECTION 1009.4
DOORS	PER SECTION 1010
STAIRWAYS	PER SECTION 1011
RAMPS	PER SECTION 1012
EXIT SIGNS	PER SECTION 1013
HANDRAILS	PER SECTION 1014
GUARDS	PER SECTION 1015
EXIT ACCESS	PER SECTION 1016
EXIT ACCESS AND TRAVEL DISTANCE	PER SECTION 1017
EXIT ACCESS TRAVEL DISTANCE	PER TABLE 1017.2
CORRIDOR	PER SECTION 1020
CORRIDOR WIDTH	PER TABLE 1020.3
DEAD END CORRIDORS	PER SECTION 1020.5 - 20'-0", EXCEPTIONS NOT USED
EXITS, NUMBER OF EXITS AND CONTINUITY	PER SECTIONS 1022, 1007 - 2 MINIMUM
INTERIOR EXIT STAIRWAYS AND RAMPS	PER SECTION 1023
EXIT PASSAGEWAYS	PER SECTION 1024
HORIZONTAL EXITS	PER SECTION 1026
EXTERIOR EXIT RAMPS AND STAIRS	PER SECTION 1027
ASSEMBLY	PER SECTION 1030, NOT SMOKE PROTECTED SEATING
ASSEMBLY AISLES	PER SECTION 1030.9
AISLE ACCESSORIES	PER SECTION 1030.13

CHAPTER 11

ACCESSIBILITY (ABBREVIATED)

		REQ'D	PROVIDED
ACCESSIBLE ROUTE (1104)	BUILDING, SITE	YES	YES
ACCESSIBLE ENTRANCES (1105)	BUILDING	YES	YES
PARKING/PASSENGER LOADING (1106)	SITE	YES	YES
SPECIAL OCCUPANCIES ASSEMBLY (1109)	FIXED SEATING	NO	N/A
	WHEEL CHAIR SPACES	NO	N/A
	ASSISTIVE LISTENING SYSTEM	NO	N/A
SIGNAGE (1112)		YES	YES
MOUNTING HEIGHTS (ANSI A117.1, ADA)		YES	YES

CHAPTER 29

TABLE 2902.1 (ABBREVIATED) REQUIRED PLUMBING FIXTURES

FIXTURE TYPE	RATIOS: MALE = 100 , FEMALE= 100		REQ'D	PROVIDED
WATER CLOSETS	1 PER 125 MALES		1	3
	1 PER 65 FEMALES		2	3
LAVATORIES	1 PER 200 MALES		1	2
	1 PER 200 FEMALES		1	2
DRINKING FOUNTAIN	1/1000 (HI / LO)		1	1
SERVICE SINKS	1		1	1
ASSISTED USE TOILET (1109.2.2)	AGGREGATE 6 TOILETS OR MORE		--	--
AMBULATORY ACCESSIBLE (ANSI A117.1, ADA)	IF 6 OR MORE WC ARE PROVIDED PER RESTROOM	MALE	--	--
		FEMALE	--	--

MINIMUM NUMBER OF EXITS (1006.2.1.1)

1-500	2 REQUIRED *
501-1000	3 REQUIRED
MORE THAN 1000	4 REQUIRED

LIFE SAFETY LEGEND *

1005.1

SYMBOL	DESCRIPTION
	NON-RATED PARTITION
	1 HOUR FIRE-RATED WALL
	2 HOUR FIRE-RATED WALL
	3 HOUR FIRE-RATED WALL
	1 HOUR FIRE-RATED FLOOR/CEILING ASSEMBLY
# / # TABLE 1005.1	ACTUAL EGRESS / EGRESS CAPACITY
FEC	FIRE EXTINGUISHER AND CABINET
FE	FIRE EXTINGUISHER

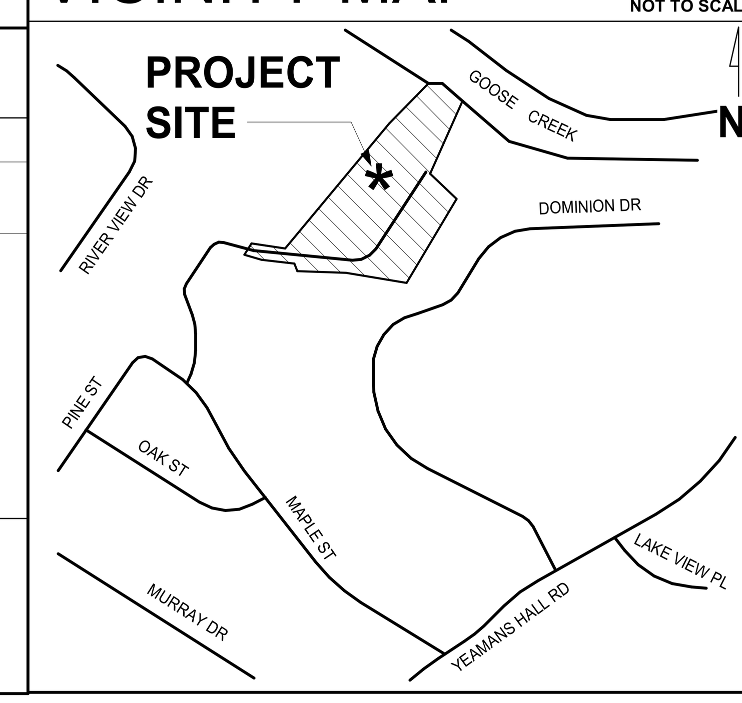
MINIMUM REQ'D EGRESS WIDTH

STAIRS 0.3" PER OCC.	OTHER EGRESS 0.2" PER OCC.
# 110 3'-0" DOOR	# 165 3'-0" DOOR
# 224 PAIR 3'-0" DOORS	# 334 PAIR 3'-0" DOORS

* **NOTE:** SEE ALSO MECHANICAL & ELECTRICAL ENGINEERING DRAWINGS FOR ADDITIONAL LIFE SAFETY COMPONENTS

VICINITY MAP

NOT TO SCALE



DESIGN TEAM

OWNER
CITY OF HANAHAN
STEWARD STREET PARK
HANAHHAN, SC 29410
TEL: 843.576.251

CONTACT: COURTNEY SOLER, CITY ADMINISTRATOR

ARCHITECT
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3251 LANDMARK DRIVE, SUITE 241
NORTH CHARLESTON, SC 29418
TEL: 843.722.4334

CONTACT: ROBERT V. GERBER, AIA NCARB CSI CDT

GENERAL CONTRACTOR

MP&E ENGINEER
LIVE OAK CONSULTANTS ENGINEERS, LLC
PO BOX 60490
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CONTACT: MARK DILLON, PE, SE

DRAWING INDEX

DRAWING NO.	DRAWING NAME	ISSUE DATE
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C002	TOPOGRAPHIC SURVEY	05.12.2023
C003	ADA PLAN	05.12.2023
C100.1	SWPPP PLAN - INITIAL PHASE	05.12.2023
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BUILDING ENVELOPE REQUIREMENTS - OPAQUE ASSEMBLIES

IECC 2009 - TABLE 502.2(1)

CLIMATE ZONE 3	REQUIREMENT	APPLICABLE	DESIGNED
ROOF			
INSULATION ENTIRELY ABOVE DECK	R-20ci	--	--
METAL BUILDINGS (WITH R-5 THERMAL BLOCKS)	R-13 + R-13	--	--
ATTIC AND OTHER	R-38	*	*
WALLS, ABOVE GRADE			*
MASS	R-7.6ci	--	--
METAL BUILDING	R-19	--	--
METAL FRAMED	R-13 +R-3.8ci	--	--
WOOD FRAMED AND OTHER	R-13	*	*
WALLS, BELOW GRADE			
BELOW-GRADE WALL	NO REQUIREMENT	--	--
FLOORS		--	--
MASS	R-6.3ci	--	--
JOIST/FRAMING	R-19	--	--
SLAB-ON GRADE FLOORS			
UNHEATED SLABS	NO REQUIREMENT	*	*
HEATED SLABS	R-10 FOR 24" BELOW	--	--
OPAQUE DOORS		--	--
SWINGING	U-0.70	*	*
ROLL-UP OR SLIDING	U-1.45	--	--

101.5.2 LOW ENERGY BUILDINGS. THE FOLLOWING BUILDINGS, OR PORTIONS THEREOF, SEPARATED FROM THE REMAINDER OF THE BUILDING BY BUILDING THERMAL ENVELOPE ASSEMBLIES COMPLYING WITH THIS CODE SHALL BE EXEMPT FROM THE BUILDING THERMAL ENVELOPE PROVISIONS OF THIS CODE:
1. THOSE WITH A PEAK DESIGN RATE OF ENERGY USAGE LESS THAN 3.4 BTU/ H-FT2 (10.7 W/M2) OR 1.0 WATT/FT2 (10.7 W1M2) FLOOR AREA FOR SPACE CONDITIONING PURPOSES.
2. THOSE THAT DO NOT COINTAIN CONSITIONED SPACE.

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK RENOVATIONS

HANAHAN SOUTH CAROLINA

STATE OF SOUTH CAROLINA REGISTERED ARCHITECTS — GJS ARCHITECTURE, LLC N.Charleston, SC No. 03051

STATE OF SOUTH CAROLINA REGISTERED ARCHITECT — ROBERT V. GERBER N.Charleston, SC No. 3565 05/12/23

CITY OF HANAHAN SOUTH CAROLINA

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GJS ARCHITECTURE
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DATE: 05.12.2023
ADC PROJECT #: 20381
DESIGNED: CA
CHECKED: RVG
DRAWN: CA
REVISION:

DRAWING TITLE
COVER SHEET, CODE MATRIX & LIFE SAFETY PLAN

DRAWING NUMBER
G001

100% CONSTRUCTION DOCUMENTS

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NOTE: FULL SIZE DRAWING IS 30" X 42"

EXISTING PHOTOS

P.1

P.2

P.3

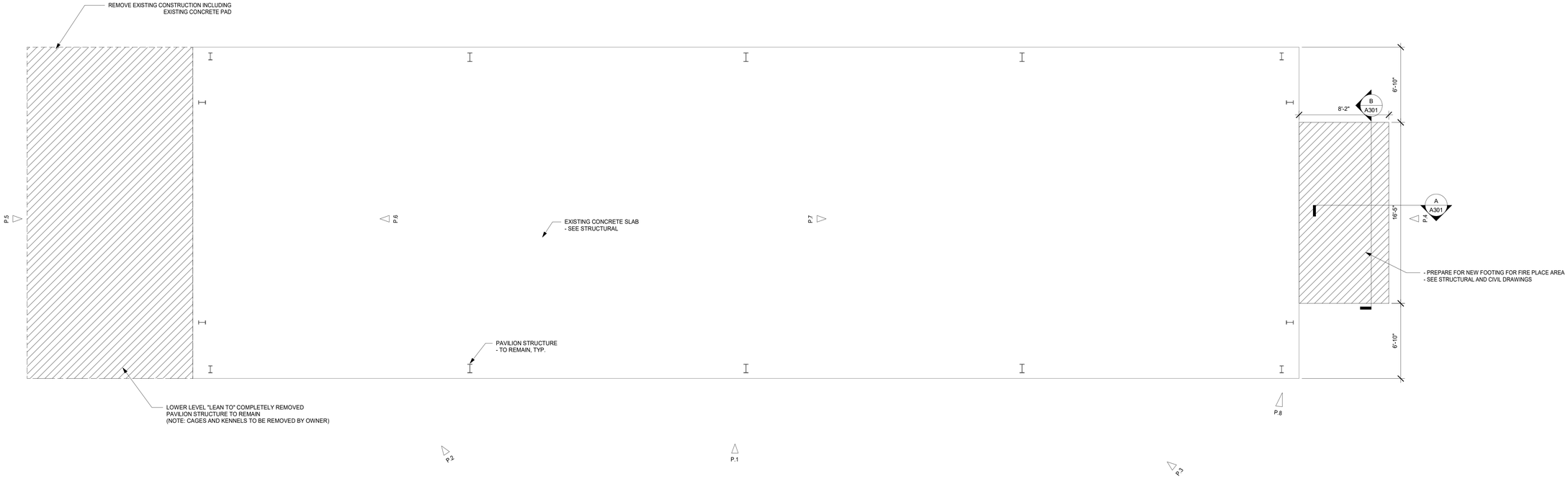
P.4

P.5

P.6

P.7

P.8



1 DEMOLITION PLAN - PAVILION
1/4" = 1'-0"

0' 2' 4' 8'
1/4" = 1'-0"

100% CONSTRUCTION DOCUMENTS

DEMOLITION NOTES

- THE GENERAL CONTRACTOR SHALL INSPECT THE EXISTING FACILITY TO DETERMINE THE EXACT EXTENT OF ALL DEMOLITION WORK.
- REMOVE ALL EXISTING FIXTURES, FURNISHING, CABINETRY, ETC. NOT INDICATED TO REMAIN.
- REMOVE ALL EXISTING LIGHTING, CEILINGS AND SUSPENSION SYSTEMS, WALL FINISHES AS REQUIRED FOR THE NEW WORK.
- REMOVE ALL EXISTING CONSTRUCTION AS REQUIRED FOR ALL NEW CONSTRUCTION.
- SEE STRUCTURAL, MECHANICAL, PLUMBING AND ELECTRICAL DOCUMENTS FOR COORDINATION OF DEMOLITION ACTIVITIES.
- CONTRACTOR TO CONFIRM THAT THE AREA IS FREE AND CLEAR OF ANY ASBESTOS-CONTAINING MATERIALS WITH OWNER.
- REMOVE ALL ITEMS ATTACHED TO, SET INTO, OR OTHERWISE AFFIXED TO PARTITIONS NOT INTENDED FOR INCORPORATION INTO FINISHED WORK, TO INCLUDE BUT NOT LIMITED TO WALL AND FLOOR STOPS, THERMOSTATS, EXISTING SIGNAGE, SWITCHES, ETC.
- ALL ELECTRICAL AND PLUMBING NOT REUSED SHALL BE CAPPED.
- ALL DEMOLITION SHALL BE COORDINATED WITH THE BUILDING OWNER / SCHEDULED PROVIDED.
- PROVIDE TEMPORARY BRACING AS REQUIRED TO STABILIZE THE BUILDING WHILE DEMOLITION IS OCCURRING AND UNTIL NEW CONSTRUCTION CAN BEGIN.
- REMOVE EXISTING METAL ROOFING / TRANSPARENT PANELS. PREPARE FOR NEW METAL ROOFING
- ALL REMOVED ITEMS SHALL BE DISPOSED OF BY THE CONTRACTOR OFF SITE PER ALL LOCAL, STATE AND FEDERAL ORDINANCES.
- FOR EXTENT OF STRUCTURAL/MECH/ELEC/PLUMB. DEMOLITION SEE STRUCTURAL AND MP&E ENGINEERING DRAWINGS.

DEMOLITION LEGEND

- WALL TO REMAIN
- WALL TO BE REMOVED
- CUT OPENING IN PREPARATION FOR NEW OPENING
- EXISTING DOOR TO REMAIN
- REMOVE DOOR AND FRAME
- EXISTING CONDITIONS TO REMAIN
- AREA TO BE REMOVED

City of Hanahan
Hanahan, South Carolina

STEWARD STREET
PARK RENOVATIONS

HANAHAN
SOUTH CAROLINA

STATE OF SOUTH CAROLINA
GJS ARCHITECTURE, LLC
N.Charleston, SC
No. 03051
REGISTERED ARCHITECT'S

STATE OF SOUTH CAROLINA
ROBERT J. GERBER
N. Charleston, SC
No. 3565
05/12/23
REGISTERED ARCHITECT

CITY OF HANAHAN
SOUTH CAROLINA
Est. 1967

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DRAWING TITLE

DEMOLITION PLAN - PAVILION

DRAWING NUMBER

D101

NOTE: FULL SIZE DRAWING IS 30" X 42"
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SYMBOL LEGEND

COLUMN GRID LINE	0 — GRID LINE REFERENCE; GRID LINE
ROOM NAME AND NUMBER	ROOM NAME 101 150 SF — ROOM NAME; ROOM NUMBER; ROOM AREA (IF PRESENT)
PLAN OR SECTION DETAIL	1 A101 — SIM; DETAIL NUMBER; SHEET NUMBER
THROUGH BUILDING SECTION DETAIL	1 A101 SIM — DETAIL NUMBER; SHEET NUMBER
PARTIAL BUILDING SECTION OR DETAIL	1 A101 SIM — DETAIL NUMBER; VIEW DIRECTION; SHEET NUMBER
WALL SECTION DETAIL	1 A101 SIM — DETAIL NUMBER; VIEW DIRECTION; SHEET NUMBER
INTERIOR / EXTERIOR ELEVATION DETAIL	SIM 1 A101 — DETAIL NUMBER; SHEET NUMBER
DOOR TAG	101A — DOOR NUMBER; SEE DOOR SCHEDULE ON A-601
WINDOW TAG	1i — WINDOW NUMBER; SEE WINDOW SCHEDULE ON A-611
REVISION TAG	1 — REVISION NUMBER
CASEWORK TAG	B-3 — TYPE MARK; SEE CASEWORK SCHEDULE ON A-721
WALL TAG	402 D NF — WALL TYPE; HEIGHT DESIGNATOR; FURRING DESCRIPTOR; SEE SHEET A-002 FOR HEIGHT AND FURRING ABBREVIATIONS
KEYNOTE TAG	A — KEYNOTE REFERENCE

MATERIALS LEGEND

	EARTH, COMPACT FILL
	CONCRETE
	PRECAST CONCRETE
	CONCRETE MASONRY
	SAND, MORTAR, GYPSUM BOARD, PLASTER, STUCCO
	BATT INSULATION / SOUND ATTENUATION BLANKET
	RIGID INSULATION
	FACE BRICK
	FINISH WOOD
	PLYWOOD
	ROUGH WOOD
	WOOD BLOCKING

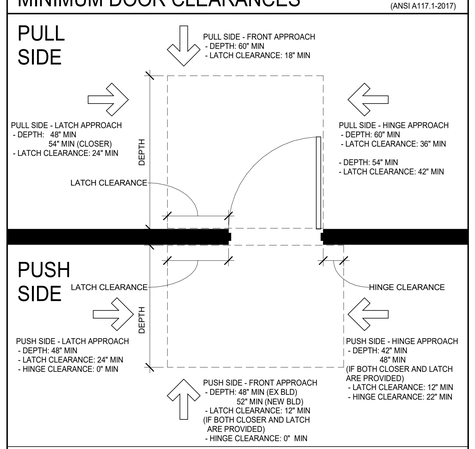
WALL TYPE LEGEND - MASONRY

TAG	WALL TYPE	FIRE RATING	UL #	STC RATING UNGROUTED/ GROUTED	DESCRIPTION
401	10 1/8"	--	--	46/51	6" CONCRETE MASONRY UNIT (CMU) 1-5/8" (METAL) OR 1-1/2" (WOOD) STUD FURRING VERTICALLY @ 16" OC 5/8" GYP BD EACH SIDE
402	1' - 0 1/8"	--	--	48/55	8" CONCRETE MASONRY UNIT (CMU) 1-5/8" (METAL) OR 1-1/2" (WOOD) STUD FURRING VERTICALLY @ 16" OC 5/8" GYP BD EACH SIDE
403	10 5/8"	--	--	48/55	8" CONCRETE MASONRY UNIT (CMU) 7/8" METAL FURRING STRIPS VERTICALLY @ 16" O.C. 5/8" GYP BD EACH SIDE
404	1' - 4 1/8"	--	--	52/62	12" CONCRETE MASONRY UNIT (CMU) 1-5/8" (METAL) OR 1-1/2" (WOOD) STUD FURRING VERTICALLY @ 16" OC 5/8" GYP BD EACH SIDE
411	10 1/8"	1 HR	--	46/51	6" CONCRETE MASONRY UNIT (CMU) (BASIC RATING) 1-5/8" (METAL) OR 1-1/2" (WOOD) STUD FURRING VERTICALLY @ 16" OC 5/8" GYP BD EACH SIDE
412	1' - 0 1/8"	1 HR	--	48/55	8" CONCRETE MASONRY UNIT (CMU) (BASIC RATING) 1-5/8" (METAL) OR 1-1/2" (WOOD) STUD FURRING VERTICALLY @ 16" OC 5/8" GYP BD EACH SIDE
413	1' - 4 1/8"	1 HR	--	52/62	12" CONCRETE MASONRY UNIT (CMU) (BASIC RATING) 1-5/8" (METAL) OR 1-1/2" (WOOD) STUD FURRING VERTICALLY @ 16" OC 5/8" GYP BD EACH SIDE
421	10 1/8"	2 HR	UL-U906	46/51	6" CONCRETE MASONRY UNIT (CMU) (D-2 CLASSIFICATION) 1-5/8" (METAL) OR 1-1/2" (WOOD) STUD FURRING VERTICALLY @ 16" OC 5/8" GYP BD EACH SIDE
422	1' - 0 1/8"	2 HR	UL-U906	45/55	8" CONCRETE MASONRY UNIT (CMU) (D-2 CLASSIFICATION) 1-5/8" (METAL) OR 1-1/2" (WOOD) STUD FURRING VERTICALLY @ 16" OC 5/8" GYP BD EACH SIDE
423	1' - 4 1/8"	2 HR	UL-U906	52/62	12" CONCRETE MASONRY UNIT (CMU) (D-2 CLASSIFICATION) 1-5/8" (METAL) OR 1-1/2" (WOOD) STUD FURRING VERTICALLY @ 16" OC 5/8" GYP BD EACH SIDE
431	1' - 0 1/8"	3 HR	UL-U904	48/55	8" CONCRETE MASONRY UNIT (CMU) (C-3 CLASSIFICATION) 1-5/8" (METAL) OR 1-1/2" (WOOD) STUD FURRING VERTICALLY @ 16" OC 5/8" GYP BD EACH SIDE
432	9 7/8"	3 HR	UL-U904 SIM.	48/55	8" CONCRETE MASONRY UNIT (CMU) (C-3 CLASSIFICATION) 1 ROW 1-5/8" METAL STUDS, ONE SIDE 5/8" TYPE "X" GYP BD, ONE SIDE
433	1' - 4 1/8"	3 HR	UL-U904	52/62	12" CONCRETE MASONRY UNIT (CMU) (C-3 CLASSIFICATION) 1-5/8" (METAL) OR 1-1/2" (WOOD) STUD FURRING VERTICALLY @ 16" OC 5/8" GYP BD EACH SIDE

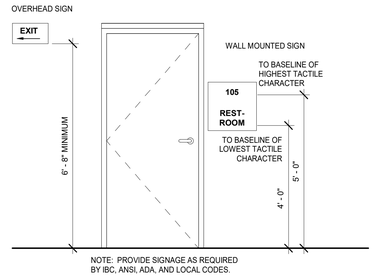
- NOT ALL WALL TYPES USED IN THIS PROJECT. SEE FLOOR PLANS FOR WALL TAGS
- SEE WALL SECTIONS FOR EXTERIOR WALLS
- UNIT DIMENSIONS ARE NOMINAL
- SOUND ATTENUATION BATTS NOT SHOWN FOR CLARITY. SEE WALL DESCRIPTION

MINIMUM DOOR CLEARANCES

(ANSI A117.1-2017)



MINIMUM REQUIRED ANSI LATEST EDITION/ADA CLEARANCES AT ALL DOORS. PLEASE NOTIFY ARCHITECT PRIOR TO INSTALLATION IF FRAME CLEARANCE CANNOT BE MAINTAINED. DIMENSIONS SHOWN ARE MINIMUMS PER ANSI 117/ADA REQUIREMENTS. ALL DOORS SHALL MEET ANSI 117/ADA GUIDELINES.



NOTE: PROVIDE SIGNAGE AS REQUIRED BY IBC, ANSI, ADA, AND LOCAL CODES.

SIGNAGE

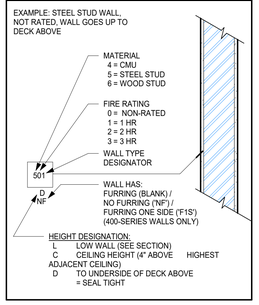
4.30.6 MOUNTING LOCATION AND HEIGHT. WHERE PERMANENT IDENTIFICATION IS PROVIDED ROOMS AND SPACES, SIGNS SHALL BE INSTALLED ON WALL ADJACENT TO THE LATCH SIDE OF THE DOOR. WHERE THERE IS NO WALL SPACE TO LATCH THE SIDE OF THE DOOR, SIGNS SHALL BE PLACED ON THE NEAREST ADJACENT WALL. MOUNTING HEIGHT SHALL BE 60" (1525MM) ABOVE THE FINISH FLOOR TO THE CENTERLINE OF THE SIGN. SHALL BE 60" (1525MM) ABOVE THE FINISH FLOOR TO THE CENTERLINE OF THE SIGN. WITHIN 3" (76MM) OF THE SIGN WITHOUT ENCOUNTERING PROTRUDING OBJECTS OR STANDING WITHIN THE DOORSWING.

4.4.2 HEAD ROOM. WALKS, HALLS, CORRIDORS, PASSAGEWAYS, AISLES, OR OTHER CIRCULATION SPACES SHALL HAVE 80" (2030 MM) MINIMUM CLEAR HEAD ROOM. IF VERTICAL CLEARANCE OF AN AREA ADJOINING AN ACCESSIBLE ROUTE IS REDUCED TO LESS THAN 80" A BARRIER TO WARN THE BLIND OR VISUALLY IMPAIRED PERSONS SHALL BE PROVIDED.

HEIGHT ABOVE FINISH FLOOR	MINIMUM CHARACTER HEIGHT
SUSPENDED OR PROJECTED OVERHEAD IN COMPLIANCE WITH 4.4.2. 60": MOUNTED ON WALL ADJACENT TO LATCH SIDE OF THE DOOR, CENTERLINE OF THE SIGN.	MINIMUM OF 3"

WALL TYPE TAG LEGEND

EXAMPLE: STEEL STUD WALL; NOT RATED, WALL GOES UP TO DECK ABOVE



INTERIOR NON-STRUCTURAL STEEL STUD HEIGHT SCHEDULE

STUD SIZE / GAUGE	3-5/8" STUDS MAX. HEIGHT		6" STUDS MAX. HEIGHT	
	16" OC	24" OC	16" OC	24" OC
25 GAUGE	15' - 2"	13' - 2"	20' - 1"	16' - 4"
22 GAUGE (STRUCTURAL)	16' - 6"	14' - 5"	24' - 4"	21' - 3"
20 GAUGE	16' - 7"	14' - 6"	24' - 7"	21' - 6"
20 GAUGE (STRUCTURAL)	17' - 5"	15' - 3"	25' -6"	22' - 3"

NOTE: AS BASED UPON STEEL STUD MANUFACTURERS ASSOCIATION GUIDELINES OF AN UNBRACED COMPOSITE WALL CONSTRUCTION WITHOUT ANY WALL BRACING. FOR 5-PSF AND L/240 DEFLECTION, CONTRACTOR TO PROVIDE STUDS IN UL RATED WALLS (SEE PLANS AND WALL TYPES) THAT HAVE BEEN TESTED AND APPROVED BY UL.

ABBREVIATIONS

@	AT
AB	ANCHOR BOLT
ABV	ABOVE
ACP	ACOUSTICAL PANEL
ACT	ACOUSTICAL TILE
ADJ	ADJUSTABLE / ADJACENT
AFF	ABOVE FINISHED FLOOR
ALT	ALTERNATIVE
ALUM	ALUMINNIUM
ANOD	ANODIZED
ARCH	ARCHITECTURAL / ARCHITECT
B	BASE
BB	BOND BEAM
BD	BOARD
BIT	BITUMINOUS
BLDG	BUILDING
BLKG	BLOCKING
BO	BY OWNER
BOT	BOTTOM
BRG	BEARING
BRK	BRICK
CAB	CABINET
C/C	CENTER TO CENTER
CF/CI	CONTRACTOR FURNISHED / CONTRACTOR INSTALLED
CF/OI	CONTRACTOR FURNISHED / OWNER INSTALLED
CIP	CAST IN PLACE
C	CENTER LINE
CLG	CEILING
CJ	CONTROL JOINT
CLO	CLOSET
CLR	CLEAR
CMU	CONCRETE MASONARY UNIT
COL	COLUMN
CONC	CONCRETE
CONST	CONSTRUCTION
CONT	CONTINUOUS
CPT	CARPET
CT	CERAMIC TILE
CTR	CENTER
D	DEPTH
DB	DECIBEL
DBL	DOUBLE
DEMO	DEMOLISH
DET	DETAIL
DG	DRINKING FOUNTAIN
DIA	DIAMETER
DIM	DIMENSION
DN	DOWN
DS	DOWNSPOUT
DW	DISHWASHER
DWR	DRAWER
E	EAST
EA	EACH
EL	EACH LAYER OR ELEVATION
EFS	EXTERIOR FINISH SYSTEM
ELEC	ELECTRIC SPACE / ELECTRICAL
ELEV	ELEVATOR
EJ	EXPANSION JOINT
EQ	EQUAL
EQUIP	EQUIPMENT
ES	EACH SIDE
EW	EACH WAY
EWC	ELECTRIC WATER COOLER
EXH FN	EXHAUST FAN
EXIST (E)	EXISTING
EXT	EXTERIOR
EXP	EXPANSION / EXPOSED
FC	FIBER CEMENT
FD	FLOOR DRAIN
FDC	FIRE DEPARTMENT CONNECTION
FE	FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
FF	FINISHED FLOOR / FACTORY FINISH
FFE	FINISHED FLOOR ELEVATION
FIN	FINISH
FLR	FLOOR
FOM	FACE OF MASONRY
FOS	FACE OF STUD
FT	FEET
FRZ	FREEZER
GA	GAGE
GALV	GALVANIZED
GB	GRAB BAR
GL	GLASS
GYP BD	GYPSUM WALLBOARD
H	HIGH
HC	HANDICAP ACCESSIBLE
HDW	HARDWARE
HM	HOLLOW METAL
HORIZ	HORIZONTAL
HR	HOUR / HANDRAIL
HT	HEIGHT
HVAC	HEATING VENTILATION AIR CONDITIONING
ID	INTERIOR DIAMETER
IN	INCH
INSUL	INSULATION
INT	INTERIOR
IR	IMPACT RESISTANT
JAN	JANITOR
JF	JOINT FILLER
JT	JOINT
L	ANGLE / LEFT / LENGTH / LIGHTING PANEL / LONG LEG
LAV	LAVATORY
LKR	LOCKER
LVR	LOUVER
MATL	MATERIAL
MAX	MAXIMUM
MB	MARKER BOARD
MBMF	METAL BUILDING MFR.
ME	MATCH EXISTING
MECH	MECHANICAL
MED	MEDIUM
MEMB	MEMBRANE
MEZZ	MEZZANINE
MFR	MANUFACTURER
MIN	MINIMUM
MIR	MIRROR
MO	MASONRY OPENING
MR	MOISTURE RESISTANT
MTD	MOUNTED
MTH	MARBLE THRESHOLD
MTL	METAL
N	NORTH / NEW
NIC	NOT IN CONTRACT
NO	NUMBER
NOM	NOMINAL
NTS	NOT TO SCALE
OA	OVERALL / OUTSIDE AIR
OB	OBSCURE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OF	OUTSIDE FACE
OF/CI	OWNER FURNISHED / CONTRACTOR INSTALLED
OF/OI	OWNER FURNISHED / OWNER INSTALLED
OH	OVERHEAD
OPNG	OPENING
OPP	OPPOSITE / OPPOSITE HAND
ORD	OVERFLOW ROOF DRAIN
OZ	OUNCE
P	PAINT
PH	PAPER HOLDER/ PHONE/ PHASE
PLAM	PLASTIC LAMINATE
PLBG	PLUMBING
PLTF	PLATFORM
PLYWD	PLYWOOD
PNL	PANEL
PORC	PORCELAIN
PR	PAIR
PREFAB	PREFABRICATED
PREFIN	PREFINISHED
PSI	POUNDS PER SQUARE INCH
PTB	PORCELAIN TILE BASE
PTD	PAINTED / PAPER TOWEL DISPENSER
PTD/R	PAPER TOWEL DISPENSER / RECEPTACLE
PTN	PARTITION
QT	QUARRY TILE
QTB	QUARRY TILE BASE
QTY	QUANTITY
R	RISER
R & S	ROD AND SHELF
RAD	RADIUS
RB	RUBBER BASE
RCP	REFLECTED CEILING PLAN
RD	ROOF DRAIN
REBAR	REINFORCING STEEL BAR
RECP	RECEPTACLE
REF	REFERENCE / REFRIGERATOR
REINF	REINFORCE / REINFORCING
REQD	REQUIRED
RESIL	RESILIENT
RET	RETURN / RETAINING
RGH	ROUGH
RM	ROOM
RO	ROUGH OPENING
RP	RESIN PANEL
RS	ROUGH SAW
RTD	RATED
S	SOUTH
SB	SPLASH BLOCK
SCHED	SCHEDULE
SCWD	SOLID CORE WOOD
SD	SOAP DISPENSER
SF	SQUARE FEET
SH	SHELF
SHV	SHELVING
SHWR	SHOWER
SHT	SHEET
SIM	SIMILAR
SK	SINK
SM	SHEET METAL
SND	SANITARY NAPKIN DISPENSER
SNR	SANITARY NAPKIN RECEPTACLE
SPEC	SPECIFICATION
SPK	SPEAKER
SS	STANDING SEAM
SSK	SERVICE SINK
SST	STAINLESS STEEL
STC	SOUND TRANSMITION CLASS
STD	STANDARD
STL	STEEL
STRUCT	STRUCTURAL
SUSP	SUSPENDED
T	TREAD
T/	TOP
T & G	TONGUE AND GROOVE
TB	TOWEL BAR
TEL	TELEPHONE
TGL	TEMPERED GLASS
TH	THRESHOLD
THK	THICK
TKBD	TACKBOARD
TLT	TOILET
TPD	TOILET PAPER DISPENSER
TPH	TOILET PAPER HOLDER
TPTN	TOILET PARTITION
TR	TREAD
TRTD	TREATED
TSL	TOP OF SLAB
T/S	TOP OF STEEL
TV	TELEVISION
TYP	TYPICAL
UL	UNDERWRITERS LABORATORIES
UNFIN	UNFINISHED
UNO	UNLESS NOTED OTHERWISE
UR	URINAL
VB	VAPOR BARRIER / VINYL BASE
VCT	VINYL COMPOSITION TILE
VERT	VERTICAL
VR	VAPOR RETARDER
VRFY	VERIFY
VT	VINYL TILE
VWC	VINYL WALL COVERING
VTR	VENT THROUGH ROOF
W	WIDE / WEST
W/	WITH
W/O	WITHOUT
WB	WOOD BASE
WC	WATER CLOSET
WD	WOOD
WDB	WOOD BASE
WDO	WINDOW
WDP	WOOD PANEL
WG	WIRE GLASS
WH	WATER HEATER
WP	WATERPROOFING
WR	WATER RESISTANT
WS	WEATHER STRIPPING
WSCT	WAINSCOT
WWM	WELDED WIRE MESH
YD	YARD

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK RENOVATIONS

HANAHAN SOUTH CAROLINA

STATE OF SOUTH CAROLINA — GJS ARCHITECTURE, LLC N.Charleston, SC No. 03051 — REGISTERED ARCHITECT'S

STATE OF SOUTH CAROLINA — ROBERT W. GERBER N.Charleston, SC No. 3565 — 05/12/23 — REGISTERED ARCHITECT

ADC ENGINEERING
1226 YEAMANS HALL ROAD
HANAHAN, SC 29410
843-566-0161
ADCENGINEERING.COM

GJS ARCHITECTURE
3251 LANDMARK DRIVE, SUITE 241
NORTH CHARLESTON, SC 29418
843-722-4334 (T)
843-722-4135 (F)

DATE: 05.12.2023
ADC PROJECT #: 20381
DESIGNED: CA
CHECKED: RVG
DRAWN: CA
REVISION:

DRAWING TITLE
ABBREVIATION, SYMBOLS, WALL TYPES AND DETAILS

DRAWING NUMBER
A001

100% CONSTRUCTION DOCUMENTS

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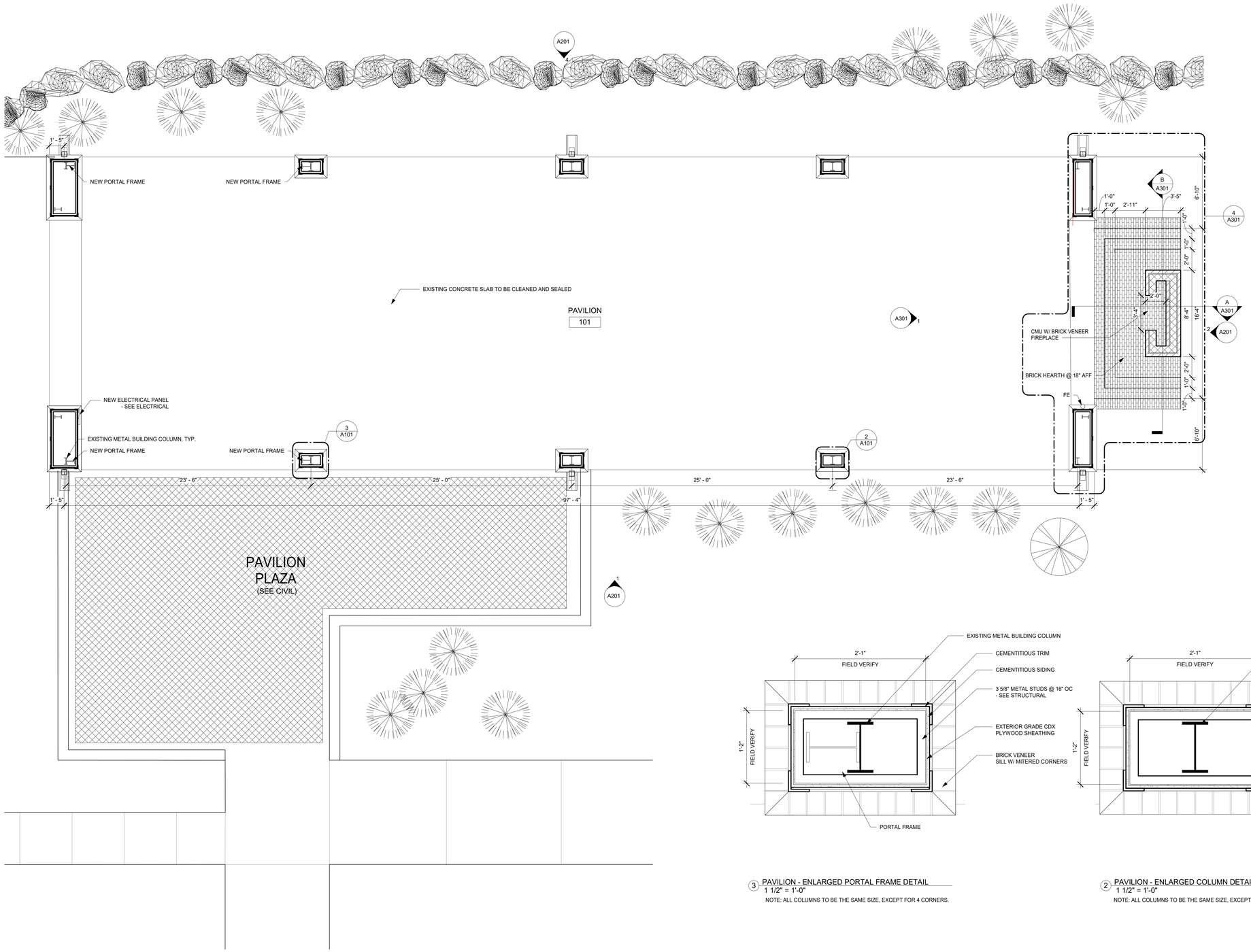
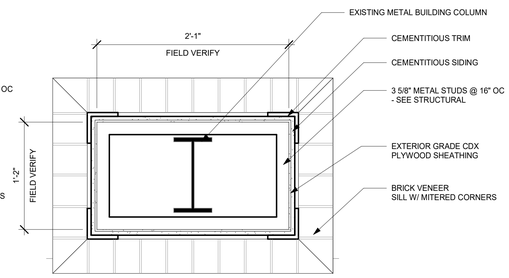


1 PAVILION FLOOR PLAN
1/4" = 1'-0"

3 PAVILION - ENLARGED PORTAL FRAME DETAIL
1 1/2" = 1'-0"
NOTE: ALL COLUMNS TO BE THE SAME SIZE, EXCEPT FOR 4 CORNERS.



2 PAVILION - ENLARGED COLUMN DETAIL
1 1/2" = 1'-0"
NOTE: ALL COLUMNS TO BE THE SAME SIZE, EXCEPT FOR 4 CORNERS.

0' 6" 1'-6" 3'
1 1/2" = 1'-0"

0' 2' 4' 8'
1/4" = 1'-0"

100% CONSTRUCTION DOCUMENTS

City of Hanahan
Hanahan, South Carolina

STEWARD STREET
PARK RENOVATIONS

HANAHAN
SOUTH CAROLINA

STATE OF SOUTH CAROLINA
GJS ARCHITECTURE, LLC
N.Charleston, SC
No. 03051
REGISTERED ARCHITECTS

STATE OF SOUTH CAROLINA
ROBERT J. GERBER
N. Charleston, SC
No. 3565
05/12/23
REGISTERED ARCHITECT

CITY OF HANAHAN
SOUTH CAROLINA
Est. 1967

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DATE: 05.12.2023
ADC PROJECT #: 20381
DESIGNED: CA
CHECKED: RVG
DRAWN: CA
REVISION:

DRAWING TITLE
PAVILION FLOOR PLAN

DRAWING NUMBER
A101

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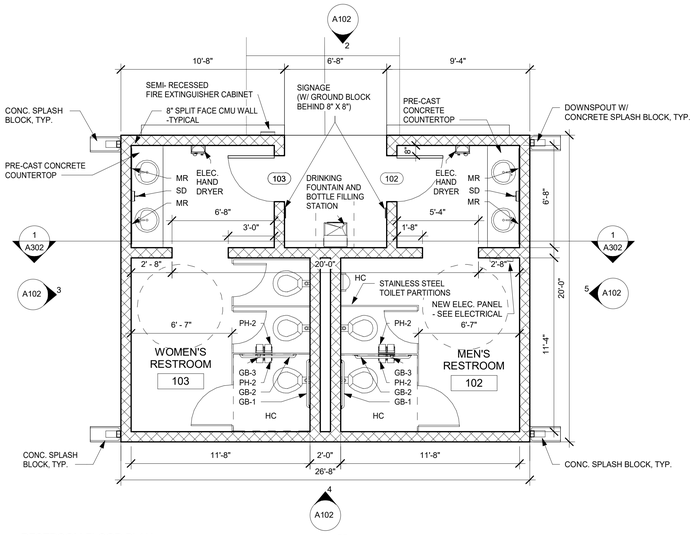
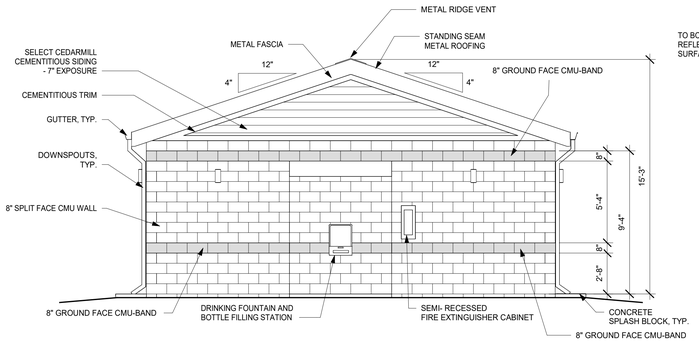
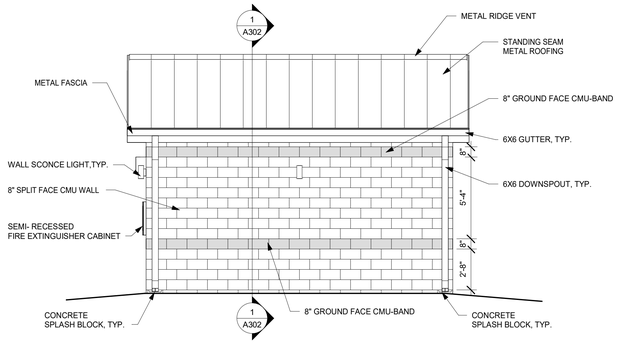


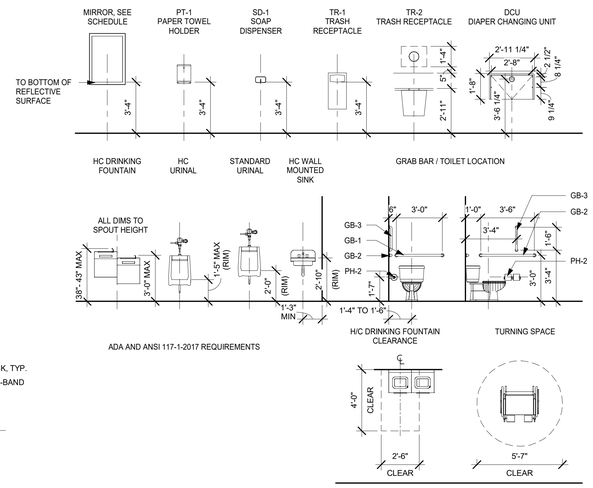
1 RESTROOM FLOOR PLAN
1/4" = 1'-0"



2 RESTROOM - FRONT ELEVATION
1/4" = 1'-0"



3 RESTROOM - RIGHT ELEVATION
1/4" = 1'-0"



NOTE: DOORS SHALL NOT SWING INTO THE CLEAR FLOOR SPACE OR CLEARANCE FOR ANY FIXTURE ANSI 117-1-2017 (603.2.2)

ACCESSORIES SCHEDULE

ABBREV.	DESCRIPTION	MFGR MODEL #:	REMARKS
GB-1	GRAB BAR - 36"	# 812 SERIES	36" TO CENTERLINE OF BAR
GB-2	GRAB BAR - 42"	# 812 SERIES	36" TO CENTERLINE OF BAR
GB-3	GRAB BAR - 18"	# 812 SERIES	40" TO CENTERLINE OF VERTICAL BAR
MR	WALL MIRROR - 18" X 36"	# 780 SERIES	MOUNT CENTERED OVER LAV.
PH-2	TOILET PAPER HOLDER (DOUBLE)	# 5224	19" MINIMUM TO CENTER OF UNIT
SD	SOAP DISPENSER	# 6542	WALL MOUNTED
DCU	KOALA KARE PRODUCT - DIAPER CHANGING UNIT	#KB110-SSWM	WALL MOUNTED

NOTE:
1. MODEL NUMBER SELECTIONS GIVEN ARE FROM BRADLEY CORP., UNLESS NOTED OTHERWISE, AND ARE REFERENCED AS ACCEPTABLE PRODUCT QUALITY ONLY, NOT AS SOLE SOURCE SELECTION.
2. ALL FINISHES TO BE SATIN.
3. INSTALL PIPE PROTECTION DEVICES FOR WATER SUPPLY AND DRAINPIPES UNDER LAVATORIES
4. MOUNT IN STRICT COMPLIANCE W/ ADA AND ANSI.
5. SEAL ALL GAPS & CONNECTIONS BETWEEN WALL & ACCESSORY WITH ANTIMICROBIAL SEALANTS.

ROOF LEGEND

- SLOPE: 4"/ 12" — ROOF SLOPE 4:12
- DS — DOWNSPOUT
- GUTTER, ARROW INDICATES DIRECTION OF FLOW
- OUTLINE OF STRUCTURE BELOW
- METAL ROOF

ROOF NOTES

- ROOF VENTS AND PIPING SHALL BE FINISHED TO MATCH ROOFING COLOR
- ALL CURBS, PENETRATIONS, AND TERMINATIONS AT VERTICAL SURFACES SHALL BE FLASHED
- IF NOT DETAILED, APPLY MOST STRINGENT CONDITION OF NRCA (5TH EDITION), SMACNA (LATEST EDITION) STANDARDS FOR ROOF DETAIL CONDITIONS
- ANY CLARIFICATION IN REFERENCE TO FLASHING, SHEET METAL, GUTTERS AND DOWNSPOUTS REQUIREMENTS OF THIS JOB SHALL FOLLOW THE RECOMMENDATIONS AND GUIDELINES OF THE SMACNA MANUAL (LATEST EDITION)
- ALL SHEET METAL TERMINATIONS SHALL HAVE 1/2" HEMMED EDGES AT EXPOSED LOCATIONS
- FLASHING COLOR TO MATCH ADJACENT MATERIAL
- ALL ROOFING TO BE INSTALLED IN COMPLIANCE W/ MANUFACTURERS SPECIFICATIONS, DETAILS AND REQUIREMENTS.

LEGEND

- INTERIOR STUD WALL, SEE A001 FOR WALL TYPES
- EXISTING PARTITION
- 1 HOUR FIRE-RATED PARTITION
- 2 HOUR FIRE-RATED PARTITION
- 3 HOUR FIRE-RATED PARTITION
- SOFFIT OVERHEAD

GENERAL NOTES

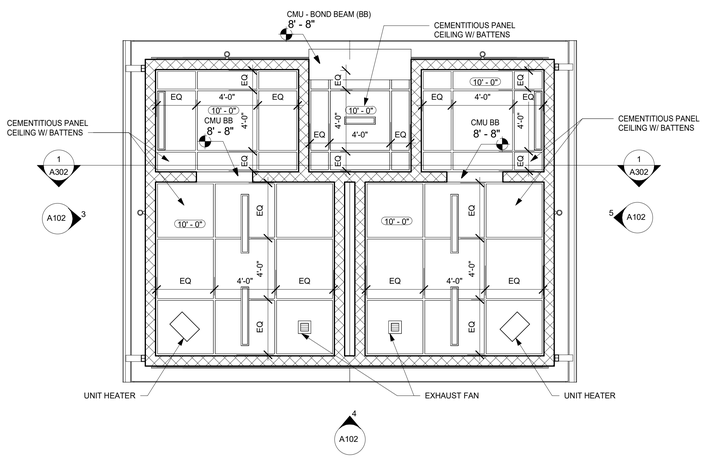
- SEE SHEET A001 FOR WALL TYPES
- WALL CHANGES OCCUR AT CORNERS
- SEE SHEET A102 FOR REFLECTED CEILING PLAN
- SEE SHEETS A601 FOR DOOR SCHEDULE, DOOR TYPES, AND DETAILS
- SEE SHEET A601 FOR FINISH SCHEDULE
- DIMENSIONS ARE TO CMU AND CENTER OF STRUCTURAL COMPONENTS UNLESS NOTED OTHERWISE
  - -HOLD MEANS FACE OF FINISHED WALL TO FACE OF FINISHED WALL
  - -CLEAR MEANS AT LEAST MINIMUM DIMENSION INDICATED

LEGEND

- INTERIOR STUD WALL, SEE A-001 FOR WALL TYPES
- 1 HOUR FIRE-RATED WALL
- 2 HOUR FIRE-RATED WALL
- 3 HOUR FIRE-RATED WALL
- SOFFIT OVERHEAD
- EXISTING CEILING
- 2' X 4' ACOUSTICAL TILE
- GYPSUM BOARD CEILING
- 2' X 4' LIGHT
- 2' X 2' LIGHT
- 4' LINEAR LED LIGHT
- CAN LIGHT
- SCONCE LIGHT
- EMERGENCY LIGHT
- EXIT SIGN
- SUPPLY DIFFUSER
- RETURN REGISTER
- EXHAUST FAN UNIT
- UNIT HEATER

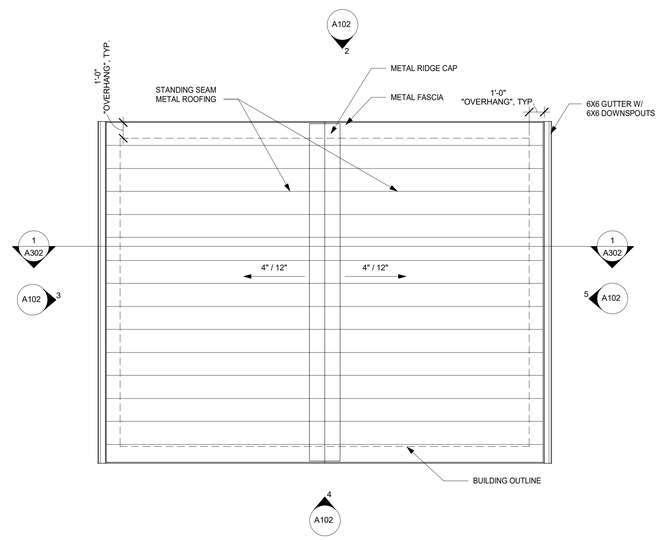
CEILING NOTES

- THE INTENT OF THE REFLECTED CEILING PLANS IS TO FAMILIARIZE THE CONTRACTOR WITH THE TOTAL CEILING CONCEPT. THE CONTRACTOR SHALL NOT USE THE REFLECTED CEILING PLAN FOR ESTIMATING ELECTRICAL AND MECHANICAL WORK.
- THE ARCHITECTURAL PLAN DOES NOT REPRESENT ALL COMPONENTS SUCH AS SPECIAL SYSTEMS,SMOKE DETECTORS, LIGHTING AND WALL MOUNTED FIXTURES.
- SEE MECHANICAL AND ELECTRICAL DRAWINGS FOR LOCATIONS OF COMPONENTS.
- MECHANICAL AND ELECTRICAL DRAWINGS IN CONFLICT WITH THE REFLECTED CEILING PLAN SHOULD BE BROUGHT TO THE ATTENTION OF THE ARCHITECT FOR RESOLUTION PRIOR TO ORDERING AND/OR INSTALLING ANY SYSTEM. CONTRACTOR TO PROVIDE COORDINATION DRAWING FOR REVIEW OF ALL SYSTEMS AT SHOP DRAWING STAGE / SUBMITTAL.
- PARTICULAR ATTENTION IS TO BE GIVEN TO COORDINATING MULTI-HEIGHT CEILINGS WITH REQUIRED ELECTRICAL LIGHTING AND SOFFIT CONSTRUCTION
- ALL OPENINGS IN CEILINGS SHALL BE COORDINATED BY THE CONTRACTOR TO ENSURE PROPER LOCATION OF THE CEILING ACCESSORIES AS INDICATED ON THE DRAWINGS.
- CONTRACTOR TO LABEL HIDDEN, ABOVE CEILING LIFE SAFETY SYSTEMS SUCH AS FIRE DAMPERS AND DUCT DETECTORS AT THE CEILING LEVEL. VISIBLE TO THE ROOM WHICH IT IS ABOVE.
- SEE SHEET G101 FOR CEILING SEISMIC REQUIREMENTS AND DETAILS.
- REFER TO SHEET A001 IN CONJUNCTION WITH THE A100 SERIES FOR WALL TYPES AND INFORMATION ABOUT HEIGHTS OF WALLS ABOVE THE CEILING.
- REFER TO A601 - FINISH SCHEDULE FOR MATERIALS, COLORS.
- DIMENSIONS ARE FROM FACE OF CONCRETE BLOCK

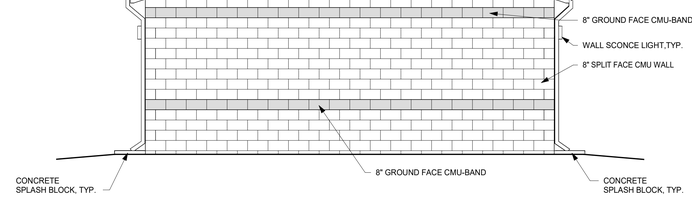


6 RESTROOM - REFLECTED CEILING PLAN
1/4" = 1'-0"

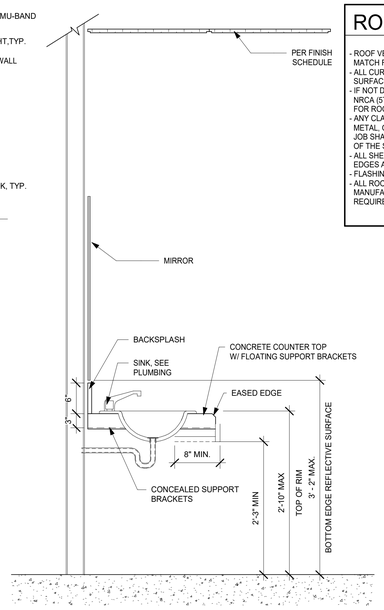
5 RESTROOM - LEFT ELEVATION
1/4" = 1'-0"
NOTE: ALL SPLIT FACE CMU, GROUND FACE CMU AND MORTAR IS TO HAVE INTEGRAL WATERPROOFING



7 RESTROOM - ROOF PLAN
1/4" = 1'-0"



4 RESTROOM - BACK ELEVATION
1/4" = 1'-0"



8 BATHROOM CONCRETE COUNTERTOP
1" = 1'-0"
NOTE: COUNTERTOP AND SINK TO BE IN STRICT COMPLIANCE W/ ADA AND ANSI A117.1

TRUE NORTH | PROJECT NORTH

0' 2' 4' 8'
1/4" = 1'-0"

100% CONSTRUCTION DOCUMENTS

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK RENOVATIONS

HANAHAN
SOUTH CAROLINA

STATE OF SOUTH CAROLINA — GJS ARCHITECTURE, LLC — N.Charleston, SC — No. 03051 — REGISTERED ARCHITECT'S

STATE OF SOUTH CAROLINA — ROBERT W. GERBER — N.Charleston, SC — No. 3565 — 05/12/23 — REGISTERED ARCHITECT

CITY OF HANAHAN — SOUTH CAROLINA — Est. 1967

ADC ENGINEERING
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843-566-0161
ADCENGINEERING.COM

GJS ARCHITECTURE
3251 LANDMARK DRIVE, SUITE 241
NORTH CHARLESTON, SC 29418
843-722-4334 (T)
843-722-4135 (F)

DATE: 05.12.2023
ADC PROJECT #: 20381
DESIGNED: CA
CHECKED: RVG
DRAWN: CA
REVISION:

DRAWING TITLE
RESTROOMS PLANS & ELEVATIONS

DRAWING NUMBER
A102

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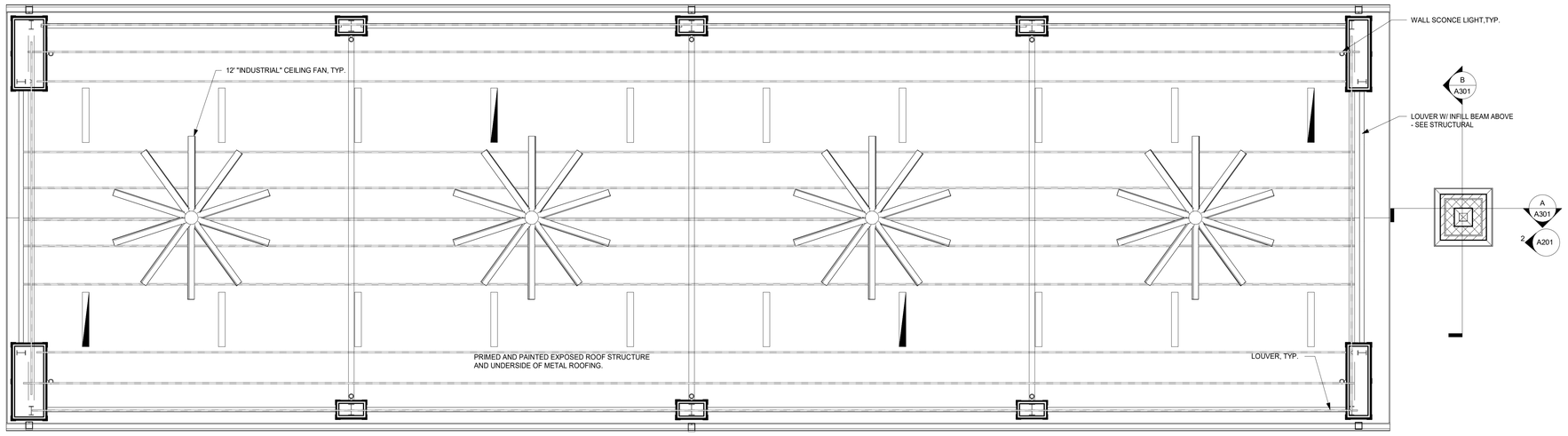
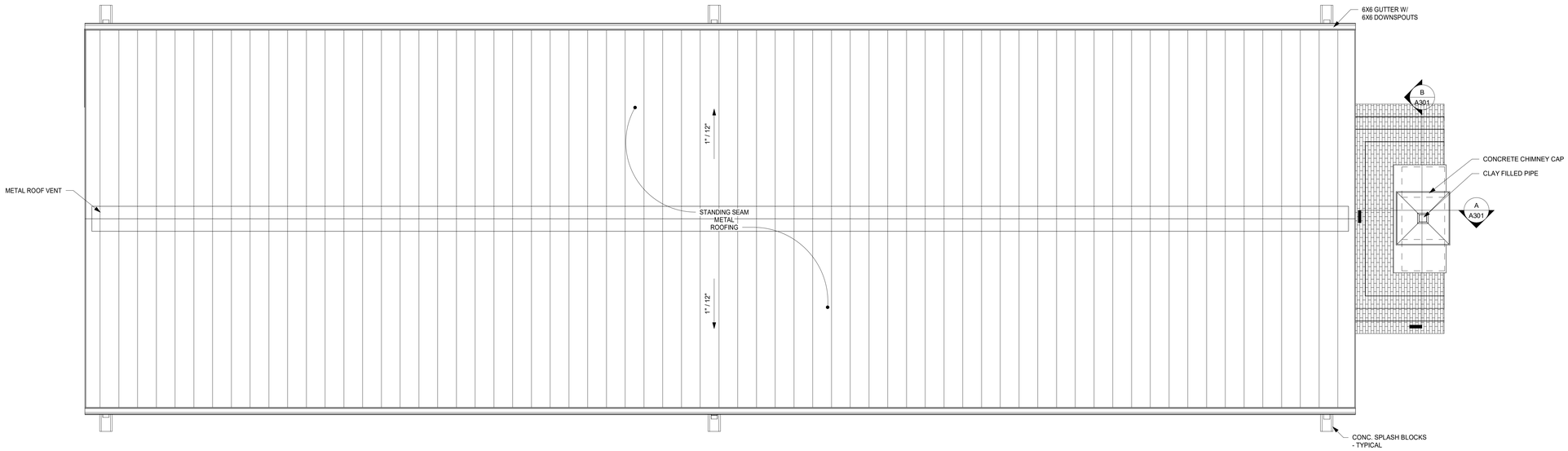


1 PAVILION - REFLECTED CEILING PLAN
1/4" = 1'-0"
NOTE: ALL EXPOSED STEEL METAL STRUCTURE AND ROOFING TO BE SANDBLASTED (IF REQUIRED), CLEANED, PRIMED AND PAINTED



2 PAVILION - ROOF PLAN
1/4" = 1'-0"

LEGEND

- INTERIOR STUD WALL, SEE A-001 FOR WALL TYPES
- 1 HOUR FIRE-RATED WALL
- 2 HOUR FIRE-RATED WALL
- 3 HOUR FIRE-RATED WALL
- SOFFIT OVERHEAD
- EXISTING CEILING
- 2' X 4' ACOUSTICAL TILE
- GYPSUM BOARD CEILING
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- REFER TO A601 - FINISH SCHEDULE FOR MATERIALS, COLORS.
- DIMENSIONS ARE FROM FACE OF CONCRETE BLOCK

ROOF LEGEND

- SLOPE: 4"/ 12" — ROOF SLOPE 4:12
- DS — DOWNSPOUT
- GUTTER, ARROW INDICATES DIRECTION OF FLOW
- OUTLINE OF STRUCTURE BELOW
- METAL ROOF

ROOF NOTES

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0' 2' 4' 8'
1/4" = 1'-0"

100% CONSTRUCTION DOCUMENTS

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STEWARD STREET PARK RENOVATIONS

HANAHAN
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DATE: 05.12.2023
ADC PROJECT #: 20381
DESIGNED: CA
CHECKED: RVG
DRAWN: CA
REVISION:

DRAWING TITLE
PAVILION - REFLECTED CEILING PLAN

DRAWING NUMBER
A121

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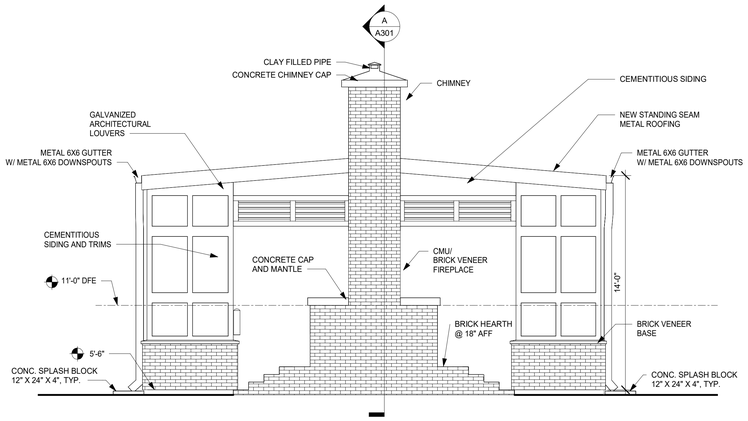
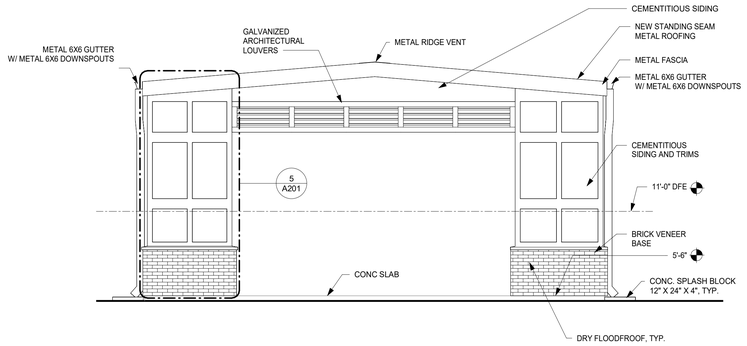
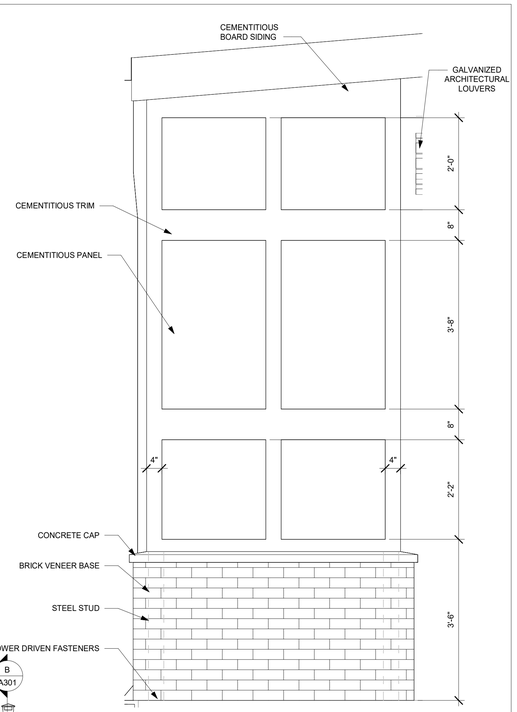


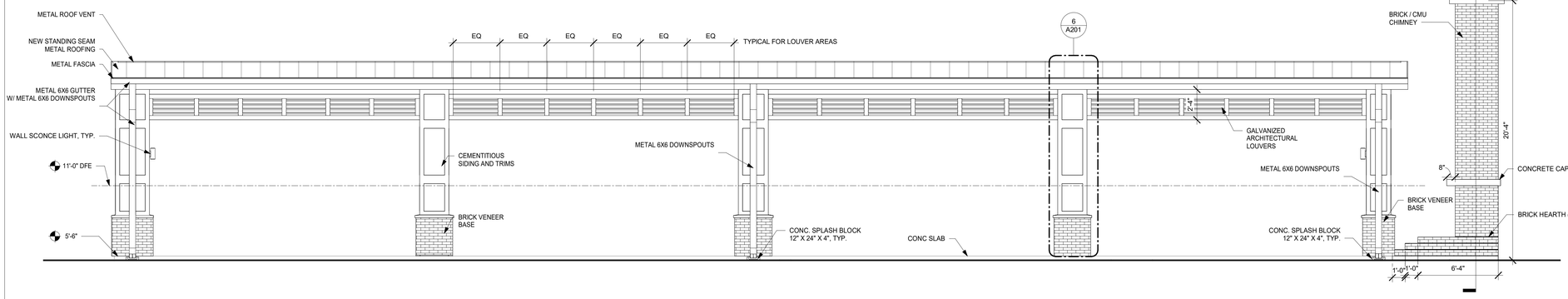
2 PAVILION - RIGHT ELEVATION
1/4" = 1'-0"



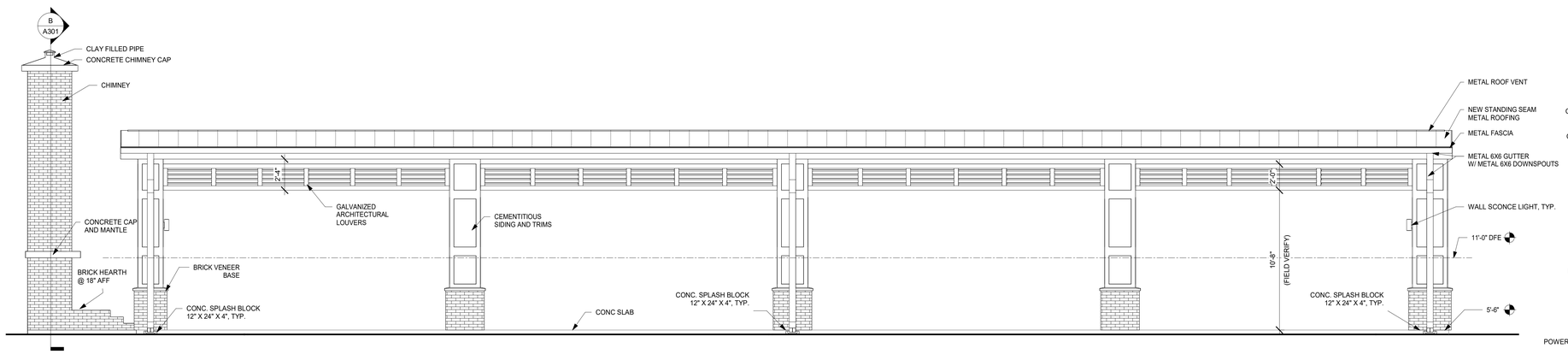
3 PAVILION - LEFT ELEVATION
1/4" = 1'-0"



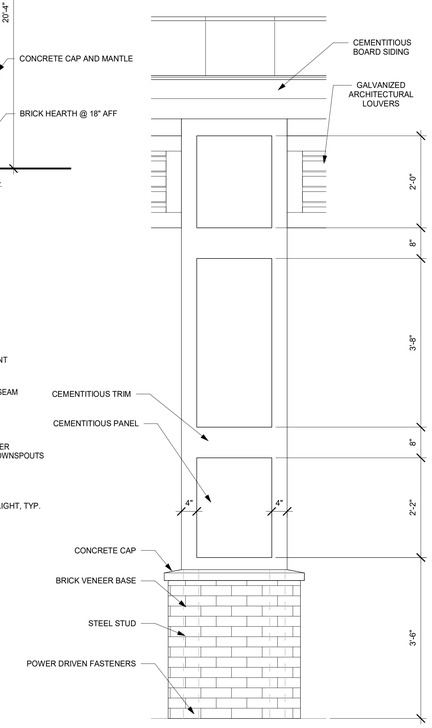
5 CORNER COLUMN DETAIL
3/4" = 1'-0"



1 PAVILION - FRONT ELEVATION
1/4" = 1'-0"



4 PAVILION - BACK ELEVATION
1/4" = 1'-0"



6 COLUMN DETAIL
3/4" = 1'-0"

0' 2' 4' 8'
1/4" = 1'-0"

100% CONSTRUCTION DOCUMENTS

City of Hanahan
Hanahan, South Carolina

STEWARD STREET
PARK RENOVATIONS

HANAHAN
SOUTH CAROLINA

STATE OF SOUTH CAROLINA
GJS ARCHITECTURE, LLC
N.Charleston, SC
No. 03051
REGISTERED ARCHITECTS

STATE OF SOUTH CAROLINA
ROBERT W. GERBER
N. Charleston, SC
No. 3565
05/12/23
REGISTERED ARCHITECT

CITY OF HANAHAN
SOUTH CAROLINA
Est. 1967

ADC ENGINEERING
1226 YEAMANS HALL ROAD
HANAHAN, SC 29410
843-566-0161
ADCENGINEERING.COM

GJS ARCHITECTURE
3251 LANDMARK DRIVE, SUITE 241
NORTH CHARLESTON, SC 29418
843-722-4334 (T)
843-722-4335 (F)

DATE: 05.12.2023
ADC PROJECT #: 20381
DESIGNED: CA
CHECKED: RVG
DRAWN: CA
REVISION:

DRAWING TITLE
PAVILION ELEVATIONS

DRAWING NUMBER
A201

NOTE: FULL SIZE DRAWING IS 30" X 42"
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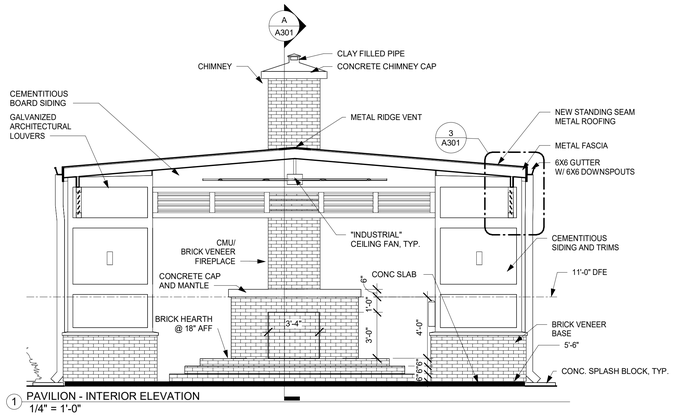
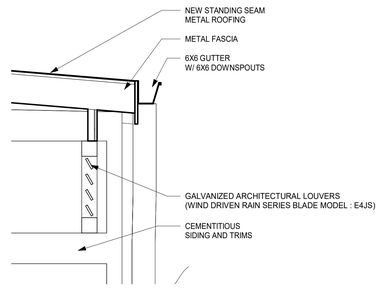
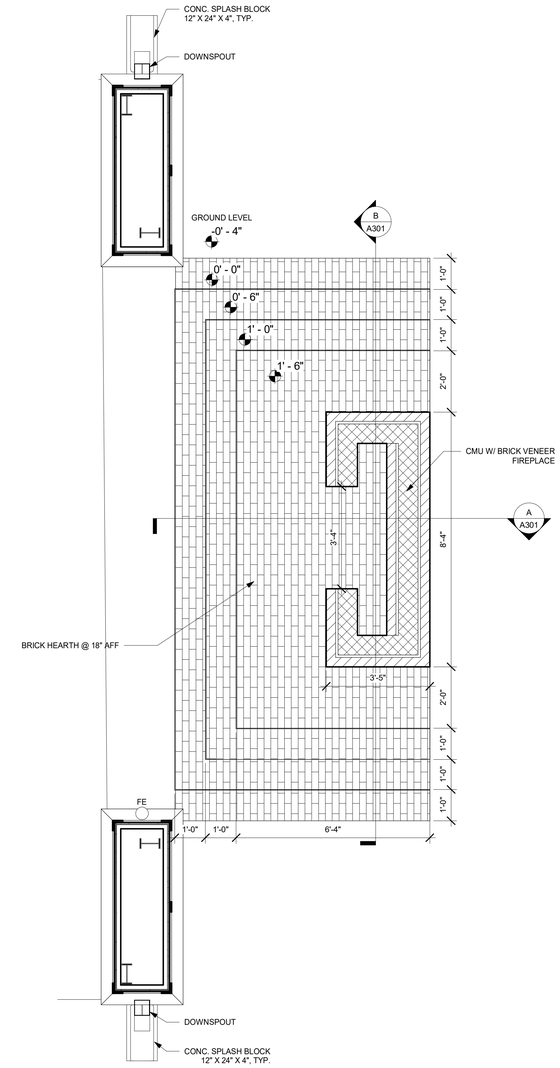


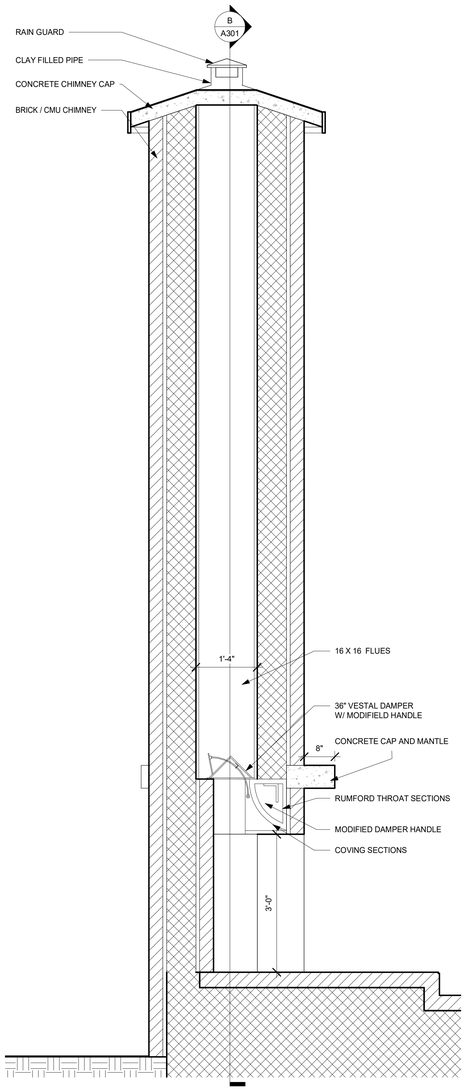
1 PAVILION - INTERIOR ELEVATION
1/4" = 1'-0"



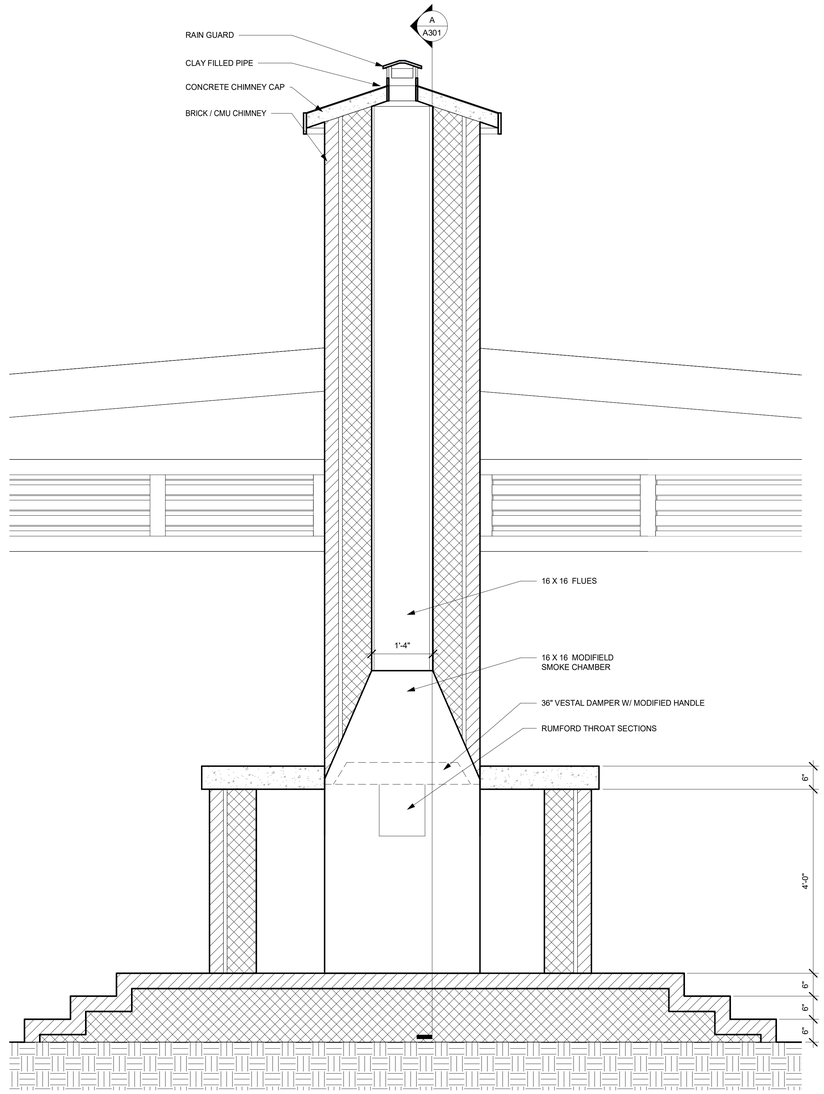
3 LOUVER DETAIL
3/4" = 1'-0"



4 PAVILION - CHIMNEY ENLARGED FLOOR PLAN
1/2" = 1'-0"



A CHIMNEY SECTION DETAIL A
3/4" = 1'-0"



B CHIMNEY SECTION DETAIL B
3/4" = 1'-0"

NOTE: CHIMNEY DESIGN TO BE A DELEGATED DESIGN INCLUDING BUT NOT LIMITED TO FIREBRICK, MASONRY, FIREBOX, FLUE LINE SURROUND, ETC.

FIREPLACE IS ADD ALTERNATE #4

100% CONSTRUCTION DOCUMENTS

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ROBERT V. GERBER
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05/12/23
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GJS ARCHITECTURE
3251 LANDMARK DRIVE, SUITE 241
NORTH CHARLESTON, SC 29418
843-722-4334 (T)
843-722-4135 (F)

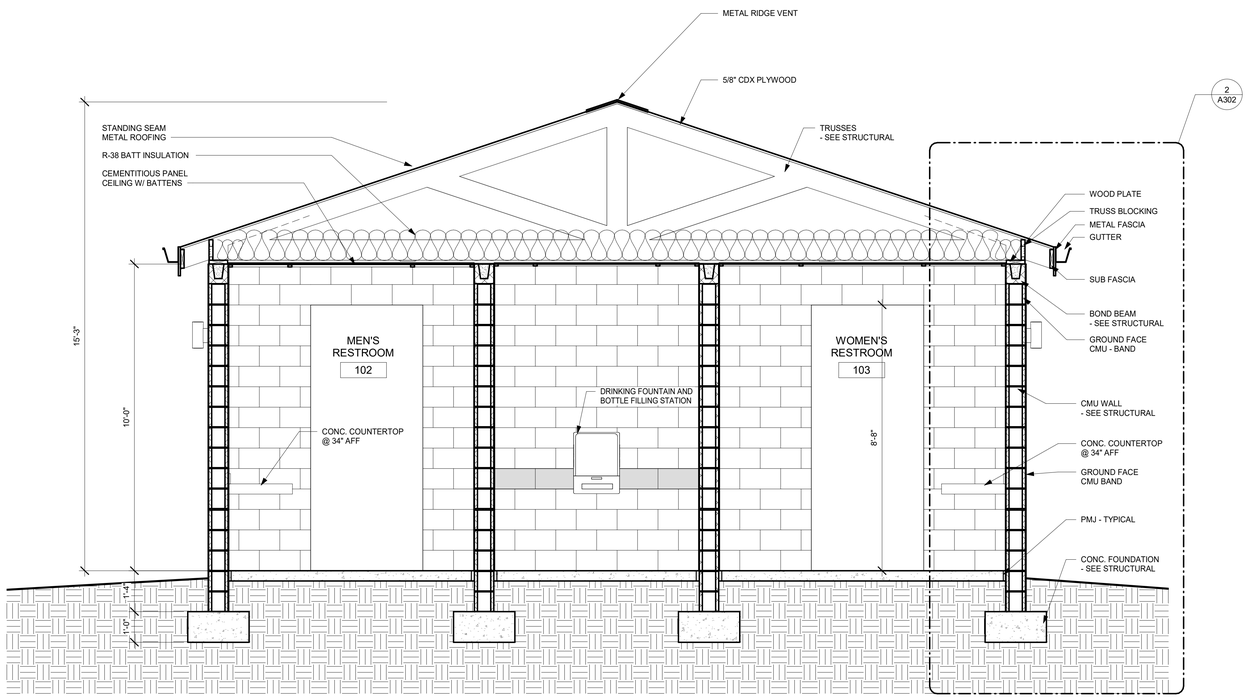
DATE: 05.12.2023
ADC PROJECT #: 20381
DESIGNED: CA
CHECKED: RVG
DRAWN: CA
REVISION:

DRAWING TITLE

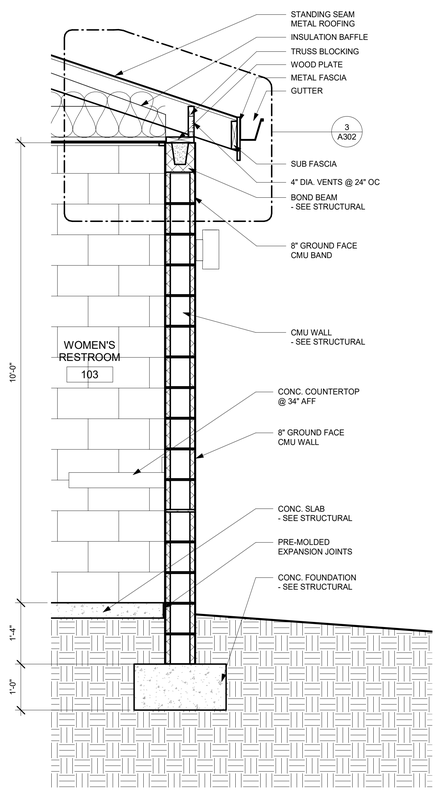
PAVILION FIREPLACE PLANS AND DETAILS

DRAWING NUMBER

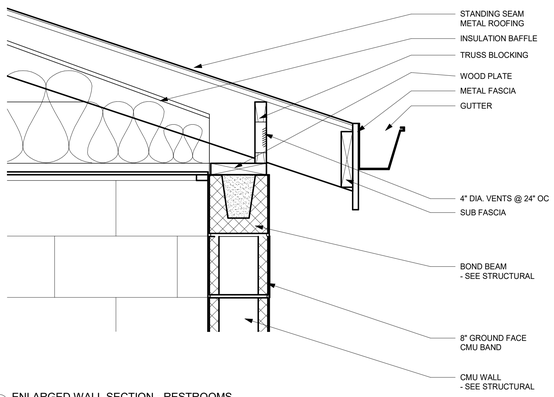
A301



1 RESTROOMS - SECTION
1/2" = 1'-0"



2 RESTROOMS - WALL SECTION
3/4" = 1'-0"
NOTE: ALL EXPOSED WOOD INCLUDING WOOD TRUSS TAILS SHALL BE PRESSURE TREATED



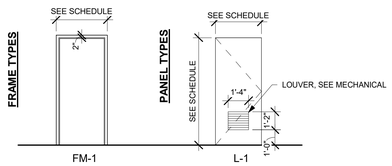
3 ENLARGED WALL SECTION - RESTROOMS
1 1/2" = 1'-0"

ABBREVIATIONS

ABBREVIATION	MATERIAL
ACR	ACRYLIC
ACT	ACOUSTICAL TILE
B	BASE
BI	BASE-INTEGRAL
CONC	CONCRETE
CM	CEMENTITIOUS SIDING
CMU	CONCRETE MASONRY UNIT
CTB	CERAMIC TILE BASE
EXP	EXPOSED
EXIST (EX)	EXISTING
FF	FACTORY FINISH
FIN	FINISH
GRAN	GRANITE
GYP BD	GYPSUM BOARD
GYP BD IR	IMPACT RESISTANT GYPSUM BOARD
GYP BD MR	MOISTURE RESISTANT GYPSUM BOARD
HORZ	HORIZONTAL
INT	INTERIOR
L	LINOLEUM
LP	LINER PANEL
LVT	LUXURY VINYL TILE
MFR	MANUFACTURER
MTL	MATERIAL
PL	PLASTER
PLAM	PLASTIC LAMINATE
PORC	PORCELAIN TILE
PT	PAINT
PTB	PORCELAIN TILE BASE
QT	QUARRY TILE
QTB	QUARRY TILE BASE
RB	RUBBER BASE
RF	RUBBER FLOORING
RP	REINFORCED PANELS
SC	SEALED CONCRETE
SS	SOLID SURFACE
ST	STAIN
V	VINYL
VB	VINYL BASE
VCT	VINYL COMPOSITION TILE
VERT	VERTICAL
VWC	VINYL WALL COVERING
WD	WOOD (SOLID CORE PL-T)
WDB	WOOD BASE
WDP	WOOD PANELING

DOOR SCHEDULE

MARK	DOOR PANEL: PANEL TYPE	DOOR PANEL: SIZE: WIDTH	DOOR PANEL: SIZE: HEIGHT	DOOR PANEL: SIZE: THICKNESS	DOOR PANEL: MATL	DOOR PANEL: FIN	DOOR PANEL: GLAZING	DP RATING	FRAME: TYPE	FRAME: SIZE: WIDTH	FRAME: SIZE: HEIGHT	FRAME: MATL	FRAME: FIN	FRAME: DETAIL: HEAD	FRAME: DETAIL: JAMB	FRAME: DETAIL: SILL	FIRE RATING LABEL	HARDWARE: SET NO	HARDWARE: KEYSIDE RM NO	COMMENTS	MARK
102	L-1	3' - 0"	7' - 0"	0' - 2"	HM	PT	--	50	FM-1	3' - 4"	7' - 2"	HM	PT	--	--	--	--	1	--	16" X 14" TRANSFER GRILLE	102
103	L-1	3' - 0"	7' - 0"	0' - 2"	HM	PT	--	50	FM-1	3' - 4"	7' - 2"	HM	PT	--	--	--	--	1	--	16" X 14" TRANSFER GRILLE	103



FINISH SCHEDULE

ROOM NO.	ROOM NAME	FLOOR: FLOOR	FLOOR: BASE	WALLS: N: MATL	WALLS: N: FIN	WALLS: E: MATL	WALLS: E: FIN	WALLS: S: MATL	WALLS: S: FIN	WALLS: W: MATL	WALLS: W: FIN	CEILING: MATL	CEILING: FIN	CASEWORK: HORZ	CASEWORK: VERT	NOTES	ROOM NO.
101	PAVILION	SC	--	--	--	--	--	--	--	--	--	--	--				101
102	MEN'S RESTROOM	SC	--	CMU	PT	CMU	PT	CMU	PT	CMU	PT	CM	PT				102
103	WOMEN'S RESTROOM	SC	--	CMU	PT	CMU	PT	CMU	PT	CMU	PT	CM	PT				103

FINISH DESCRIPTIONS

ITEM NO.	MATERIAL	MANUFACTURER	PRODUCT	DESCRIPTION
WALL				
PT	LATEX PAINT	--	--	SEE SPECIFICATIONS
EXTERIOR DOORS				
HM	HOLLOW METAL	--	--	SEE SPECIFICATIONS
CEILING				
PT	LATEX PAINT	--	--	SEE SPECIFICATIONS
FLOOR				
SC	SEALED CONCRETE	--	--	SEE STRUCTURAL SPECIFICATIONS

0' 1' 2' 4' 1/2" = 1'-0"
0' 1' 2' 4' 3/4" = 1'-0"
0' 6" 1'-6" 3' 1 1/2" = 1'-0"

100% CONSTRUCTION DOCUMENTS

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK RENOVATIONS

HANAHAN SOUTH CAROLINA

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GJS ARCHITECTURE, LLC
N.Charleston, SC
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GJS ARCHITECTURE
3251 LANDMARK DRIVE, SUITE 241
NORTH CHARLESTON, SC 29418
843-722-4334 (T)
843-722-4335 (F)

DATE: 05.12.2023
ADC PROJECT #: 20381
DESIGNED: CA
CHECKED: RVG
DRAWN: CA
REVISION:

DRAWING TITLE
BUILDING SECTIONS AND SCHEDULES

DRAWING NUMBER
A302

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ABBREVIATIONS:

AB	ANCHOR BOLT
ADJ	ADJACENT
AESS	ARCHITECTURALLY EXPOSED STRUCTURAL STEEL
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
ALUM	ALUMINUM
ALT	ALTERNATE
APPD	APPROVED
APPROX	APPROXIMATE
ARCH	ARCHITECT
B/	BOTTOM OF
BLDG	BUILDING
BM	BEAM
BOT	BOTTOM
BRDG	BRIDGING
BRG	BEARING
BLK	BLOCK
BTWN	BETWEEN
CANT	CANTILEVER
C/C	CENTER TO CENTER
CHAM	CHAMFER
CIRC	CIRCULAR
CJ	CONTROL JOINT
CLR	CLEAR
CMU	CONCRETE MASONRY UNITS
COL	COLUMN
CONC	CONCRETE
CONN	CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUOUS
CONTR	CONTRACTOR
COORD	COORDINATE
CTRD	CENTERED
D	DEPTH
DBE	DECK BEARING ELEVATION
DBL	DOUBLE
DET	DETAIL
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DL	DEAD LOAD
DWGS	DRAWINGS
E	EAST
EA	EACH
EB	EXPANSION BOLT
EF	EACH FACE
EJ	EXPANSION JOINT
EL	ELEVATION
ELEV	ELEVATOR
EMBED	EMBEDMENT
ENGR	ENGINEER
E0S	EDGE OF SLAB
EQ	EQUAL
EQUIP	EQUIPMENT
EQUIV	EQUIVALENT
ES	EACH SIDE
EW	EACH WAY
EXP	EXPANSION
EXIST	EXISTING
EXT	EXTERIOR
F/	FACE OF
FC	FILLED CELL
FF	FINISHED FLOOR
FIN	FINISH
FLR	FLOOR
FDN	FOUNDATION
FRMG	FRAMING
FT	FEET
FTG	FOOTING
FV	FIELD VERIFY
GALV	GALVANIZED
GA	GAUGE
HORIZ	HORIZONTAL
HSA	HEADED STUD ANCHOR
HSB	HIGH STRENGTH BOLT
HT	HEIGHT
ID	INSIDE DIAMETER
IF	INSIDE FACE
IN	INCH
INCL	INCLUDE, ING
INT	INTERIOR
JBE	JOIST BEARING ELEVATION
LB	POUND
LG	LONG
LL	LIVE LOAD
LLBB	LONG LEG BACK TO BACK
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LONG	LONGITUDINAL
LSL	LONG SLOTTED HOLES
LT	LIGHT
LTWT	LIGHTWEIGHT
MAS	MASONRY
MAX	MAXIMUM
MBD	METAL BUILDING DESIGNER
MECH	MECHANICAL
MEZZ	MEZZANINE
MFR	MANUFACTURER
MID	MIDDLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MJ	MASONRY JOINT
MO	MASONRY OPENING
MSD	METAL STUD DESIGNER
N	NORTH
NIC	NOT IN CONTRACT
NO	NUMBER
NOM	NOMINAL
NS	NEAR SIDE
NTS	NOT TO SCALE
O/O	OUT TO OUT
OC	ON CENTER
OD	OUTSIDE DIAMETER
OF	OUTSIDE FACE
OPNG	OPENING
OPP	OPPOSITE
OW	OPEN WEB
PAF	POWDER ACTUATED FASTENER
PL	PLATE
PLF	POUNDS PER LINEAL FOOT
PROJ	PROJECTION
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	PRESSURE TREATED
PEMB	PRE-ENGINEERED METAL BUILDING
RAD	RADIUS
REF	REFERENCE
REINF	REINFORCEMENT
RET	RETURN
REV	REVISION
RP	RADIUS POINT
RT	RIGHT
RTU	ROOF TOP UNIT
S	SOUTH
SA	SLEEVE ANCHOR
SB	SLAB BOLSTER
SCHED	SCHEDULE
SECT	SECTION
SF-	STEP FOOTING
SIM	SIMILAR
SPEC	SPECIFICATIONS
SP	SPACING,ES
SQ	SQUARE
SSL	SHORT SLOTTED HOLES
SS	STAINLESS STEEL
STD	STANDARD
STIFF	STIFFENERS
STL	STEEL
SYMM	SYMMETRICAL
T/	TOP OF
TB	TIE BEAM
TC	TIE COLUMN
TCX	TOP CHORD EXTENSION
T&B	TOP AND BOTTOM
TEMP	TEMPORARY
TRAN	TRANSVERSE
TS	TUBE STEEL
TYP	TYPICAL
TD	TREATED
UNO	UNLESS NOTED OTHERWISE
VERT	VERTICAL
W	WEST
W/	WITH
W/O	WITHOUT
WP	WORK POINT
WT	WEIGHT
WWF	WELDED WIRE FABRIC
WWM	WELDED WIRE MESH
WWR	WELDED WIRE REINFORCEMENT

GENERAL NOTES

1. STRUCTURAL DRAWINGS ARE TO BE USED IN CONJUNCTION WITH THE ENTIRE SET OF PROJECT DRAWINGS, PROJECT MANUAL, AND ALL SHOP DRAWING SUBMITTALS.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING AND COORDINATING DIMENSIONS, CLEARANCES AND ALL OTHER COORDINATION ISSUES WITH OTHER TRADES.
3. IN CASE OF CONFLICT BETWEEN VARIOUS STRUCTURAL DRAWINGS, STRUCTURAL PLANS, OR STRUCTURAL DETAILS THE MORE STRINGENT SHALL GOVERN. THE CONTRACTOR SHALL MAKE ALLOWANCE IN HIS BID FOR THE MORE COSTLY CONDITION.
4. IN CASE OF CONFLICT BETWEEN DRAWINGS, DRAWING NOTES, AND SPECIFICATIONS THE MORE STRINGENT SHALL GOVERN. THE CONTRACTOR SHALL MAKE ALLOWANCE IN HIS BID FOR THE MORE COSTLY CONDITION.
5. WORK NOT INDICATED ON THE DRAWINGS, BUT REASONABLY IMPLIED TO BE SIMILAR TO THAT SHOWN AT CORRESPONDING PLACES SHALL BE REPEATED.
6. ALL NOTES, DETAILS AND SECTIONS ARE INTENDED TO BE TYPICAL FOR THE GENERAL CONDITIONS INDICATED OR REFERENCED. ALL NOTES, DETAILS AND SECTIONS SHALL APPLY TO ANY SIMILAR SITUATION THROUGHOUT THE ENTIRE PROJECT UNLESS A SEPARATE NOTE, DETAIL OR SECTION IS PROVIDED.
7. REVIEW ALL PROJECT DOCUMENTS PRIOR TO FABRICATION AND START OF CONSTRUCTION. REPORT ANY DISCREPANCIES TO THE OWNER OR OWNER'S REPRESENTATIVE PRIOR TO PROCEEDING WITH WORK.
8. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROTECT EXISTING AND IN PLACE WORK OR UTILITIES DURING CONSTRUCTION
9. COORDINATE STRUCTURAL DRAWINGS WITH OTHER CONTRACT DRAWINGS, SPECIFICATIONS, OR SHOP DRAWINGS WHICH MAY AFFECT THE STRUCTURAL WORK.
10. USE OF REPRODUCED CONTRACT DRAWINGS IN PART OR WHOLE FOR THE PURPOSE OF SHOP DRAWING PREPARATION SHALL NOT RELIEVE THE CONTRACTOR OR SUBCONTRACTOR FROM THE REQUIREMENT TO ACCURATELY LAYOUT, COORDINATE, DETAIL, FABRICATE AND INSTALL A COMPLETE STRUCTURE.
11. ALL SUBMITTALS SHALL BE REVIEWED BY THE SUBCONTRACTOR AND CONTRACTOR FOR CONFORMANCE TO THE CONTRACT DOCUMENTS, FOR COMPLETENESS, AND TO RESPOND TO CONTRACTOR COORDINATION RELATED QUESTIONS PRIOR TO SUBMITTING FOR APPROVAL. ALL SHEETS SHALL BE STAMPED AND INITIALED BY THE CONTRACTOR INDICATING SUCH A REVIEW HAS BEEN COMPLETED PRIOR TO ISSUING SUBMITTAL FOR APPROVAL.
12. CONTRACTOR SHALL MAKE NO DEVIATIONS FROM THE CONTRACT DOCUMENTS WITHOUT WRITTEN APPROVAL.
13. ALL ELEVATIONS INDICATED IN STRUCTURAL DRAWINGS ARE IN REFERENCED TO A GROUND FLOOR FINISHED SLAB ELEVATION OF 0'-0" UNLESS NOTED OTHERWISE. SEE CIVIL FOR GROUND FLOOR FINISHED SLAB ELEVATION.

FOUNDATIONS

1. SUBGRADE PREPARATION SHALL BE IN ACCORDANCE WITH THE GEOTECHNICAL INVESTIGATION REPORT.
2. PROVIDE ALL MEASURES NECESSSARY FOR THE INSTALLATION OF FOUNDATIONS INCLUDING BUT NOT LMITED TO DEWATERING AND SHORING.
3. CENTER ALL FOUNDATIONS BENEATH THEIR RESPECT WALL OR COLUMN UNLESS NOTED OTHERWISE.
4. HORIZONTAL JOINT ARE NOT PERMITTED IN FOUNDATIONS
5. SEE TYPICAL DETAILS FOR CONSTRUCTION OF VERTICAL CONSTRUCTION JOINTS AND LIMITATIONS ON LOCATIONS
6. DO NOT INSTALL PLUMBING, PLUMBING SLEEVES IN OR THROUGH FOUNDATIONS UNLESS SPECIFICALLY DETAILED ON THE STRUCTURAL DRAWINGS, OR WITHOUT WRITTEN APPROVAL FROM THE ENGINEER OF RECORD
7. PLUMBING RUNS BELOW GRADE SHALL NOT RUN BENEATH AND PARALLEL TO CONTINUOUS FOOTINGS
8. ALL REINFORCING STEEL SHALL BE SUPPORTED ON CHAIRS OR BOLSTERS TO PROPER ELEVATION AND SHALL BE SECURELY ANCHORED
9. FOUNDATION SIZES SHOWN ASSUME FOOTINGS ARE CONSTRUCTED WITH SIDE FORMS
10. EARTH FORMED FOUNDATIONS ARE PERMITTED IF SUBGRADE IS STABLE ENOUGH TO HOLD THE FACE OF THE EXCAVATION. ALL FOUNDATION SIZES FOR EARTH FORMED FOUNDATIONS SHALL BE INCREASED 1" IN ALL DIRECTIONS
11. ALL FOUNDATION EXCAVATIONS SHALL BE DEWATERED PRIOR TO PLACING CONCRETE
12. BACKFILL SHALL NOT BE PLACED AGAINST FOUNDATION WALLS UNTIL CONCRETE OR GROUT HAS ACHIEVED 75% OF THE REQUIRED STRENGTH.
13. FIELD TESTING AND INSPECTION OF FOUNDATIONS, SUBGRADE MATERIALS AND SUBGRADE PREPARATION SHALL BE COMPLETED BY AN INDEPENDENT TESTING AGENCY COMMISSIONED BY THE OWNER, AND SHALL BE IN ACCORDANCE WITH THE SCHEDULE OF SPECIAL INSPECTIONS.

CAST-IN-PLACE CONCRETE

1. ALL CAST-IN-PLACE CONCRETE SHALL CONFORM TO SPECIFICATION SECTION 033000-"CAST-IN-PLACE CONCRETE"
2. LAP ALL WWM/WWR ONE MESH SPACING PLUS A 2" OFFSET AND SECURELY ANCHOR
3. ALL CONTINUOUS REINFORCEMENT SHALL BE LAPPED PER SCHEDULES AND DETAILS
4. REINFORCEMENT SHALL BE SECURELY ANCHORED IN POSITION. THE CONTRACTOR SHALL PROVIDE ADDITIONAL BARS, STANDEES, OR STIRRUPS TO ANCHOR BARS IN THE PROPER POSITION
5. THE DESIGN AND CONSTRUCTION OF FORMS AND SHORES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
6. QUALIFIED WORKMEN SHALL CONSTANTLY OBSERVE AND ADJUST FORMS AND SHORES AS REQUIRED DURING CONCRETE PLACEMENT.
7. ALL SHORING SHALL REMAIN IN PLACE UNTIL THE SUPPORTED CONCRETE HAS ATTAINED 75% OF THE REQUIRED 28 DAY COMPRESSIVE STRENGTH.
8. CONTRACTOR SHALL VERIFY DIMENSIONS AND LOCATIONS OF ALL SLOTS, PIPE SLEEVES, ANCHOR BOLTS, ETC AS REQUIRED FOR ALL TRADES BEFORE CONCRETE IS POURED THESE ITEMS SHALL BE INSTALLED AND VERIFIED BY THE CONTRACTOR.
9. SEE PLUMBING DRAWINGS FOR FLOOR DRAINS
10. FOR CONCRETE PADS SEE ARCHITECTURAL AND MECHANICAL DRAWINGS
11. FOR EXTERIOR SIDEWALKS AND CURBS SEE CIVIL DRAWINGS
12. FOR WATERPROOFING REQUIREMENTS SEE ARCHITECTURAL DRAWINGS
13. DOWELS SHALL MATCH WALL REINFORCING UNLESS NOTED OTHERWISE.
14. ALL INTERIOR SLABS SHALL HAVE A STEEL TROWELED FINISH UNLESS NOTED OTHERWISE. COORDINATE SLAB FINISH FOR AREAS WITH SPECIALTY FLOOR COVERINGS WITH SPECIFICATIONS AND FINISH SCHEDULE.
15. ALL REINFORCING STEEL SHALL BE DETAILED FABRICATED AND INSTALLED IN ACCORDANCE WITH ACI 318-14 AND ACI 315-99.
16. PROVIDE THE FOLLOWING CONCRETE CLEAR COVER OVER REINFORCING (UNO):
    - FOOTINGS, GRADE BEAMS, TIE BEAMS AND PILE CAPS: 3"
    - INTERIOR BEAMS AND COLUMNS: 1"
    - EXTERIOR BEAMS AND COLUMNS: 2"
    - PEDESTALS: 2"
    - STRUCTURAL SLABS ON GRADE: 3" BOTTOM, 3/4" TOP @ INTERIOR SPACES (1 1/2" TOP AT EXTERIOR SPACES)
    - INTERIOR FORMED ELEVATED SLABS: 3/4" BOTTOM, 3/4" TOP
    - EXTERIOR FORMED ELEVATED SLABS: 1 1/2" BOTTOM, 1 1/2" TOP
    - SLABS ON DECK: WWM CENTERED IN COVER OVER DECK FLUTES
    - SLABS ON GRADE: WWM IN TOP 1/3, REINFORCING STEEL CENTERED
    - CONCRETE WALLS: 1 3/4" UNO
17. REINFORCEMENT SHALL NOT BE CUT TO ACCOMMODATE THE INSTALLATION OF ANCHORS EMBEDS OR OTHER ITEMS.
18. AT CHANGES OF DIRECTION IN CONTINUOUS CONCRETE ELEMENTS PROVIDE CORNER BARS OF SAME SIZE AND SPACING OF HORIZONTAL REINFORCING.
19. PLACE CONCRETE PER ACI 318-14. USE INTERNAL MECHANICAL VIBRATION FOR ALL CONCRETE. LIMIT MAXIMUM FREE FALL HEIGHT TO 6'-0" AND TAKE PRECAUTIONS TO AVOID CONCRETE SEGREGATION.
20. FIELD TESTING AND INSPECTION OF CONCRETE MATERIALS AND CONCRETE INSTALLATION SHALL BE COMPLETED BY AN INDEPENDENT TESTING AGENCY COMMISSIONED BY THE OWNER, AND SHALL BE IN ACCORDANCE WITH THE SCHEDULE OF SPECIAL INSPECTIONS.

MASONRY

1. ALL MASONRY SHALL CONFORM TO SPECIFICATION SECTION 042000-"UNIT MASONRY"
2. MASONRY CONSTRUCTION SHALL CONFORM TO "BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES" (ACI/ASE 530 LATEST EDITION) AND "SPECIFICATIONS FOR MASONRY STRUCTURES (ACI/ASCE 530.0) EXCEPT AS MODIFIED OR AMENDED BY THE CONTRACT DOCUMENTS
3. LAP SPLICES FOR STEEL REINFORCING SHALL BE PER SCHEDULES
4. GROUT MASONRY AT ALL REINFORCING, LOCATIONS SHOWN IN PLANS, SCHEDULES AND DETAILS AND AS REQUIRED FOR MISCELLANEOUS ANCHORAGE.
5. GROUT SOLID ALL MASONRY BELOW GRADE, INCLUDING BUT NOT LIMITED TO STEM WALLS AND RETAINING WALLS..
6. CAP ALL UNREINFORCED CELLS NOT SPECIFICALLY NOTED TO BE GROUTED WITH CLOSURE PLATES OR SCREENS PRIOR TO GROUTING.
7. EXTEND ALL NON-LOAD BEARING WALLS A MINIMUM OF 8" ABOVE CEILING AND CAP WITH A CONTINUOUS BOND BEAM REINFORCED WITH (2)-#5'S UNLESS NOTED OTHERWISE
8. PROVIDE LINTELS OVER ALL OPENINGS PER PLANS, SCHEDULES, AND DETAILS. PROVIDE OVER ALL OPENINGS WIDER THAN 12" INCLUDING HVAC DUCTS, PIPING, EMBEDDED PANELS AND CABINETS, AND CONDUIT.
9. PROVIDE POURED SILL UNITS WITH KNOCK-OUT BOTTOMS AT THE BOTTOM OF ALL OPENINGS AND REINFORCE PER SCHEDULES AND DETAILS.
10. ALL OPENINGS FOR ELEMENTS PASSING THROUGH MASONRY WALLS SHALL BE BUILT IN AS WORK PROGRESSES. SAW CUTTING OR CORING OF COMPLETED MASONRY CONSTRUCTION IS NOT PERMITTED.
11. ALL OPENINGS FOR ELEMENTS PASSING THROUGH MASONRY WALLS SHALL BE COORDINATED SUCH THAT THEY DO NOT PASS THROUGH OR INFRINGE ON OTHER MASONRY LINTELS INCLUDING THE FULL DEPT OF THE LINTEL FOR THE FULL WIDTH OF THE BEARING.
12. COORDINATE VERTICAL REINFORCING WITH ALL SCHEDULES, DETAILS AND TYPICAL DETAILS
13. PROVIDE MASONRY CONTROL JOINTS LOCATED AND REINFORCED PER PLANS, NOTES AND TYPICAL DETAILS
14. GROUT A MINIMUM OF 24" (OR TO BOND BEAM BELOW IF LESS THAN 24") ALL BEARING PLATES.
15. COORDINATE INSTALLATION OF MASONRY WALLS WITH ALL TRADES AND STRUCTURAL DETAILS TO ENSURE PROPER INSTALLATION SEQUENCE
16. THE MASONRY WALLS ARE NOT DESIGNED TO WITHSTAND TEMPORARY CONSTRUCTION LOADS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DESIGN, INSTALL AND MAINTAIN BRACING TO STABILIZE MASONRY WALLS DURING CONSTRUCTION.
17. FIELD TESTING AND INSPECTION OF MASONRY MATERIALS AND MASONRY CONSTRUCTION SHALL BE COMPLETED BY AN INDEPENDENT TESTING AGENCY COMMISSIONED BY THE OWNER, AND SHALL BE IN ACCORDANCE WITH THE SCHEDULE OF SPECIAL INSPECTIONS.
18. PROVIDE NONSHRINK GROUT BELOW BEARING PLATES AS REQUIRED FOR FULL CONTACT OF BEARING PLATE TO CMU. NONSHRINK GROUT BETWEEN BEARING PLATE & CMU MAY BE OMITTED IF BEARING PL HAS FULL CONTACT WITHOUT GROUT.

STRUCTURAL STEEL FRAMING

1. ***ALL STRUCTURAL STEEL FRAMING SHALL CONFORM TO SPECIFICATION SECTION 051200-"STRUCTURAL STEEL FRAMING".***
2. ALL STRUCTURAL STEEL FRAMING AND ARCHITECTURALLY EXPOSED STRUCTURAL STEEL FRAMING SHALL CONFORM TO SPECIFICATION SECTION 051200-"STRUCTURAL STEEL FRAMING".
3. ***ALL EXPOSED STRUCTURAL STEEL SHALL BE CONSIDERED AESS***.
4. ALL STRUCTURAL STEEL ERECTION SHALL COMPLY WITH AISC 360-10 AND AISC 303-10.
5. CUTS OR BURNING OF HOLES IN STRUCTURAL STEEL MEMBERS IN THE FIELD WILL NOT BE PERMITTED.
6. THE CONTRACTOR SHALL PROVIDE TEMPORARY BRACING OR GUYS TO PROVIDE LATERAL SUPPORT OF THE STRUCTURAL STEEL UNTIL THE PERMANENT LATERAL FORCE RESISTING SYSTEM IS COMPLETED.
7. THE ERECTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH THE OWNER'S SPECIAL INSPECTOR FOR PRE-INSTALLATION VERIFICATION OF SLIP CRITICAL BOLT TIGHTENING PROCEDURES.
8. FIELD TESTING AND INSPECTION OF STRUCTURAL STEEL MATERIALS AND STRUCTURAL STEEL T INSTALLATION SHALL BE COMPLETED BY AN INDEPENDENT TESTING AGENCY COMMISSIONED BY THE OWNER, AND SHALL BE IN ACCORDANCE WITH THE SCHEDULE OF SPECIAL INSPECTIONS.
9. UNLESS NOTED OTHERWISE ALL WELDS SHALL BE 1/4" FILLET WELD ALL AROUND
10. UNLESS NOTED OTHERWISE: BEAM SHEAR CONNECTIONS SHALL BE DESIGNED FOR 1/2 THE MAXIMUM UNIFORM LOAD. MOMENT FRAME BEAMS SHALL BE DESIGNED FOR 75% OF THE MAXIMUM UNIFORM LOAD.
11. CONNECTIONS OF BEAMS ALONG GRID LINES SHALL BE DESIGNED WITH A 30KIP AXIAL LOAD UNLESS NOTED OTHERWISE.
12. WELDS NOT SPECIFICALLY CALLED OUT SHALL BE ASSUMENED TO BE 1/4" FIELD APPLIED FILLET WELDS ALL AROUND, CONTINUOUS.
13. ALL EXTERIOR EXPOSED STEEL SHALL BE HOT DIPPED GALVANIZED.
14. ALL BASE PLATE MATERIAL SHALL BE 50-KSI.

POST INSTALLED STRUCTURAL ANCHORS

1. ALL POST INSTALLED STRUCTURAL ANCHORS SHALL CONFORM TO SPECIFICATION SECTION 050520-"POST INSTALLED STRUCTURAL ANCHORS"
2. NOTED EMBEDMENT DEPTHS ARE FROM FACE OF CMU OR FACE OF CONCRETE
3. ALL INSTALLATION SHALL BE IN STRICT ACCORDANCE WITH THE MANUFACTURER'S DATA AND THE ASSOCIATED ICC REPORT.
4. ALL PERSONNEL INSTALLING ANCHORS SHALL HAVE ATTENDED INSTALLER TRAINING PER THE SPECIFICATIONS
5. FIELD TESTING AND INSPECTION OF POST INSTALLED ANCHOR MATERIALS AND POST INSTALLED ANCHOR INSTALLATION SHALL BE COMPLETED BY AN INDEPENDENT TESTING AGENCY COMMISSIONED BY THE OWNER, AND SHALL BE IN ACCORDANCE WITH THE SCHEDULE OF SPECIAL INSPECTIONS.

FIELD WELDING

1. ALL FIELD WELDING SHALL CONFORM TO SPECIFICATION SECTION 051200-"STRUCTURAL STEEL FRAMING" FOR WELDING STRUCTURAL STEEL FRAMING
2. ALL FIELD WELDING SHALL CONFORM TO SPECIFICATION SECTION 052100-"STEEL JOIST FRAMING" FOR WELDING STEEL JOIST FRAMING
3. ALL FIELD WELDING SHALL CONFORM TO SPECIFICATION SECTION 053100-"STEEL DECKING" FOR WELDING STEEL DECKING
4. ALL FIELD WELDING SHALL CONFORM TO SPECIFICATION SECTION 054000-"COLD FORMED METAL FRAMING", 054100-"ENGINEERED COLD FORMED METAL FRAMING", AND 054400-"ENGINEERED COLD FORMED METAL TRUSSES" FOR WELDING COLD FORMED MEMBERS
5. ALL FIELD WELDING SHALL BE IN ACCORDANCE WITH AWS D1.1, "STRUCTURAL WELDING CODE-STEEL" AND AWS D1.3, "STRUCTURAL WELDING CODE-SHEET STEEL", LATEST EDITIONS.
6. ALL FIELD WELDING SHALL BE IN STRICT ACCORDANCE WITH WRITTEN WELD PROCEDURE (WPS) FOR THE GIVEN WELD CONDITION
7. REPAIR ALL DAMAGED GALVANIZING, PRIMER OR PAINT ONCE WELDING IS COMPLETE
8. ELECTRODES SHALL BE STORED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS.
9. ALL PERSONNEL COMPLETING FIELD WELDS SHALL BE CERTIFIED IN ACCORDANCE WITH AWS TO PERFORM THE GIVEN WELD.
10. FIELD TESTING AND INSPECTION OF FIELD WELDING MATERIALS AND FIELD WELDING SHALL BE COMPLETED BY AN INDEPENDENT TESTING AGENCY COMMISSIONED BY THE OWNER, AND SHALL BE IN ACCORDANCE WITH THE SCHEDULE OF SPECIAL INSPECTIONS.

PLYWOOD SHEATHING NOTES

1. SHEATH OUTSIDE FACE OF INDICATED WALLS W/ 1/2" STRUCTURAL GRADE 1 PLYWOOD. ATTACH PLYWOOD TO STUDS W/ 10D RING SHANKED NAILS @ 4" O.C. AROUND THE PERIMETER OF EACH PLYWOOD SHEET AND @ 6" O.C. ALONG THE INTERIOR OF EACH PLYWOOD SHEET. PROVIDE SOLID BLOCKING @ ALL PLYWOOD PANEL SEAMS.
2. FOR ALL ROOF AND WALL SHEATHING, SOLID BLOCKING SHALL INSTALLED BETWEEN STUDS AND RAFTERS, ALONG ALL PLYWOOD PANEL EDGES. AT SHEATHING ON WALLS, DO NOT SPLICE PLYWOOD AT FLOOR LEVELS. PLYWOOD SHEATHING SHALL LAP FROM SUPPORT BEAMS OVER THE FLOOR FRAMING AND ON TO THE WALLS, AND ALL SHEATHING SHALL BE NAILED TO SILL AND TOP PLATES @ 4" O.C.
3. TYPICAL FLOOR DECKING SHALL BE 23/32" STRUCTURAL GRADE 1 PLYWOOD. ATTACH W/ 10d RING SHANKED NAILS @ 4" O.C. AROUND THE PERIMETER OF EACH SHEET & 6" @ INTERIOR OF EACH PLYWOOD SHEET.
4. ALL PLYWOOD SHEATHING SHALL BE STRUCTURAL "TYPE 1" PANELS WITH EXPOSURE ONE RATING, AND 48/24 SPAN RATING.

WOOD FRAMING NOTES

1. STRUCTURAL TIMBERS SHALL BE SOUTHERN YELLOW PINE, PREMIUM JOIST.
2. STRUCTURAL LVL'S SHALL BE SOUTHERN PINE WITH MINIMUM PROPERTY VALUES:
   - F_b = 2800 PSI
   - F_v = 275 PSI
   - F_c = 500 PSI
   - E = 1,900,000 PSI
3. TIMBER CONNECTORS SHALL BE SIMPSON STRONG TIE CONNECTORS, AND THE CONNECTION REQUIREMENTS SHALL BE PER SIMPSON'S SPECIFICATIONS.
4. TIMBER DESIGNATED AS "TD" OR "TR" SHALL BE PRESSURE TREATED IN ACCORDANCE WITH AWPA. ALL TIMBER USED IN DECKS AND PORCHES AND OTHER EXPOSED AREAS SHALL BE PRESSURE TREATED. TIMBER TREATED BY INCISING IS NOT PERMITTED.
5. AT TOP PL'S, PLYWOOD TO LAP OVER HURRICANE CLIPS AND THEN ATTACHED TO TOP PL.
6. ALL STEEL SHAPES, PLATES & BOLTS SHALL BE GALVANIZED, G90 OR ZMAX FINISH MIN.
7. ALL MULTIPLE MEMBER 2x HEADERS/ BEAMS SHALL BE GLUED AND NAILED TOGETHER W/ 3-ROWS OF 10d NAILS @ 6" O.C. UNLESS NOTED OTHER WISE ON PLAN OR IN DETAILS AND SECTIONS.
8. ALL ROOF SHEATHING SHALL BE MINIMUM 5/8" STRUCTURAL RATED PLYWOOD SHEATHING. SHEATHING SHALL BE ATTACHED WITH 10D RING SHANKED NAILS @ 4" O.C. AROUND THE PERIMETER (MAX.), AND 6" O.C. @ THE INTERIOR (MAX.).
9. UNLESS NOTED OTHERWISE ON PLAN, ALL ENGINEERED WOOD BEAMS/ HEADERS SHALL BEAR ON A TRIPLE STUD COLUMN, 4x4 POST OR 6x6 POST. ALL ENGINEERED WOOD SHALL BE FASTENED TO TRIPLE STUD COLUMN, 4x4 POST OR 6x6 POST WITH 2-CS16 STRAPS, OR SIMPSON CCQ TYPE CONNECTOR AT EACH END, SEE TYP. DETAIL. ALL TRIPLE STUD AND POST BASES SHALL BE ATTACHED TO THE POST'S STRUCTURAL SUPPORT MEMBER W/ 2-H6'S AND 2-CS16 STRAPS AT EACH POST, OR A SIMPSON TYPE COLUMN BASE CONX.
10. UNLESS NOTED OTHERWISE ON PLAN, ALL BUILT-UP 2x HEADERS SHALL BEAR ON DOUBLE JACK STUDS, W/ A DOUBLE KING STUDON EACH SIDE OF OPENING. NAIL KING STUDS TO THE END OF EACH HEADER, W/ A MIN. 8-16D NAILS EACH HEADER, W/ A MIN. 8-16D NAILS
11. PROVIDE SOLID 2-2x BLOCKING BELOW ALL JAMB STUDS. BLOCK SHALL BE SOLID FROM UNDERSIDE OF JAMB STUDS TO STRUCTURAL SUPPORT BELOW
12. ALL FASTENERS AND CONNECTERS USED WITH TREATED WOOD SHALL BE STAINLESS STEEL UNLESS NOTED OTHERWISE.
13. ALL FLOOR JOISTS SHALL HAVE FULL DEPTH BLOCKING AT MIDSPAN AND AT 8'-0" O.C. MAX TOWARD BEARING ENDS.
14. ALL CLIPS AND HANGERS SHALL BE INSTALLED WITH MAX NAILS OF NUMBER AND SIZE AS INDICATED IN MANUFACTURER'S CATALOG UNLESS NOTED OTHERWISE.
15. ALL TIMBER FRAMING, ANCHORS, CLIPS, FASTENERS, SHEATHING TYPE, SHEATHING ATTACHMENT, HOLD DOWNS, ANCHOR RODS, ETC. SHALL BE INSPECTED BY THE OWNER'S INSPECTOR IN ACCORDANCE WITH THE SCHEDULE OF SPECIAL INSPECTIONS.
16. ALL ROUGH CARPENTRY SHALL CONFORM TO SPECIFICATION SECTION 061000-"ROUGH CARPENTRY".
17. THE BASIS OF DESIGN PRODUCT IS LISTED FOR ALL METAL FRAMING ANCHORS. CONTRACTOR MAY SUBMIT EQUIVALENT PROPRIETARY CONNECTORS FOR USE SUBJECT TO EOR APPROVAL. SEE SPECIFICATIONS FOR SUBSTITUTION SUBMITTAL REQUIREMENTS.
18. WOOD SCREWS SHALL BE INSTALLED USING A LEAD HOLE WITH DIAMETER EQUAL TO 70% OF THE SCREW ROOT DIAMETER. SCREWS SHALL BE INSERTED INTO THE HOLE WITH A TURNING ACTION AND NOT A DRIVING ACTION. THE MINIMUM EMBEDMENT INTO THE MAIN MEMBER FOR WOOD SCREWS SHALL BE SIX TIMES THE SCREW DIAMETER UNO.
19. LAG SCREWS SHALL SHALL BE INSTALLED USING A LEAD HOLE WITH DIAMETER EQUAL TO 75% OF THE LAG SCREW SHANK DIAMETER AND A CLEARANCE HOLE EQUAL TO 100% OF THE LAG SCREW SHANK DIAMETER. THE LEAD HOLE SHALL BE OF DEPTH EQUAL TO THE EMBEDMENT OF THE LAG SCREW, AND THE CLEARANCE HOLE SHALL BE OF DEPTH EQUAL TO THE LENGTH OF UNTHREADED SHANK. LAG SCREWS SHALL BE INSERTED INTO THE HOLE WITH A TURNING ACTION AND NOT A DRIVING ACTION. THE MINIMUM EMBEDMENT INTO THE MAIN MEMBER FOR LAG SCREWS SHALL BE FOURTIMES THE SCREW DIAMETER UNO.
20. STRUCTURAL STEEL PLATES USED FOR CONNECTING ROUGH CARPENTRY SHALL BE PREDRILLED WITH HOLES 1/16" GREATER THAN THE FASTENER DIAMETER FOR FASTENERS 3/8" OR GREATER IN DIAMETER, AND 1/32" GREATER THAN THE FASTENER DIAMETER FOR FOR FASTENERS LESS THAN 3/8" IN DIAMETER.
21. ALL BOLTS CONNECTING ROUGH CARPENTRY SHALL HAVE AN ASTM F844 WASHER BENEATH BOTH THE HEAD AND THE NUT.
22. FIELD TESTING AND INSPECTION OF ROUGH CARPENTRY FRAMING AND ASSOCIATED INSTALLATION SHALL BE COMPLETED BY AN INDEPENDENT TESTING AGENCY COMMISSIONED BY THE OWNER, AND SHALL BE IN ACCORDANCE WITH THE SCHEDULE OF SPECIAL INSPECTIONS.

STRUCTURAL DESIGN CRITERIA FOR OPEN METAL BUILDING

1. GRAVITY LOAD DESIGN VALUES: IBC-2021 / ASCE 7-16

   GROUND FLOOR LIVE LOADS:
   - STORAGE 125-PSF
   - RESTROOMS 100-PSF
   - OFFICES 50-PSF

   ROOF LIVE LOADS:
   - ROOF 20-PSF

   GROUND SNOW LOADS:
   - SNOW 5-PSF

   DEAD LOADS:
   ACTUAL MATERIAL WEIGHTS PER ASCE 7-16, SEE ARCHITECTURAL DRAWINGS FOR ROOF, WALL, AND FLOOR CONSTRUCTION

   SOIL BEARING PRESSURE, (ALLOWABLE): 2000-PSF

2. SEISMIC DESIGN VALUES: IBC-2021 / ASCE 7-16
   - S_s = 1.745g
   - S_1 = 0.509g
   - S_{ds} = 1.163g
   - S_{d1} = 0.607g
   - SITE CLASS: "F"
   - BUILDING RISK CATEGORY: "II"
   - IMPORTANCE FACTOR: I_e = 1.00
   - SEISMIC DESIGN CATEGORY: "D"
   - ANALYSIS PROCEDURE: EQUIVALENT LATERAL FORCE W/ DYNAMIC FORCES

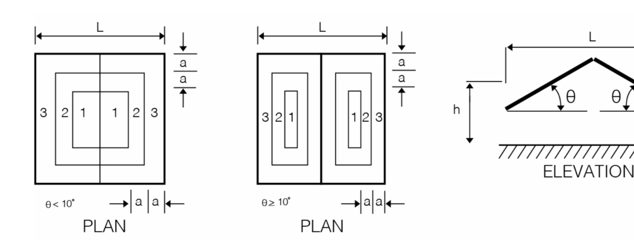
   SEISMIC FORCE RESISTING SYSTEM:

   -SPECIAL REINFORCED MASONRY SHEAR WALLS:
   - RESPONSE MODIFICATION FACTOR: R = 5.0
   - DEFLECTION AMPLIFICATION FACTOR: C_d = 3.5
   - SYSTEM OVERSTRENGTH FACTOR: Ω_o = 2.5
   - ALLOWABLE INTERSTORY DRIFT: 0.010Hsx
   - Hsx = HEIGHT

3. WIND LOAD DESIGN VALUES: IBC-2021 / ASCE 7-16
   - *V* = 144 mph (3-sec gust)
   - BUILDING RISK CATEGORY: "II"
   - EXPOSURE CATEGORY: "D"
   - ENCLOSURE CLASSIFICATION: ENCLOSED

   - WIND DIRECTIONALITY FACTOR: K_d = 0.85
   - TOPOGRAPHIC FACTOR: K_{zt} = 1.0
   - VELOCITY EXPOSURE COEFFICIENT: K_z = 1.03
   - VELOCITY PRESSURE: q_{ULT} = 46.48 PSF, q_{ASD} = 27.89 PSF

   - ALLOWABLE INTERSTORY DRIFT: 0.0025 Hsx
   - Hsx = HEIGHT
   - a = 3



Components and Cladding Wind Pressures (Unfactored/Ultimate): Open Pitched Roofs				
DESCRIPTION	AREA	ZONE	MAX P	MIN P
	SF		PSF	PSF
ROOF FIELD	<a^2	1	45.04	-45.83
ROOF FIELD	>a^2, <4.0a^2	1	45.04	-45.83
ROOF FIELD	>4.0a^2	1	45.04	-45.83
ROOF INTERMDIATE	<a^2	2	68.74	-69.53
ROOF INTERMDIATE	>a^2, <4.0a^2	2	68.74	-69.53
ROOF INTERMDIATE	>4.0a^2	2	45.04	-45.83
ROOF OUTER EDGE	<a^2	3	89.68	-137.88
ROOF OUTER EDGE	>a^2, <4.0a^2	3	68.74	-69.53
ROOF OUTER EDGE	>4.0a^2	3	45.04	-45.83

STRUCTURAL DESIGN CRITERIA FOR RESTROOM

1. GRAVITY LOAD DESIGN VALUES: IBC-2021 / ASCE 7-16

   GROUND FLOOR LIVE LOADS:
   - STORAGE 125-PSF
   - RESTROOMS 100-PSF
   - OFFICES 50-PSF

   ROOF LIVE LOADS:
   - ROOF 20-PSF

   GROUND SNOW LOADS:
   - SNOW 5-PSF

   DEAD LOADS:
   ACTUAL MATERIAL WEIGHTS PER ASCE 7-16, SEE ARCHITECTURAL DRAWINGS FOR ROOF, WALL, AND FLOOR CONSTRUCTION

   SOIL BEARING PRESSURE, (ALLOWABLE): 2000-PSF (ASSUMED)

2. SEISMIC DESIGN VALUES: IBC-2021 / ASCE 7-16
   - S_s = 1.745g
   - S_1 = 0.509g
   - S_{ds} = 1.163g
   - S_{d1} = 0.607g
   - SITE CLASS: "F"
   - BUILDING RISK CATEGORY: "II"
   - IMPORTANCE FACTOR: I_e = 1.00
   - SEISMIC DESIGN CATEGORY: "D"
   - ANALYSIS PROCEDURE: EQUIVALENT LATERAL FORCE W/ DYNAMIC FORCES

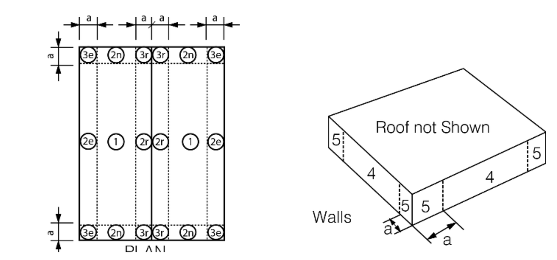
   SEISMIC FORCE RESISTING SYSTEM:

   -SPECIAL REINFORCED MASONRY SHEAR WALLS:
   - RESPONSE MODIFICATION FACTOR: R = 5.0
   - DEFLECTION AMPLIFICATION FACTOR: C_d = 3.5
   - SYSTEM OVERSTRENGTH FACTOR: Ω_o = 2.5
   - ALLOWABLE INTERSTORY DRIFT: 0.010Hsx
   - Hsx = HEIGHT

3. WIND LOAD DESIGN VALUES: IBC-2021 / ASCE 7-16
   - *V* = 144 mph (3-sec gust)
   - BUILDING RISK CATEGORY: "II"
   - EXPOSURE CATEGORY: "D"
   - ENCLOSURE CLASSIFICATION: ENCLOSED

   - WIND DIRECTIONALITY FACTOR: K_d = 0.85
   - TOPOGRAPHIC FACTOR: K_{zt} = 1.0
   - VELOCITY EXPOSURE COEFFICIENT: K_z = 1.03
   - VELOCITY PRESSURE: q_{ULT} = 46.48 PSF, q_{ASD} = 27.89 PSF

   - ALLOWABLE INTERSTORY DRIFT: 0.0025 Hsx
   - Hsx = HEIGHT
   - a = 3



Components and Cladding Wind Pressures (Unfactored/Ultimate): Enclosed Gable Roof (Includes Internal Pressures)				
DESCRIPTION	AREA	ZONE	MAX P	MIN P
	SF		PSF	PSF
ROOF FIELD	10	1	33.26	-101.34
ROOF FIELD	20	1	29.96	-101.34
ROOF FIELD	50	1	26	-61.64
ROOF FIELD	100	1	22	-31.61
ROOF EDGE	10	2	33.26	-147.82
ROOF EDGE	20	2	29.96	-127.8
ROOF EDGE	50	2	25.61	-101.34
ROOF EDGE	100	2	22.31	-81.32
ROOF EDGE OH	10	2H	16	-162.7
ROOF EDGE OH	20	2H	16	-147.68
ROOF EDGE OH	50	2H	16	-127.84
ROOF EDGE OH	100	2H	16	-112.82
ROOF CORNER	10	3	33.26	-175.72
ROOF CORNER	20	3	29.96	-150.53
ROOF CORNER	50	3	25.61	-117.23
ROOF CORNER	100	3	22.31	-92.04
ROOF CORNER OH	10	3H	16	-218.48
ROOF CORNER OH	20	3H	16	-184.9
ROOF CORNER OH	50	3H	16	-140.5
ROOF CORNER OH	100	3H	16	-106.92
WALL FIELD	10	4	54.85	-59.5
WALL FIELD	20	4	52.38	-57.03
WALL FIELD	50	4	49.12	-53.76
WALL FIELD	100	4	46.64	-51.29
WALL EDGE	10	5	54.85	-73.45
WALL EDGE	20	5	52.38	-68.51
WALL EDGE	50	5	49.12	-61.97
WALL EDGE	100	5	46.64	-57.03

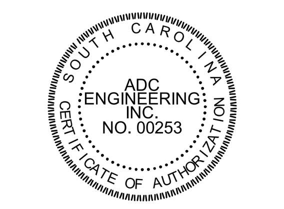
CONTRACTOR NOTES:

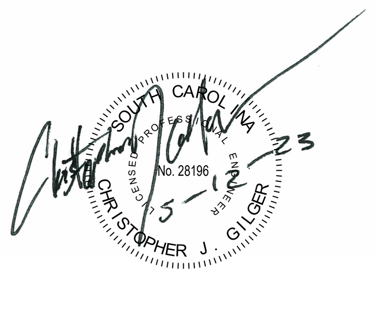
- G.C. TO VERIFY EXISTING CONDITIONS MATCH CONDITIONS SHOWN HERE IN.
- THE G.C. IS RESPONSIBLE FOR ALL TEMP. SHORING & BRACING.
- AT LOCATIONS WHERE NEW CONCRETE IS IN CONTACT WITH EXISTING CONCRETE, ROUGHEN EXISTING CONCRETE TO 1/4" AMPLITUDE AND PROVIDE A CHEMICAL BONDING AGENT.
- ALL NEW COLD ROLLED MATERIAL SHALL HAVE A G90 FINISH MINIMUM UNLESS NOTED OTHERWISE SPECIFICALLY. FINISH SHALL BE COMPATIBLE WITH THE FINAL TOP COAT.
- ALL NEW BOLTS & EPOXY BOLTS SHALL BE STAINLESS STEEL.
- ALL NEW FASTENERS, (SCREWS, NAILS, Etc.) SHALL BE STAINLESS STEEL.
- ALL EXISTING METAL BUILDING FRAMES AND GIRTS SHALL BE CLEANED/ SAND BLASTED OF ALL SURFACE RUST AND PREPPED FOR A NEW COATING. GC TO COORDINATE WITH ARCH'L DRAWINGS AND SPEC'S FOR RUST INHIBITOR AND COATING REQUIREMENTS. ALL INHIBITOR/ COATING SHALL BE COMPATIBLE.
- ALL NEW STEEL SHALL BE HOT DIP GALVANIZED, NON-QUENCHED. PROVIDE FINAL TOP COAT TO MATCH FINISH FOR EXISTING STEEL FRAMES.
- ALL ROOF PANELS AND PURLINS ARE TO BE REMOVED AND REPLACED. COORDINATE WITH ARCH'L DRAWINGS AND SPEC'S FOR COATING REQUIREMENTS

City of Hanahan

STEWARD STREET PARK RENOVATIONS

HANAHAN SOUTH CAROLINA





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HANAHAN, SC 29410
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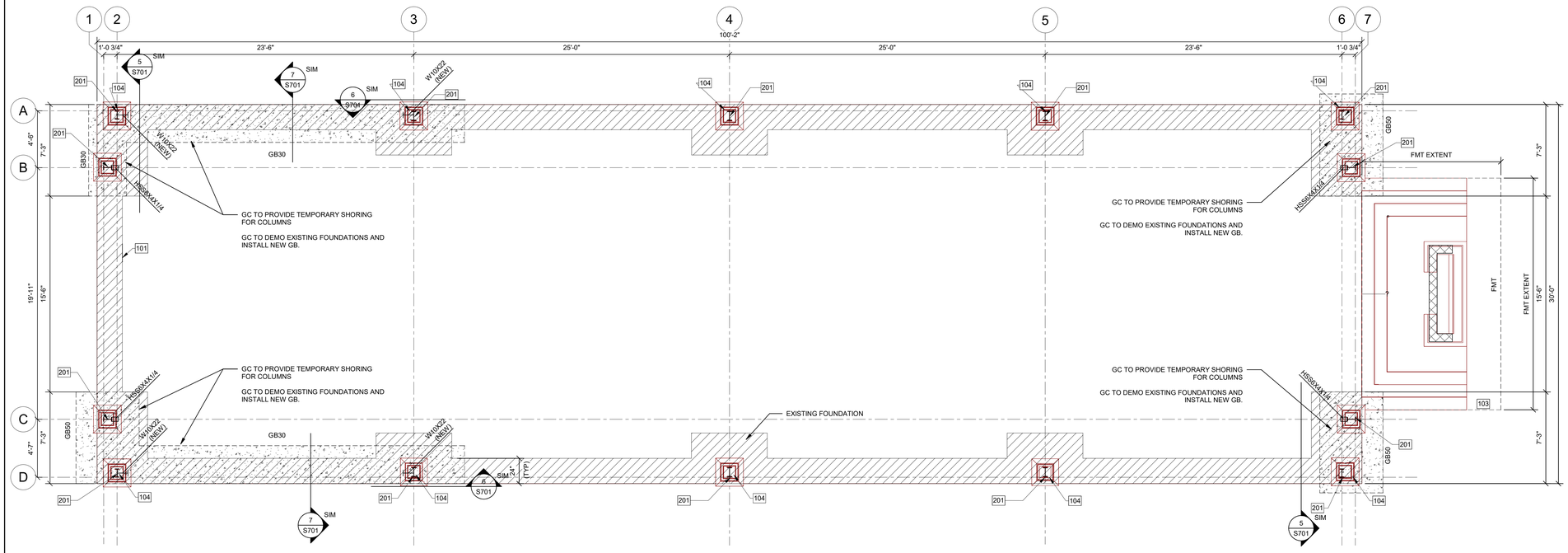
ADCENGINEERING.COM

DATE:	05.12.2023
ADC PROJECT #:	20381
DESIGNED:	CG
CHECKED:	CG
DRAWN:	EH/SB
REVISION:	

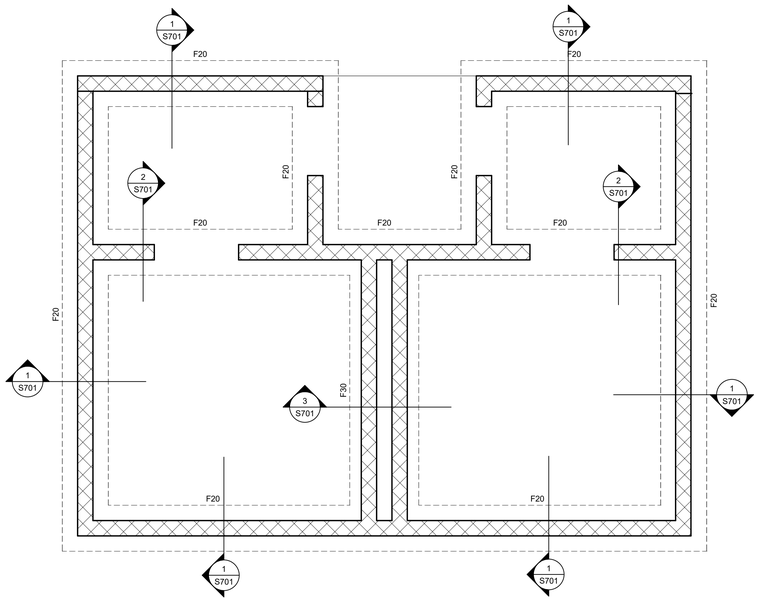
GENERAL NOTES & DESIGN CRITERIA

S100

100% CONSTRUCTION DOCUMENTS



1 FOUNDATION-PAVILLION PLAN
1/4" = 1'-0"



2 FOUNDATION-RESTROOM PLAN
3/8" = 1'-0"

GENERAL NOTES (THIS SHEET ONLY)

- TOP OF FOOTING = (-)1'-4" UNO
- SEE PLANS FOR FOUNDATION SCHEDULES
- CENTER ALL SPREAD FOOTINGS BENEATH COLUMNS/PIERS/PILASTERS
- STRIP FOOTING REINFORCING SHALL BE CONTINUOUS THROUGH SPREAD FOOTINGS
- PROVIDE CORNER BARS AT ALL STRIP FOOTING CHANGES IN DIRECTION
- EXTEND STRIP FOOTINGS A MINIMUM OF 8" PAST END OF WALL AT FOOTING TERMINATIONS
- SEE TYPICAL DETAILS FOR CONTINUOUS FOOTING CONSTRUCTION JOINT DETAIL
- SEE TYPICAL DETAILS FOR PIPING/CONDUIT BELOW FOOTINGS
- SEE TYPICAL DETAILS FOR EXCAVATION LIMITS ADJACENT TO FOOTINGS
- SEE ARCHITECTURAL DRAWINGS FOR LAYOUT DIMENSIONS OF NON-LOAD BEARING INTERIOR PARTITIONS
- FD = FLOOR DRAIN

DRAWING LEGEND

= NEW CONCRETE

= EXISTING FTG/CONCRETE

NOTE

- AFTER CLEANING, IDENTIFY ANY SEVERLY PITTED OR DELAMINATED STEEL MATERIAL. THIS MATERIAL SHALL BE REMOVED & REPLACED. SEE TYPICAL DETAILS.

KEYED NOTES (THIS SHEET ONLY)

101	DEMO EXISTING TOPPING SLABS.
103	FMT = 12" THICK; 2-MATS OF W/#5'S @ 9" O.C. EW.
104	SEE TYPICAL DETAIL FOR ANCHOR BOLT RETROFIT.
201	EXISTING PEMB COLUMN

CONTINUOUS FOOTING SCHEDULE

FOOTING TYPE	WIDTH	THICKNESS	LONGITUDINAL REINFORCING	TRANSVERSE REINFORCING
F20	2'-0"	1'-0"	(3)-#5'S	N/A
F30	3'-0"	1'-0"	(4)-#5'S	N/A

SPREAD FOOTING SCHEDULE

FOOTING TYPE	LENGTH	WIDTH	THICKNESS	BOTTOM REINFORCING	TOP REINFORCING
FMT	18'-4"	11'-0"	12"	#5'S @ 9" O.C. EW	N/A

GRADE BEAM/TIE BEAM SCHEDULE

TYPE	WIDTH	THICKNESS	TOP REINFORCING	BOTTOM REINFORCING	STIRRUPS
GB30	3'-0"	18"	(5)-#6'S	(5)-#6'S	#4'S @ 9" O.C.
GB50	5'-0"	18"	(8)-#6'S	(8)-#6'S	#4'S @ 9" O.C.

City of Hanahan

STEWARD STREET PARK RENOVATIONS

HANAHAN SOUTH CAROLINA

SOUTH CAROLINA ADC ENGINEERING INC. NO. 00253 CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER NO. 28196 CHRISTOPHER J. GILLER

CITY OF HANAHAN SOUTH CAROLINA

ADC ENGINEERING
1226 YEAMANS HALL ROAD
HANAHAN, SC 29410
843-566-0161
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FOUNDATION PLANS

S101

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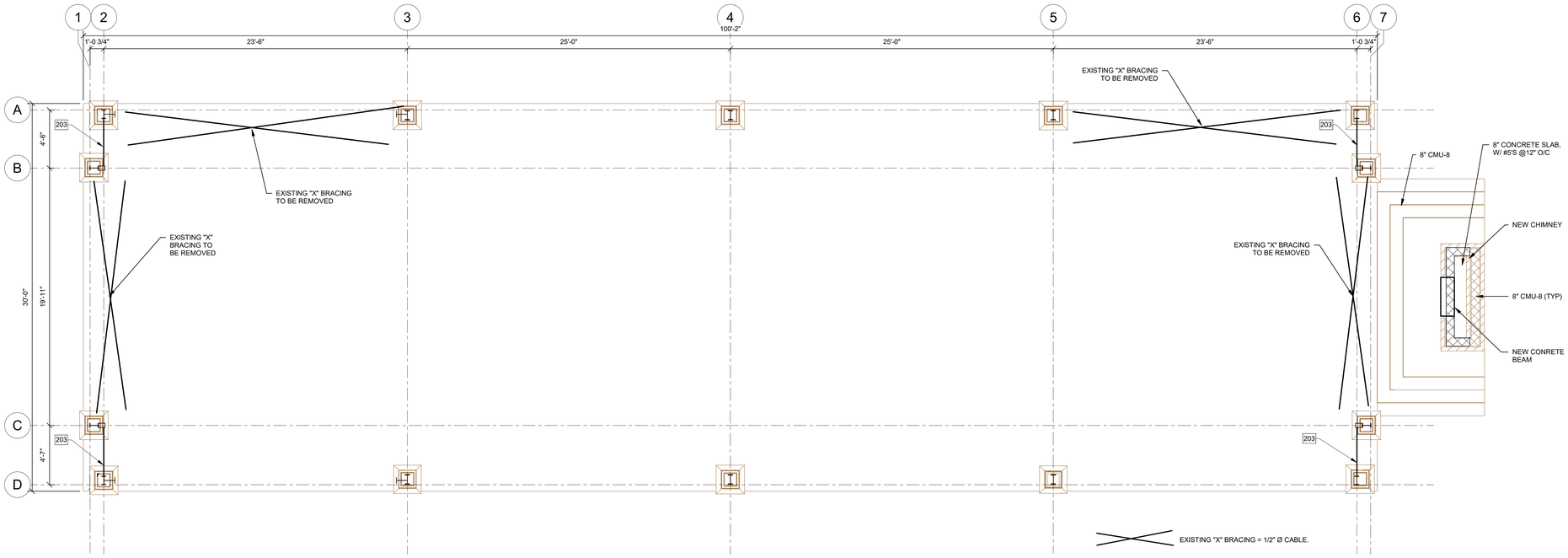


1 SLAB/WALL- PAVILLION PLAN
1/4" = 1'-0"

CMU LINTEL SCHEDULE

MARK	# OF COURSES	REINFORCEMENT (PER COURSE)	ALLOWABLE SPAN (NOTE #5)
L1	(1)	(2)-#5'S	< 2'-0"
L2	(2)	(2)-#5'S	< 5'-0"

NOTES:
1. SEE 5/S-210 FOR TYPICAL CMU LINTEL CONSTRUCTION.
2. SEE2/S-210 FOR TYPICAL CMU OPENING CONSTRUCTION.
3. WHERE LINTEL IS NOTED AS "CONT." IT IS CONTINUOUS ACROSS ADJACENT OPENINGS.
4. WHERE LINTEL IS NOTED AS "ABOVE" IT REFERS TO A SECOND LINTEL ABOVE A HIGHER OPENING.
5. ALLOWABLE SPANS ARE FOR MISCELLANEOUS OPENINGS NOT SPECIFICALLY INDICATED ON PLAN. TYPE "L1" LINTELS SHALL BE LOCATED A MINIMUM OF (3)-COURSES BELOW FLOOR ELEVATION OR ROOF JOIST BEARING ELEVATION. TYPE "L2" LINTELS SHALL BE LOCATED A MINIMUM OF 3'-4" BELOW FLOOR ELEVATION OR ROOF JOIST BEARING ELEVATION.
6. DO NOT LOCATE LINTEL WITHIN 8" FROM END OF BEAM BEARING PLATE OR 1'-4" EACH SIDE OF CENTERLINE OF BEAM BEARING ABOVE UNLESS SPECIFICALLY NOTED OTHERWISE.
7. PROVIDE MIN. 1'-4" CLEAR BETWEEN ADJACENT OPENINGS UNO.

CMU WALL SCHEDULE

MARK	THICKNESS (NOMINAL)	VERTICAL REINFORCEMENT	BOND BEAM REINFORCING	TOP/ BOND BEAM ELEVATIONS
8-CMU-8	8"	#5'S @ 8" O.C.	(2)-#4'S	SEE NOTE
8-CMU-32	8"	#5'S @ 32" O.C.	(2)-#4'S	SEE NOTE

CMU WALL SCHEDULE GENERAL NOTES:
- SEE PLAN AND TYPICAL DETAILS FOR ADDITIONAL REINFORCING AND SPECIFIC LOCATIONS
- ALL VERTICAL REINFORCING SHALL BE LOCATED AND ANCHORED USING PREFABRICATED BAR POSITIONERS
- SEE SHEET S-600'S FOR TYPICAL BOND BEAM REINFORCING ARRANGEMENT AT INTERSECTIONS, MASONRY CONTROL JOINTS, CORNERS, AND TERMINATIONS
- SEE SHEET S-600'S FOR TYPICAL VERTICAL REINFORCING AT WALL TERMINATIONS, INTERSECTIONS, AND CORNERS.
- T/BB ELEVATIONS 0'-8", 4'-8", 8'-8", 9'-4", 10'-0"

GENERAL NOTES (THIS SHEET ONLY)

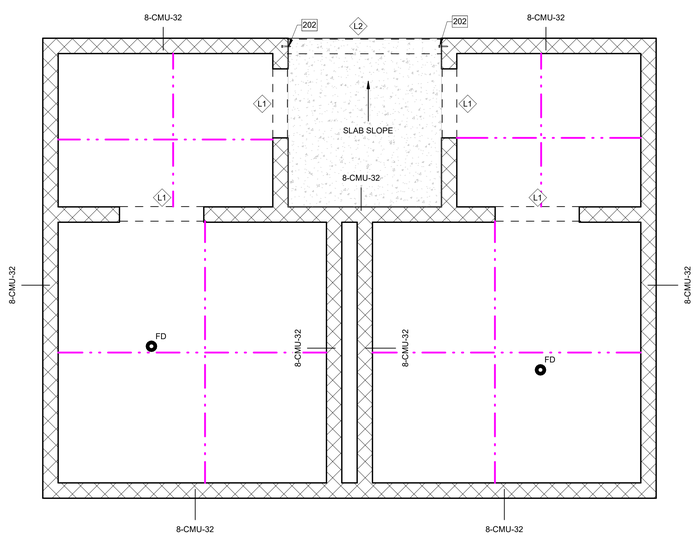
- TYPICAL SLAB ON GRADE CONSTRUCTION IS 4" SLAB W/ ONE LAYER OF 6x6~W2.9xW2.9 WWR ON VAPOR RETARDER ON 4" CAPILLARY BARRIER ON COMPACTED SUBGRADE. SEE SPECS FOR FINISH REQUIREMENTS. TOP OF SLAB = 0'-0" UNO
- INDICATES SLAB ON GRADE CONTROL/CONSTRUCTION JOINT, SEE TYPICAL DETAILS
- R=X" — DENOTES SLAB RECESS OF "X" INCHES, COORDINATE EXTENT OF RECESSS WITH ARCHITECTURAL DRAWINGS.
- FD = FLOOR DRAIN

KEYED NOTES (THIS SHEET ONLY)

202	SIMPSON HUS FACE MOUNTED HANGER FASTEN TO MASONRY PER SIMPSON REQUIREMENTS.
203	NEW HSS 6x4x3/8 SINGLE ANGLE BRACED FRAME.

GENERAL NOTES (THIS SHEET ONLY)

- TOM = TOP OF WALL ELEVATION
- ALL 6" CMU WALLS SHALL BEAR ON SLAB ON GRADE PER TYPICAL DETAIL UNO
- ALL 6" CMU WALLS SHALL BE BRACED TO BACKUP WALL PER TYPICAL DETAIL UNO
- BOL = ELEVATION AT BOTTOM OF CMU LINTEL
- BOS = ELEVATION AT BOTTOM OF STEEL LINTEL
- TOS = ELEVATION AT TOP OF STEEL LINTEL
- SEE ARCHITECTURAL DRAWINGS FOR MASONRY VENEER CONTROL JOINTS
- W8X — INDICATES CMU WALL TYPE "X" (NUMBER INDICATES NOMINAL THICKNESS), SEE PLANS FOR CMU WALL SCHEDULE
- L? — INDICATES CMU LINTEL TYPE "?", SEE PLANS
- MJ — INDICATES LOCATION OF MASONRY CONTROL JOINT (CONTINUOUS TO TOP OF WALL), SEE TYPICAL DETAIL
- (X) — INDICATES CMU PIER FOR SUPPORT OF BEAM BEARING ABOVE. CENTER PIERS BELOW BEAM CENTERLINES OR AS CLOSE AS POSSIBLE AT WALL CORNERS/TERMINATIONS/OPENINGS. "(X)" INDICATES NUMBER OF CELLS TO BE GROUTED AND REINFORCED W/ (1)-BAR EACH CELL UNO OF SIZE MATCHING TYPICAL TYPICAL WALL REINFORCING BEYOND. WHERE SPECIFICALLY INDICATED ON PLANS, THIS SHALL GOVERN OVER ALL OTHER TYPICAL DETAILS.



2 SLAB/WALL- RESTROOM PLAN
3/8" = 1'-0"

City of Hanahan

STEWARD STREET PARK RENOVATIONS

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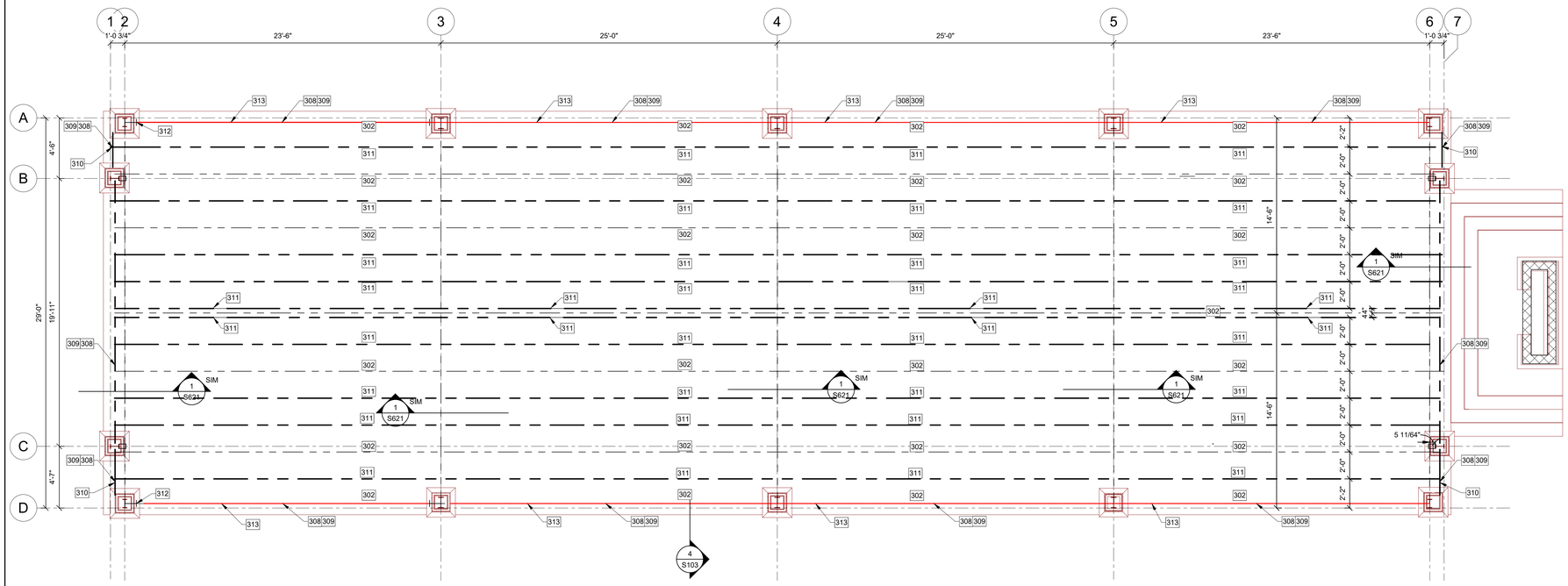
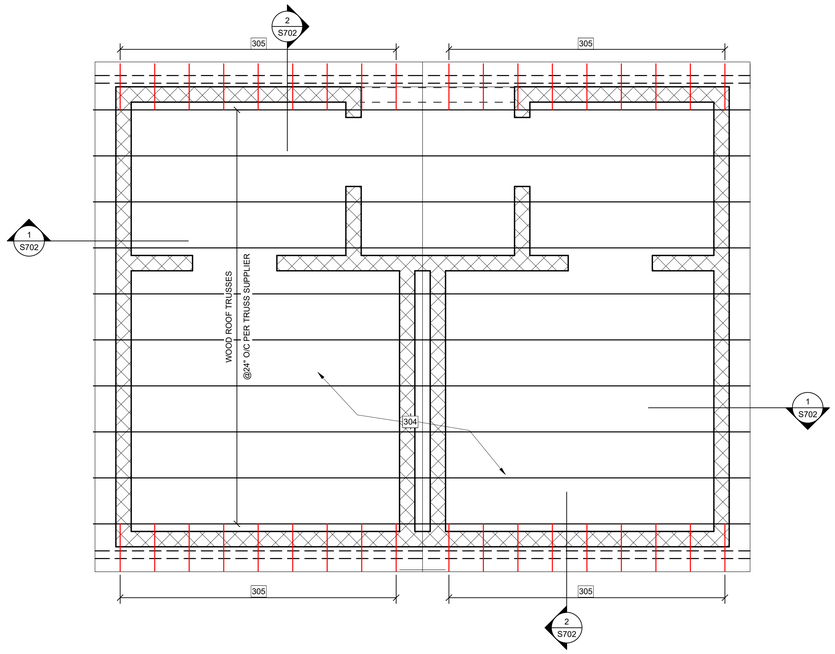
SLAB PLANS

S102

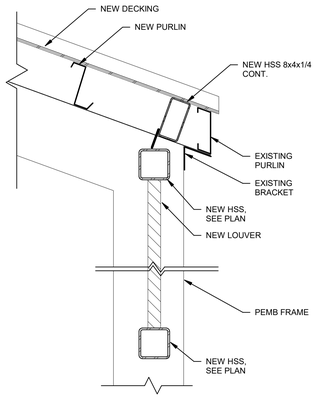
100% CONSTRUCTION DOCUMENTS



1 ROOF-PAVILLION PLAN
1/4" = 1'-0"



2 ROOF-RESTROOM PLAN
3/8" = 1'-0"



4 SECTION
1" = 1'-0"

GENERAL NOTE:

- THE EXISTING METAL BUILDING FRAMES AND PURLINS SHALL BE CLEANED/ SAND BLASTED AND PREPED FOR A NEW HIGH PERFORMANCE COATING. GC TO COORDINATE WITH ARCH'L DRAWINGS AND SPEC'S FOR COATING REQUIREMENTS.
- ALL STANDING SEAM ROOF PANELS ARE TO BE REMOVED AND REPLACED. COORDINATE WITH ARCH'L DRAWINGS AND SPEC'S FOR COATING REQUIREMENTS
- NEW PULINS SHALL BE 8"x2 1/2" 12GA Z PULINES W/ A 2 SPAN CONDITON.

KEYED NOTES (THIS SHEET ONLY)

302	EXISTING ROOF PURLIN.
304	5/8" PLYWOOD DECKING, SEE SHEATHING NOTES.
305	2x4 OUTRIGGING @ 24" O.C.
308	NEW 2- HSS 6x6x3/8 FOR LOUVER SUPPORT/BRACING.
309	NEW LOUVER / SCREENING. SEE ARCH'LS.
310	NEW BRACED FRAME.
311	NEW PURLINS TO SUPPORT NEW FAN. 8"x2 1/2" 12GA Z PULINS W/ A 2 SPAN CONDITION.
312	NEW PORTAL FRAME. W10x22 COLUMNS & BEAMS.
313	NEW HSS 8x4x1/4", CONT.

City of Hanahan

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ROOF FRAMING PLAN

S103

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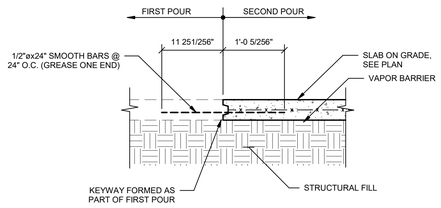
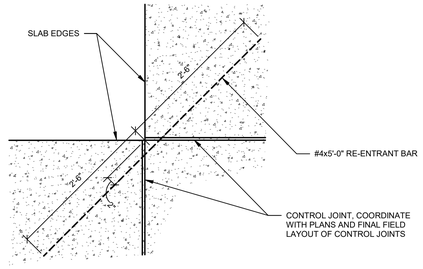
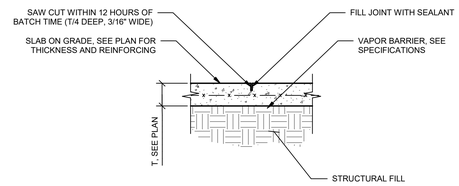


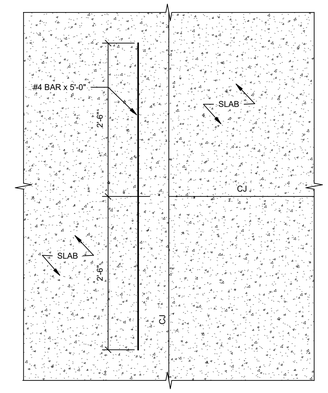
1 SLAB - TYP. SLAB-ON-GRADE CONSTRUCTION JOINT
1" = 1'-0"



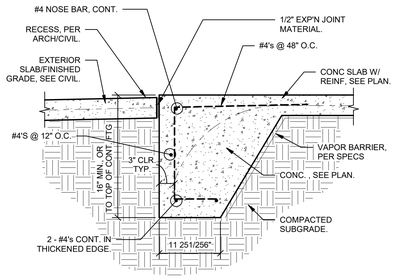
2 SLAB - TYP. SLAB RE-ENTRANT CORNER
1" = 1'-0"



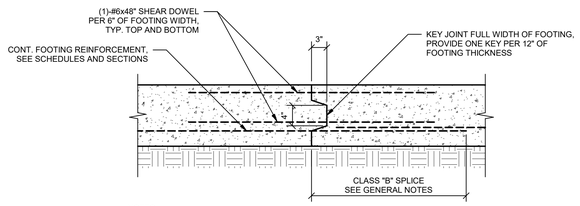
3 SLAB - TYP. SLAB-ON-GRADE CONTROL JOINT (CJ)
1" = 1'-0"



4 SLAB - TYP. CJ DYING INTO CJ
1" = 1'-0"



5 SLAB - TYP. EDGE OF SLAB DETAIL FOR EXTERIOR SLAB EDGES
1" = 1'-0"



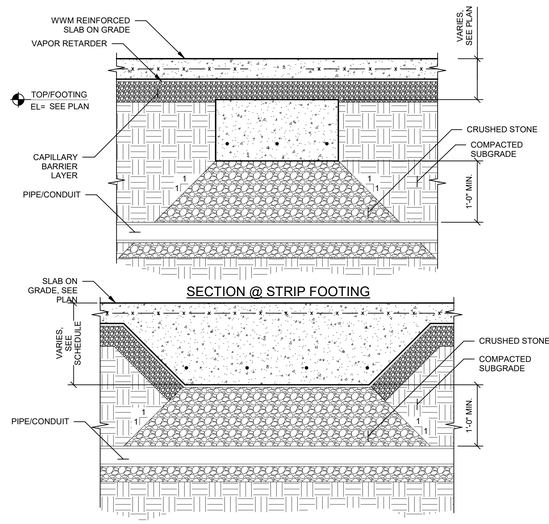
NOTES:
1. DO NOT LOCATE CONSTRUCTION JOINTS IN COLUMN FOOTINGS OR ENLARGED SECTIONS OF CONTINUOUS STRIP FOOTINGS.
2. EXTEND REINFORCING FROM FIRST POUR THRU BULKHEAD ADEQUATE DISTANCE TO ENSURE A CLASS "B" SPLICE WITH REINFORCING FOR SECOND POUR.

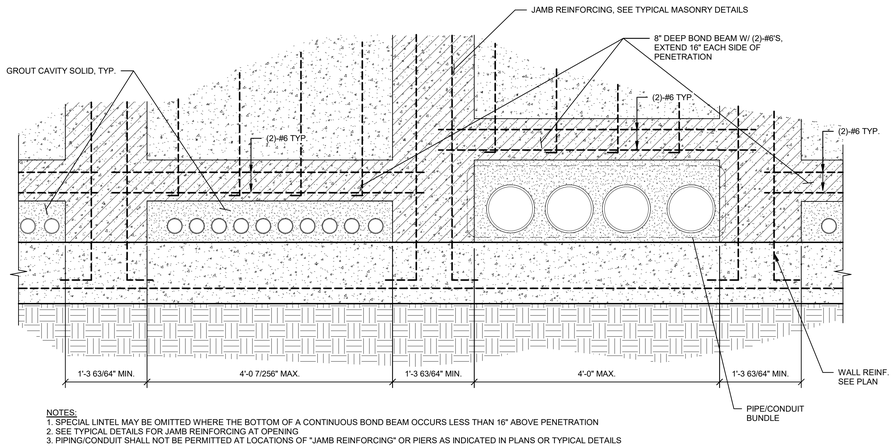
6 FND - TYP. FOOTING CONSTRUCTION JOINT
1" = 1'-0"

LAP SPLICE LENGTHS
(FOUNDATIONS AND SLABS)

BAR SIZE	3000 PSI	4000 PSI	5000 PSI	6000 PSI
#3	2'-4"	2'-1"	1'-10"	1'-8"
#4	3'-2"	2'-9"	2'-5"	2'-3"
#5	3'-11"	3'-5"	3'-0"	2'-9"
#6	4'-8"	4'-1"	3'-8"	3'-4"
#7	6'-9"	5'-11"	5'-3"	4'-10"
#8	7'-9"	6'-11"	6'-0"	5'-6"
#9	8'-10"	7'-7"	6'-9"	6'-2"
#10	9'-8"	8'-6"	7'-8"	7'-0"
#11	10'-11"	9'-6"	8'-6"	7'-9"
#14	13'-1"	11'-4"	10'-2"	9'-3"

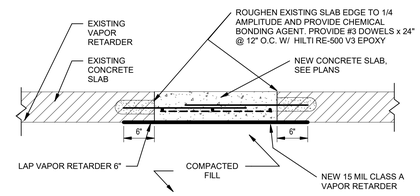
7 TYP. CONCRETE LAP SPLICE SCHEDULE
1" = 1'-0"



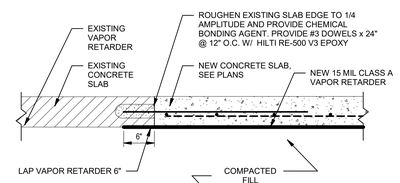


NOTES:
1. SPECIAL LINTEL MAY BE OMITTED WHERE THE BOTTOM OF A CONTINUOUS BOND BEAM OCCURS LESS THAN 16" ABOVE PENETRATION
2. SEE TYPICAL DETAILS FOR JAMB REINFORCING AT OPENING.
3. PIPING/CONDUIT SHALL NOT BE PERMITTED AT LOCATIONS OF "JAMB REINFORCING" OR PIERS AS INDICATED IN PLANS OR TYPICAL DETAILS

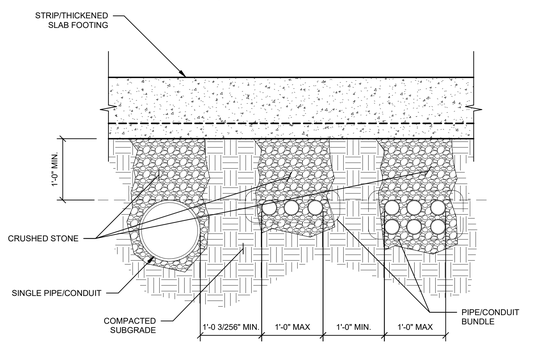
8 FND - TYP. PIPE/CONDUIT GROUP PENETRATION @ THROUGH FND WALL
1" = 1'-0"



9 TYPICAL SLAB TRENCH DETAIL
1" = 1'-0"



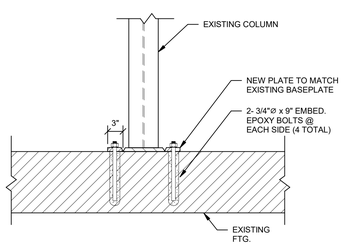
10 TYPICAL NEW SLAB TO EXISTING SLAB CONNECTION DETAIL
1" = 1'-0"



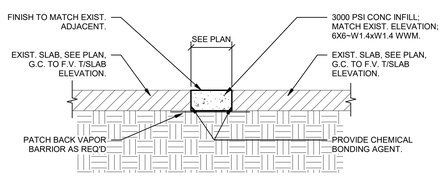
ELEVATION

NOTES:
1. TOP OF FOOTING VARIES. COORDINATE WITH PLANS
2. DETAIL IS TYPICAL WHERE PIPE OR CONDUIT IS LESS THAN 2'-0" BELOW BOTTOM OF FOOTING
3. PIPING OR CONDUIT SHALL NOT BE INSTALLED WITH THE TOP OF PIPE LESS THAN 12" BELOW BOTTOM OF FOOTING
4. PIPING OR CONDUIT SHALL NOT BE PERMITTED BELOW SPREAD FOOTINGS

12 FND - TYP. PIPE/CONDUIT BELOW STRIP/THICKENED SLAB FOOTING
1" = 1'-0"



13 TYPICAL ANCHOR BOLT RETROFIT DETAIL
1" = 1'-0"



TYPICAL FLOOR DRAIN SLAB INFILL DETAIL

11 SLAB - TYP. SLAB PATCH DETAIL
1" = 1'-0"

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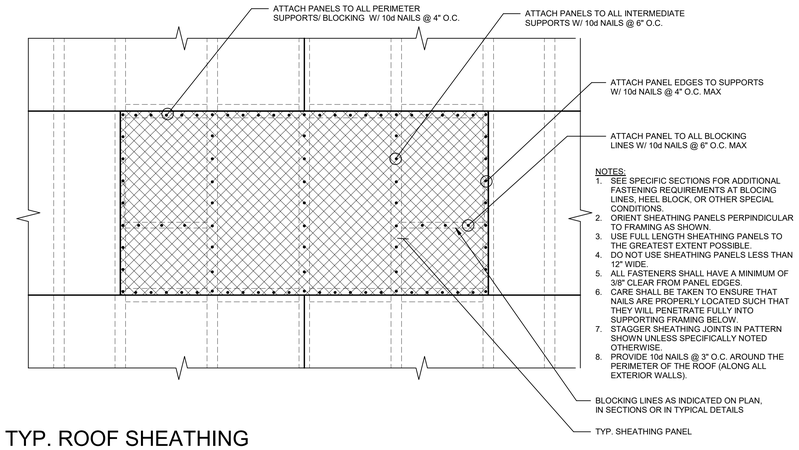
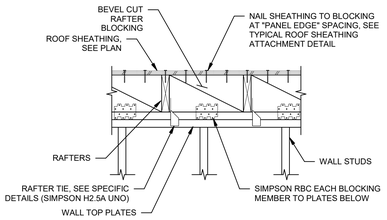
TYPICAL FOUNDATION AND SLAB DETAILS

S601



NOTES:
1. SEE SPECIFIC SECTIONS FOR ADDITIONAL FASTENING REQUIREMENTS AT BLOCING LINES, HEEL BLOCK, OR OTHER SPECIAL CONDITIONS.
2. ORIENT SHEATHING PANELS PERPINDICULAR TO FRAMING AS SHOWN.
3. USE FULL LENGTH SHEATHING PANELS TO THE GREATEST EXTENT POSSIBLE.
4. DO NOT USE SHEATHING PANELS LESS THAN 12" WIDE.
5. ALL FASTENERS SHALL HAVE A MINIMUM OF 3/8" CLEAR FROM PANEL EDGES.
6. CARE SHALL BE TAKEN TO ENSURE THAT NAILS ARE PROPERLY LOCATED SUCH THAT THEY WILL PENETRATE FULLY INTO SUPPORTING FRAMING BELOW.
7. STAGGER SHEATHING JOINTS IN PATTERN SHOWN UNLESS SPECIFICALLY NOTED OTHERWISE.
8. PROVIDE 10d NAILS @ 3" O.C. AROUND THE PERIMETER OF THE ROOF (ALONG ALL EXTERIOR WALLS).

8 TYP. ROOF SHEATHING ATTACHMENT
3/4" = 1'-0"



2 TYP. RAFTER BLOCKING @ BEARING
1" = 1'-0"

SIMPSON HANGER SCHEDULE (U.N.O.)

MEMBER SIZE	SIMPSON HANGER/ CONNECTOR FOR 2x'S OR MULTI MEMBER 2x'S			
	FACE MOUNTED	TOP FLANGE	SLOPE/ SCREWED HANGER	NOTES
2x4	LUS24	HU24TF		1., 2.
2-2x4'S	LUS24-2	HU24-2TF		1., 2.
3-2x4'S				1., 2.
2x6	LUS26	LB26	LSU26	1., 2.
2-2x6'S	LUS26-2	HUS26-2TF		1., 2.
3-2x6'S	HU26-3 (MAX)			1., 2.
2x8	LUS28	LB28	LSSU28	1., 2.
2-2x8'S	HU28-2 (MAX)	HUS28-2TF		1., 2.
3-2x8'S	LUS28-3			1., 2.
2x10	LUS210	LB210	LSSU210	1., 2.
2-2x10'S	HU210-2 (MAX)	HUS210-2TF	LSSU210-2	1., 2.
3-2x10'S	HU210-3 (MAX)	HUS210-3TF		1., 2.
2x12	LUS210	LB212	LSSU210	1., 2.
2-2x12'S	HU212-2 (MAX)	HUS212-2TF	LSSU210-2	1., 2.
3-2x12'S	HU212-3 (MAX)	HUS212-3TF		1., 2.

1. SIMPSON HANGER SCHEDULE SHALL ONLY BE USED, WHERE A SPECIFIC HANGER CONNECTION IS NOT CALLED OUT IN THE PLANS OR DETAILS.
2. CONCEALED FLANGE HANGERS MAY BE USED WHERE NEEDED, TO ALLOW FOR EASIER INSTALLATION, G.C. TO COORDINATE
3. SEE DETAILS FOR SPECIFIC CONNECTIONS G.C. TO COORDINATE

SIMPSON HANGER SCHEDULE (U.N.O.)

MEMBER SIZE	SIMPSON HANGER/ CONNECTOR FOR 16" DEEP PARALLAM BEAMS			
	FACE MOUNTED	TOP FLANGE	SLOPE/ SCREWED HANGER	NOTES
1 3/4"x16" PARA.	U14	B16	LSSUI25	1., 2.
3 1/2"x16" PARA.	HGUS414	HGLTV3.516	LSSU410	1., 2.
5 1/4"x16" PARA.	HGUS5.5/14	HGLTV5.516	LSU5.12 (COPE END OF BEAM)	1., 2.
7"x16" PARA.	HGUS7.25/14	HGLTV416-2		1., 2.
3 1/2"x9 1/4" PARA.	HGUS410	HGLTV3.56/9.25	LSSU410	1., 2.
3 1/2"x11 1/4" PARA.	HGUS412	HGLTV3.56/11.25	LSSU410	1., 2.
3 1/2"x11 7/8" PARA.	HGUS412	HGLTV3.511	LSSU410	1., 2.
5 1/4"x11 1/4" PARA.	HGUS5.5/12	GLTV5.50/11.25		1., 2.
5 1/4"x11 7/8" PARA.	HGUS5.5/12	HGLTV5.511		1., 2.

1. SIMPSON HANGER SCHEDULE SHALL ONLY BE USED, WHERE A SPECIFIC HANGER CONNECTION IS NOT CALLED OUT IN THE PLANS OR DETAILS.
2. CONCEALED FLANGE HANGERS MAY BE USED WHERE NEEDED, TO ALLOW FOR EASIER INSTALLATION, G.C. TO COORDINATE
3. SEE DETAILS FOR SPECIFIC CONNECTIONS G.C. TO COORDINATE

City of Hanahan

STEWARD STREET PARK RENOVATIONS

HANAHAN SOUTH CAROLINA

SOUTH CAROLINA ADC ENGINEERING INC. NO. 00253 CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA PROFESSIONAL ENGINEER NO. 28196 CHRISTOPHER J. GILLER

CITY OF HANAHAN SOUTH CAROLINA

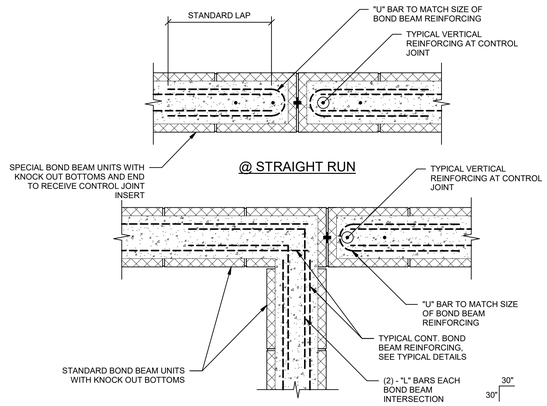
ADC ENGINEERING
1226 YEAMANS HALL ROAD
HANAHAN, SC 29410
843-566-0161
ADCENGINEERING.COM

DATE: 05.12.2023
ADC PROJECT #: 20381
DESIGNED: CG
CHECKED: CG
DRAWN: EH/SB
REVISION:

TYP. DETAILS - WOOD

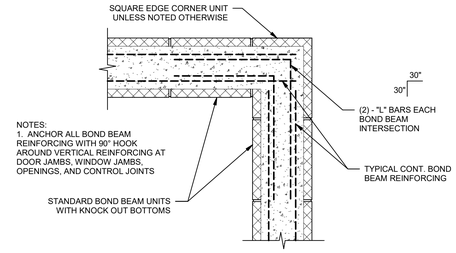
S610

100% CONSTRUCTION DOCUMENTS



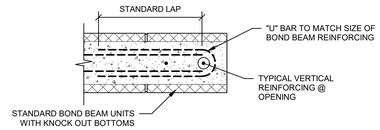
NOTES:
1. ANCHOR ALL BOND BEAM REINFORCING WITH 90" HOOK AROUND VERTICAL REINFORCING AT DOOR JAMBS, WINDOW JAMBS, OPENINGS, AND CONTROL JOINTS

1 CMU - TYP. BOND BEAM REINFORCING (CONTROL JOINT)
1" = 1'-0"

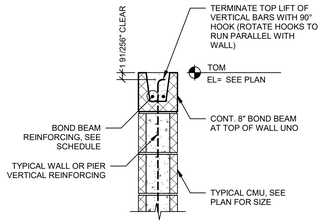


NOTES:
1. ANCHOR ALL BOND BEAM REINFORCING WITH 90" HOOK AROUND VERTICAL REINFORCING AT DOOR JAMBS, WINDOW JAMBS, OPENINGS, AND CONTROL JOINTS

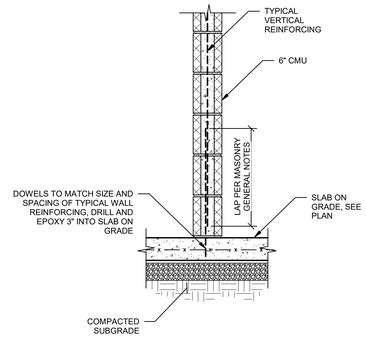
2 CMU - TYP. BOND BEAM REINFORCING (CORNER)
1" = 1'-0"



3 CMU - TYP. BOND BEAM REINFORCING (WALL OPENING)
1" = 1'-0"

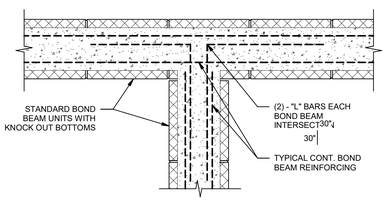


4 CMU - TYP. TOP OF WALL BOND BEAM
1" = 1'-0"



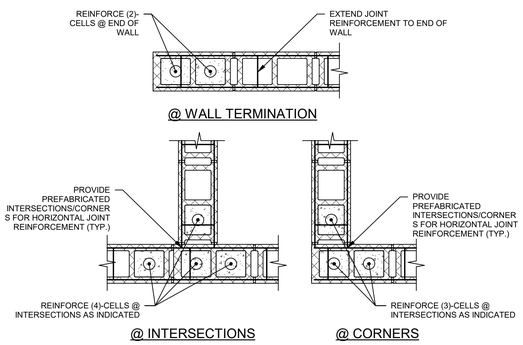
NOTES:
1. DETAIL IS TYPICAL WHERE 6" WALL IS NOT SPECIFICALLY INDICATED TO BEAR AT FOOTING LEVEL

5 CMU - TYP. 6" CMU CHASE/FURRING WALL @ SLAB ON GRADE
1" = 1'-0"



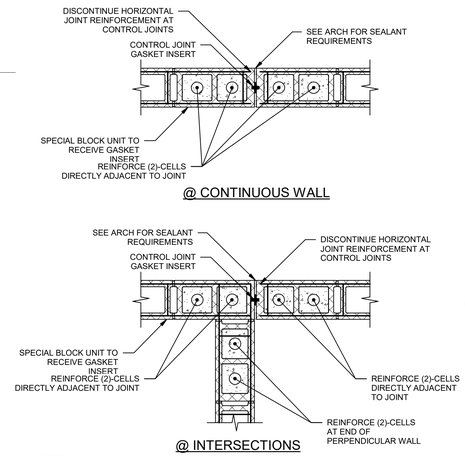
NOTES:
1. ANCHOR ALL BOND BEAM REINFORCING WITH 90" HOOK AROUND VERTICAL REINFORCING AT DOOR JAMBS, WINDOW JAMBS, OPENINGS, AND CONTROL JOINTS

6 CMU - TYP. BOND BEAM REINFORCING (WALL INTERSECTION)
1" = 1'-0"



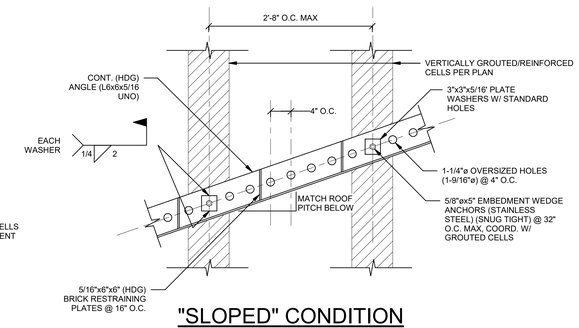
NOTES:
1. COORDINATE THESE TYPICAL DETAILS WITH SPECIFIC PIER DETAILS
2. SEE SCHEDULES AND SECTIONS FOR TYPICAL CMU WALL VERTICAL REINFORCING
3. SEE SPECIFICATIONS AND GENERAL NOTES FOR REBAR POSITIONER REQUIREMENTS

7 CMU - TYP. CMU VERTICAL REINFORCING
1" = 1'-0"

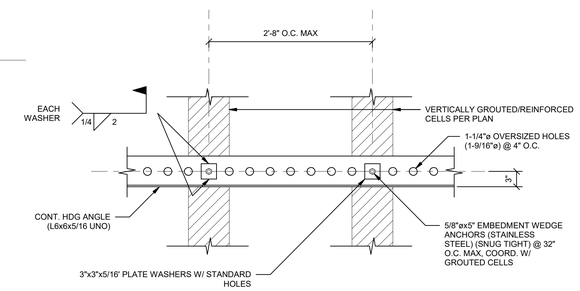


NOTES:
1. LOCATE CONTROL JOINTS @ 40'-0" O.C. MAX, AND AS INDICATED ON PLANS
2. DO NOT LOCATE CONTROL JOINT WITHIN EITHER SIDE OF A BEAM BEARING LOCATION
3. SEE TYPICAL BOND BEAM REINFORCING DETAILS FOR TERMINATION OF BOND BEAM REINFORCING AT CONTROL JOINTS
4. SEE ARCHITECTURAL DRAWINGS FOR JOINT FILLER REQUIREMENTS AT RATED WALLS
5. SEE SPECIFICATIONS AND GENERAL NOTES FOR REBAR POSITIONER REQUIREMENTS

8 CMU - TYP. CMU CONTROL JOINT
1" = 1'-0"



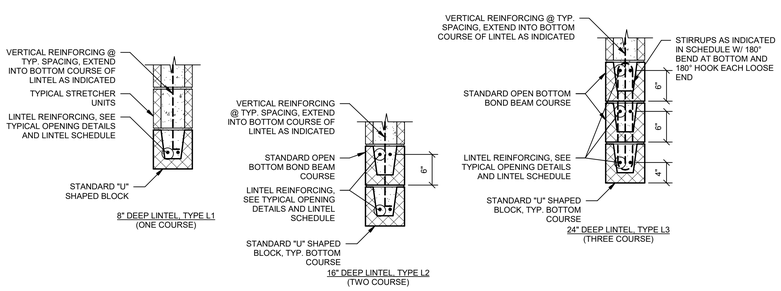
"SLOPED" CONDITION
(3/8":12" OR GREATER SLOPE)



"FLAT" CONDITION
(LESS THAN 3/8":12" SLOPE)

NOTES:
1. ALL BRICK LEDGES SHALL BE HOT DIP GALVANIZED
2. EDGE ANGLE/BENT PLATE MAY BE TOED UP OR DOWN, SEE SPECIFIC SECTIONS
3. INSTALLATION SEQUENCE SHALL BE:
   A. INSTALL ONE WEDGE ANCHOR AT EACH END OF INDIVIDUAL SEGMENT OF ANGLE.
   B. INSTALL ANGLE AND ADJUST TO PROPER LOCATION. WELD PLATE WASHERS FOR TWO INSTALL BOLTS.
   C. DRILL AND SET BALANCE OF WEDGE ANCHORS.
   D. WELD PLATE WASHERS IN PLACE FOR BALANCE OF BOLTS.
4. SEE TYPICAL SPLICE DETAIL FOR SPLICE REQUIREMENTS.
5. WHERE ANGLE IS PITCHED THE 8" ON CENTER DIMENSIONS FOR SLOTS SHALL BE A PROJECTED DIMENSION FROM HORIZONTAL
6. BRICK RESTRAINING PLATES SHALL MATCH THE HEIGHT AND WIDTH OF RELIEVING ANGLE AND HAVE A WEEP NOTCH (3/4"x3/4" AT "K" OF ANGLE)
7. BRICK RESTRAINING PLATES SHALL BE WELDED WITH 3/16" FILLET WELD EACH SIDE ALONG VERTICAL AND HORIZONTAL LEG OF RELIEVING ANGLE.

10 CMU - TYP. ANGLE/ BENT PLATE BOLTED TO CMU
1" = 1'-0"



NOTES:
1. SUPPORT LINTEL BARS ON HORIZONTAL REBAR POSITIONERS @ 16" O.C. MAX TO ACHIEVE PROPER LOCATION
2. PROVIDE ADDITIONAL BARS, WIRE TIES, ETC. AS REQUIRED TO ENSURE LINTEL BARS ARE NOT DISPLACED DURING GROUTING OPERATIONS

9 CMU - TYP. CMU LINTEL
1" = 1'-0"

City of Hanahan

STEWARD STREET PARK RENOVATIONS

HANAHAN SOUTH CAROLINA

SOUTH CAROLINA ADC ENGINEERING INC. NO. 00253 CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA NO. 28196 STATE OF REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER J. GLLER 5 12 23

CITY OF HANAHAN SOUTH CAROLINA

ADC ENGINEERING
1226 YEAMANS HALL ROAD
HANAHAN, SC 29410
843-566-0161
ADCENGINEERING.COM

DATE:	05.12.2023
ADC PROJECT #:	20381
DESIGNED:	CG
CHECKED:	CG
DRAWN:	JMJ/EH
REVISION:	

TYPICAL MASONRY DETAILS

S611

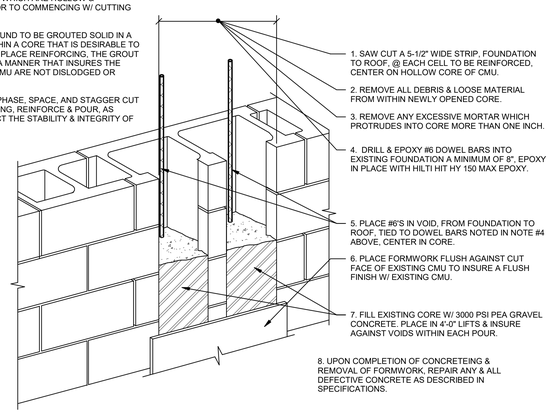
100% CONSTRUCTION DOCUMENTS

IT SHALL BE ANTICIPATED BY THE CONTRACTOR THAT EXISTING CONDITIONS EXIST WHICH MAY PREVENT REINFORCING PLACEMENT IN CERTAIN CELLS.

THE CONTRACTOR SHALL PERFORM NON-DESTRUCTIVE TESTING, SUCH AS R-METER TESTING, AS REQUIRED TO LOCATE THOSE CELLS WHICH ARE HOLLOW & UNOBSTRUCTED, PRIOR TO COMMENCING W/ CUTTING PROCEDURES.

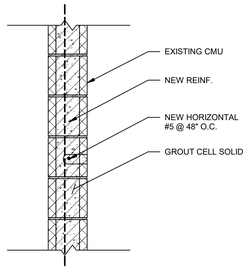
WHERE CELLS ARE FOUND TO BE GROUTED SOLID IN A LOCALIZED AREA, WITHIN A CORE THAT IS DESIRABLE TO THE CONTRACTOR TO PLACE REINFORCING, THE GROUT MAY BE CUT AWAY IN A MANNER THAT INSURES THE ADJACENT GROUT & CMU ARE NOT DISLODGED OR DAMAGED

CONTRACTOR SHALL PHASE, SPACE, AND STAGGER CUT CELLS AROUND BUILDING, REINFORCE & POUR, AS REQUIRED TO PROTECT THE STABILITY & INTEGRITY OF THE STRUCTURE.

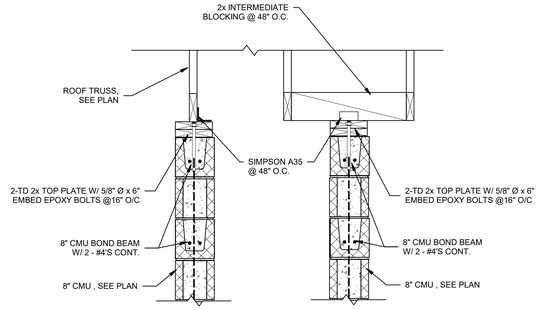


TYPICAL REINFORCING PROCEDURE ISOMETRIC

1 CMU - TYP. MASONRY REINFORCING RETROFIT DETAIL
1" = 1'-0"



2 CMU - TYP. EXISTING CMU BOND BEAM RETROFIT
1" = 1'-0"



3 CMU - TYP. WALL BRACING DETAIL
1" = 1'-0"

City of Hanahan

STEWARD STREET PARK RENOVATIONS

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CITY OF HANAHAN SOUTH CAROLINA

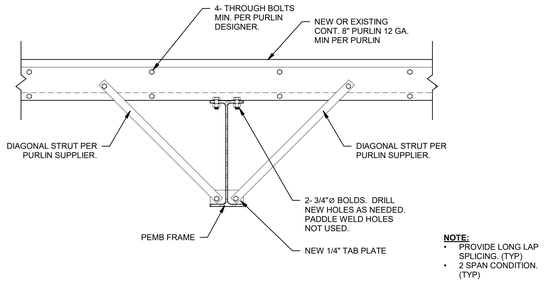
ADC ENGINEERING
1226 YEAMANS HALL ROAD
HANAHAN, SC 29410
843-566-0161
ADCENGINEERING.COM

DATE:	05.12.2023
ADC PROJECT #:	20381
DESIGNED:	CG
CHECKED:	CG
DRAWN:	EH
REVISION:	

TYPICAL MASONRY DETAILS

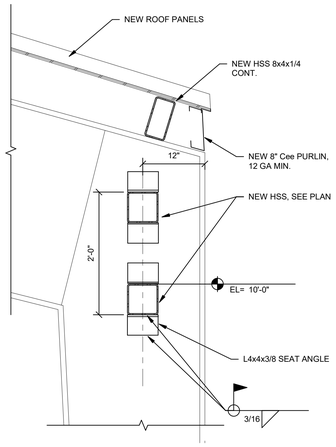
S612

100% CONSTRUCTION DOCUMENTS

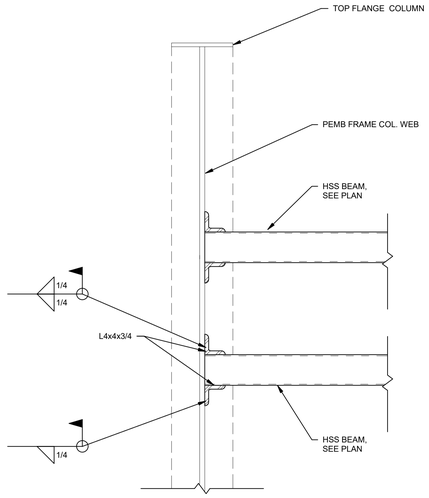


NOTE:
- PROVIDE LONG LAP SPLICING. (TYP)
- 2 SPAN CONDITION. (TYP)

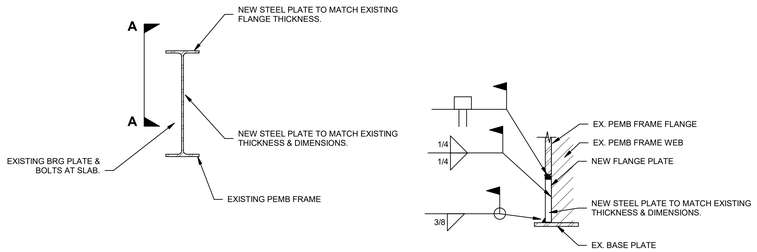
1 TYP. PURLIN ATTACHMENT TO PEMB FRAME
1" = 1'-0"



2 TYP. HSS CONNECTION TO PEMB FRAME
1" = 1'-0"



3 TYP. GUSSET PLATE DETAIL
1" = 1'-0"



SECTION A-A

4 TYP. PEMB FLANGE REPLACEMENT DETAIL
1" = 1'-0"

City of Hanahan

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1226 YEAMANS HALL ROAD
HANAHAN, SC 29410
843-566-0161
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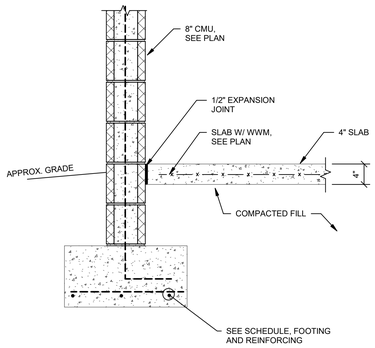
DATE:	05.12.2023
ADC PROJECT #:	20381
DESIGNED:	Designer
CHECKED:	Checker
DRAWN:	JMJ/EH
REVISION:	

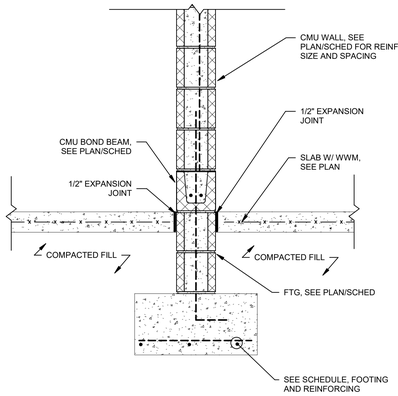
TYPICAL STEEL DETAILS

S621

100% CONSTRUCTION DOCUMENTS



1 SECTION
1" = 1'-0"



2 SECTION
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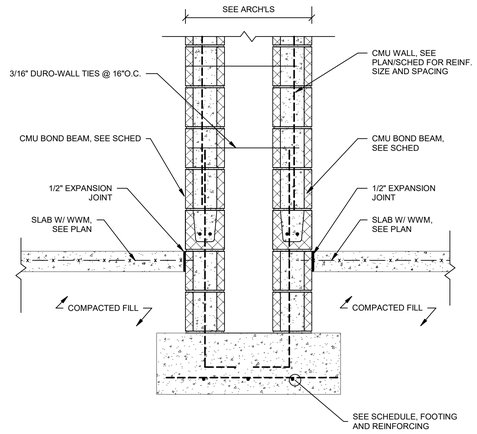

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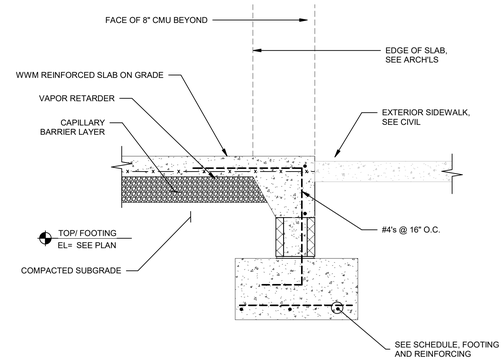
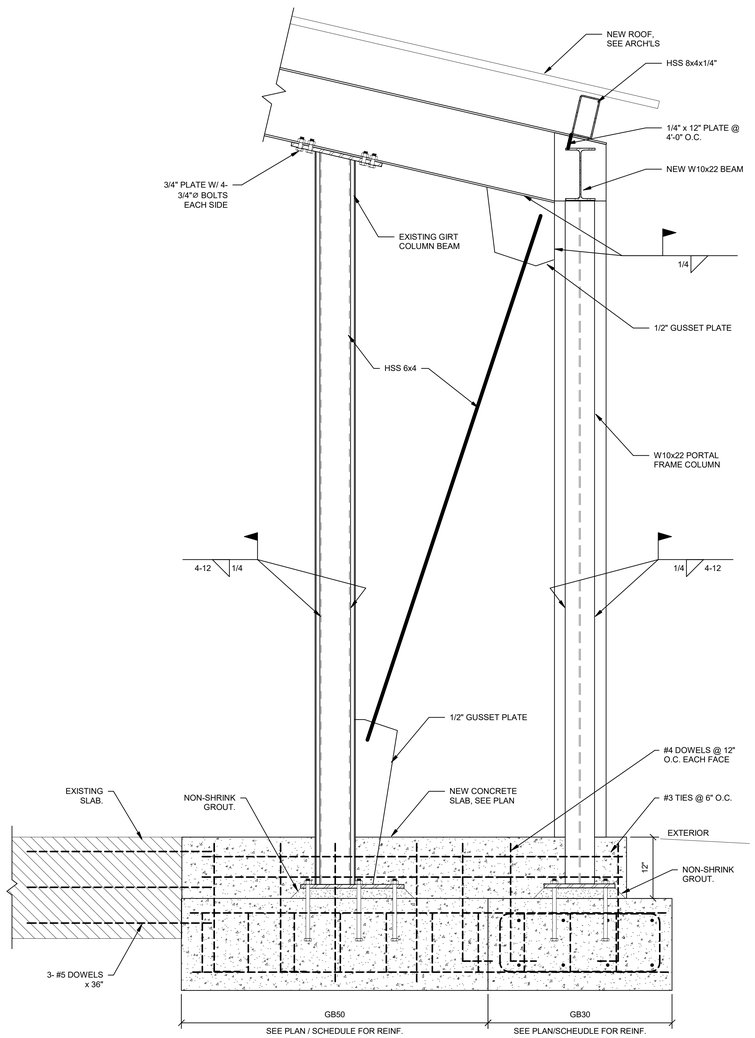
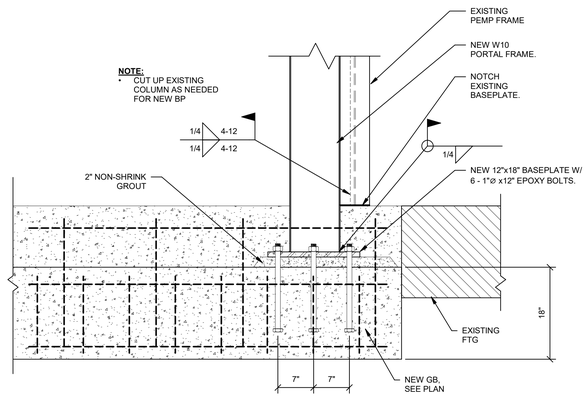


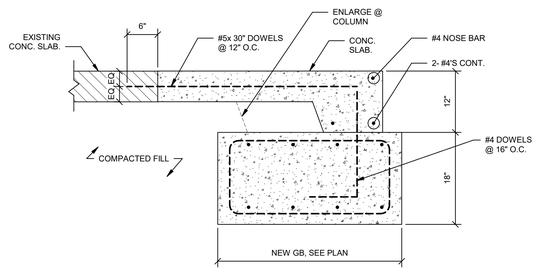
4 SECTION
1" = 1'-0"



5 SECTION
1" = 1'-0"



6 SECTION
1" = 1'-0"



7 SECTION
1" = 1'-0"

City of Hanahan

STEWARD STREET PARK RENOVATIONS

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1226 YEAMANS HALL ROAD
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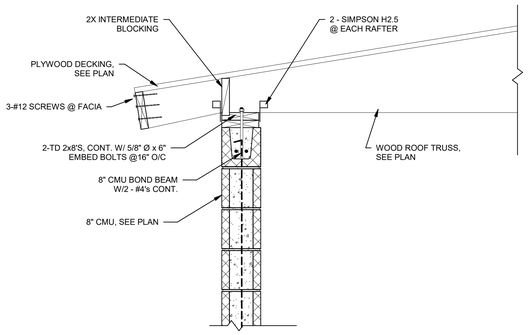
DATE:	05.12.2023
ADC PROJECT #:	20381
DESIGNED:	CG
CHECKED:	CG
DRAWN:	EH/SB
REVISION:	

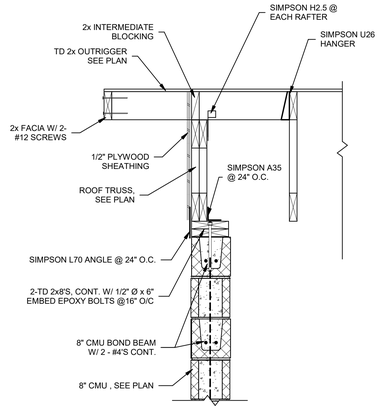
SECTIONS & DETAILS

S701

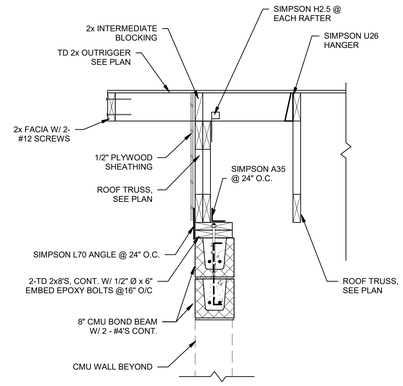
100% CONSTRUCTION DOCUMENTS



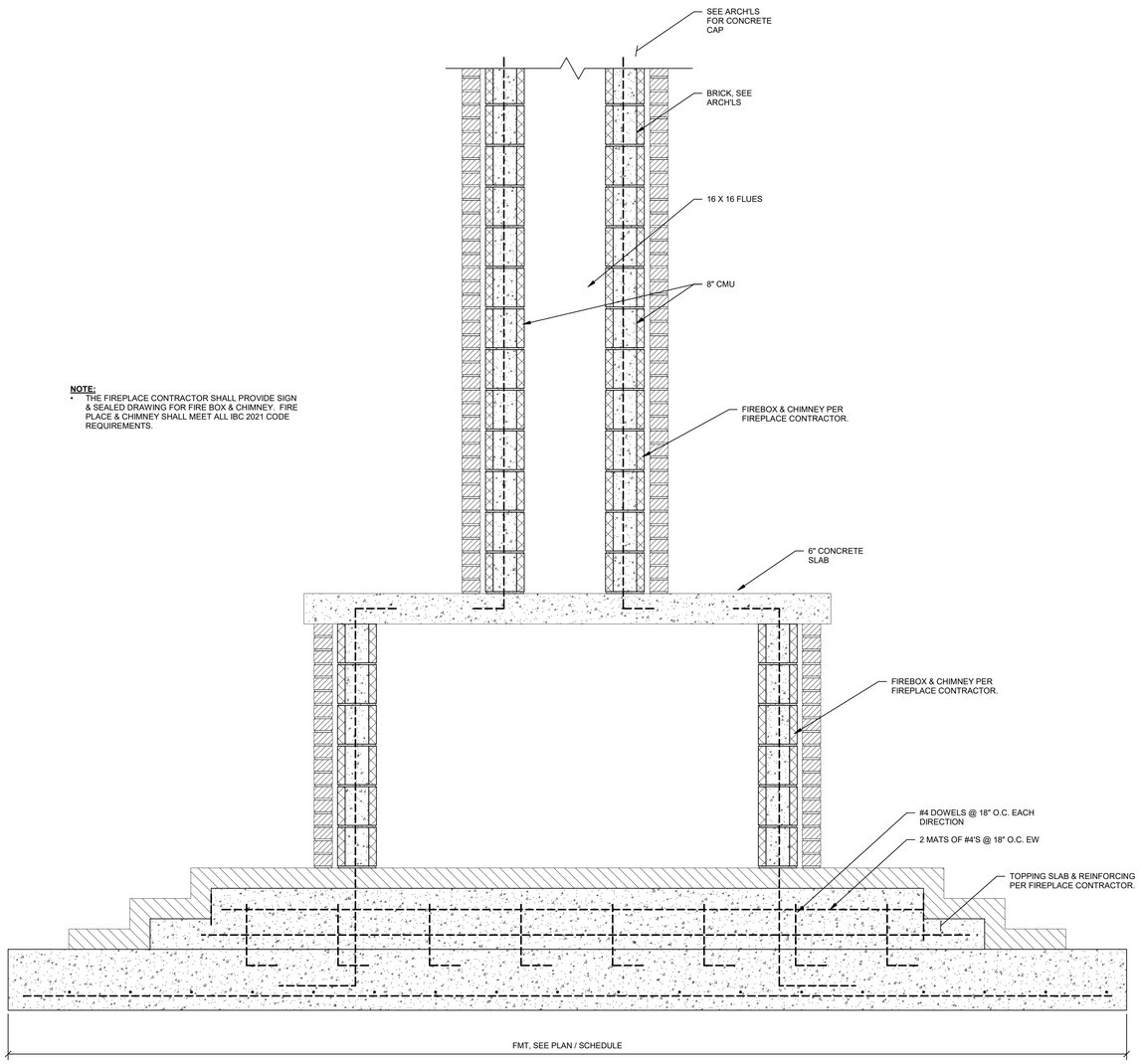
1 SECTION
1" = 1'-0"



2 SECTION
1" = 1'-0"



3 SECTION
1" = 1'-0"



NOTE:
- THE FIREPLACE CONTRACTOR SHALL PROVIDE SIGN & SEALED DRAWING FOR FIRE BOX & CHIMNEY. FIRE PLACE & CHIMNEY SHALL MEET ALL IBC 2021 CODE REQUIREMENTS.

4 CHIMNEY SECTION
1" = 1'-0"

City of Hanahan

STEWARD STREET PARK RENOVATIONS

HANAHAN SOUTH CAROLINA

SOUTH CAROLINA ADC ENGINEERING INC. NO. 00253 CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA PROFESSIONAL ENGINEER NO. 28196 CHRISTOPHER J. GILLER

ADC ENGINEERING
1226 YEAMANS HALL ROAD
HANAHAN, SC 29410
843-566-0161
ADCENGINEERING.COM

DATE:	05.12.2023
ADC PROJECT #:	20381
DESIGNED:	CG
CHECKED:	CG
DRAWN:	EH/SB
REVISION:	

SECTIONS & DETAILS

S702

100% CONSTRUCTION DOCUMENTS

GENERAL NOTES:

1. PROVIDE ALL MATERIALS AND LABOR FOR COMPLETE AND PROPERLY FUNCTIONING MECHANICAL SYSTEMS. WARRANTY ALL WORK AND ALL MATERIALS, EQUIPMENT AND DEVICES FOR A PERIOD OF ONE YEAR AFTER OWNER'S ACCEPTANCE.
2. WORK SHALL CONFORM TO OR MEET THE REQUIREMENTS OF THE MOST CURRENT EDITION OF:
   - A: INTERNATIONAL MECHANICAL CODE
   - B: SMACNA
   - C: ASHRAE
   - D: ALL FEDERAL, STATE AND LOCAL CODES AND ORDINANCES WHICH APPLY TO THIS WORK.
3. DRAWINGS ARE DIAGRAMMATIC IN NATURE AND ARE NOT INTENDED TO BE SCALED FOR DIMENSIONS.
4. ALL MATERIALS, EQUIPMENT AND DEVICES SHALL MEET THE REQUIREMENTS OF UL WHERE UL STANDARDS ARE ESTABLISHED FOR THOSE ITEMS. ALL ITEMS SHALL BE CLASSIFIED BY UL AS SUITABLE FOR THE PURPOSE USED.
5. COORDINATE LOCATION OF MECHANICAL WORK WITH OTHER TRADES TO AVOID CONFLICTS AND INTERFERENCES.
6. INSTALL ALL EQUIPMENT AND MATERIAL IN ACCORDANCE WITH MANUFACTURE'S WRITTEN, PRINTED INSTRUCTIONS AND RECOMMENDATIONS.
7. PROVIDE OWNER WITH CERTIFICATES OF FINAL INSPECTION AND ACCEPTANCE FROM AUTHORITY HAVING JURISDICTION.
8. MAKE CONNECTIONS FROM MECHANICAL EQUIPMENT TO DUCTWORK USING FLEXIBLE DUCT CONNECTIONS.
9. ALL EQUIPMENT, PIPE AND DUCTWORK ABOVE CEILING SHALL BE SUPPORTED FROM BUILDING STRUCTURE ABOVE.
10. DUCT SIZES INDICATED ARE NET FREE INSIDE DIMENSIONS OF METAL DUCT.
11. ALL DUCTWORK, EXCEPT EXPOSED DUCTWORK, SHALL BE SINGLE WALL GALVANIZED STEEL.
12. PROVIDE ALL OPERATION AND MAINTENANCE MANUALS FOR MECHANICAL EQUIPMENT TO BUILDING OWNER.

MECHANICAL LEGENDS & ABBREVIATIONS

NOTE: ALL SYMBOL DESCRIPTIONS ARE SUBJECT TO MODIFICATION ON THE DRAWINGS.
ALL SYMBOLS NOT NECESSARILY USED ON THIS PROJECT.

GENERAL SYMBOLS:

- POINT OF CONNECTION
- POINT OF REMOVAL
- KEY NOTE
- DEMOLITION NOTE
- CONSTRUCTION NOTE
- REVISION
- DETAIL BUBBLE (A / M501)
- SECTION BUBBLE (1 / M501)

MECHANICAL ABBREVIATIONS:

AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
A/100	AIR DEVICE MARK/CFM
AHU	AIR HANDLING UNIT
AD	ACCESS DOOR
B	BOILER
BDD	BACK DRAFT DAMPER
BHP	BRAKE HORSEPOWER
BLDG	BUILDING
BOD	BOTTOM OF DUCT
BOS	BOTTOM OF STEEL
CH	CHILLER
CD	CONDENSATE DRAIN
DB	DRY BULB
Ø or DIA	DIAMETER
DN	DOWN
DH	DUCT HEATER
ERV	ENERGY RECOVERY VENTILATOR
EF	EXHAUST FAN
EG	EXHAUST GRILLE
EL	ELEVATION
(E)	EXISTING
FCU	FAN COIL UNIT
FD	FIRE DAMPER OR FLOOR DRAIN
FLA	FULL LOAD AMPS
FUR	FURNACE
HP	HEAT PUMP
HX	HEAT EXCHANGER (HX)
HUM	HUMIDIFIER
L	LOUVER (EXTERIOR)
MVD	MANUAL VOLUME DAMPER
(N)	NEW
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
O.A.	OUTSIDE AIR
P	PUMP
PHP	PACKAGE HEAT PUMP
PTHP	PACKAGE TERMINAL HEAT PUMP
(R)	REMOVE / RELOCATE
RF	RETURN FAN
RG	RETURN GRILLE
S.A.	SUPPLY AIR
SD	SUPPLY DIFFUSER
SF	SUPPLY FAN
SG	SUPPLY GRILLE
SH	STEAM HUMIDIFIER
TG	TRANSFER GRILLE
TSP	TOTAL STATIC PRESSURE
UH	UNIT HEATER
VD	VOLUME DAMPER
VTR	VENT THROUGH ROOF
WB	WET BULB

DUCTWORK:

- SUPPLY ARROW
- RETURN/EXHAUST ARROW
- THERMOSTAT
- HUMIDISTAT
- SENSOR
- SMOKE DETECTOR
- EXHAUST FAN
- SUPPLY UP
- SUPPLY DOWN
- RETURN/EXHAUST UP
- RETURN/EXHAUST DOWN
- ROUND UP
- ROUND DOWN
- OVAL SUPPLY UP
- OVAL SUPPLY DOWN
- 90° MITERED ELBOW WITH TURNING VANES
- ELBOW (W, (r=w))
- DUCT END CAP
- DUCT TRANSITION – SQUARE TO ROUND
- DUCT TRANSITION – SLOPED BOTH SIDES (15° MAX)
- DUCT TRANSITION – FLAT ON ONE SIDE (15° MAX)
- FLEXIBLE DUCT
- MANUAL VOLUME DAMPER
- HORIZONTAL FIRE DAMPER (FD)
- VERTICAL FIRE DAMPER (FD)
- MOTORIZED DAMPER
- BACKDRAFT DAMPER (BDD)
- ACCESS DOOR (AD)

DUCTWORK:

SINGLE LINE REPRESENTATION:

- SUPPLY UP
- SUPPLY DOWN
- RETURN UP
- RETURN DOWN
- EXHAUST UP
- EXHAUST DOWN
- ROUND UP
- ROUND DOWN
- OVAL SUPPLY UP
- OVAL SUPPLY DOWN
- DUCT WIDTH / DUCT DEPTH (16x14)
- DUCT TURN 90°
- DUCT END CAP
- DUCT TRANSITION – SQUARE TO ROUND
- DUCT TRANSITION – SLOPED ON BOTH SIDES
- DUCT TRANSITION – FLAT ON ONE SIDE
- FLEXIBLE DUCT
- MANUAL VOLUME BALANCE DAMPER
- HORIZONTAL FIRE DAMPER (FD)
- VERTICAL FIRE DAMPER (FD)
- MOTORIZED DAMPER
- BACKDRAFT DAMPER (BDD)
- DOUBLE WALL INSULATED SPIRAL DUCTWORK (D)
- LINED DUCTWORK (L)
- INTERNALLY COATED DUCTWORK (C)

DIFFUSERS & REGISTERS

SUPPLY DIFFUSER:
SEE LAYOUT VIEW FOR RUNOUT SIZE
DIFFUSER TYPE
DIFFUSER CFM
A/750

SUPPLY DIFFUSER:
SEE LAYOUT VIEW FOR RUNOUT SIZE
DIFFUSER TYPE
DIFFUSER CFM
A/750

RETURN GRILLE:
SEE LAYOUT VIEW FOR RUNOUT SIZE
GRILLE TYPE
GRILLE CFM
RG/750

RETURN GRILLE:
SEE LAYOUT VIEW FOR RUNOUT SIZE
GRILLE TYPE
GRILLE CFM
RG/750

CONSTRUCTION DOCUMENTS

City of Hanahan
Hanahan, South Carolina

STEWARD STREET
PARK RENOVATIONS

HANAHAN
SOUTH CAROLINA

SOUTH CAROLINA LIVE OAK CONSULTANTS LLC NO. 3886 CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 18377 GERALD R. ULMER III 05/12/23

CITY OF HANAHAN SOUTH CAROLINA

ADC ENGINEERING
1226 YEAMANS HALL ROAD
HANAHAN, SC 29410
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PO Box 60490
North Charleston, SC 29419
MAIN: (843) 529-9428
Email: Info@LiveOakConsultants.com
LOC PROJECT NO.: 20210059

811 Know what's below. Call before you dig.

DATE:	05/12/2023
ADC PROJECT #:	20381
DESIGNED:	G. ULMER
CHECKED:	G. ULMER
DRAWN:	K.STEPHENS
REVISION:	

MECHANICAL GENERAL NOTES, LEGENDS, & ABBREVIATIONS

M001

FAN SCHEDULE

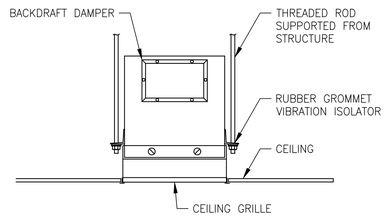
MARK	EF-1	EF-2
FAN TYPE	CEILING CABINET EXHAUST	CEILING CABINET EXHAUST
AIR QUANTITY – CFM	200	200
EXT. S.P. – IN. W.G.	0.25	0.25
DRIVE	DIRECT	DIRECT
SONES (MAXIMUM)	1.6	1.6
MOTOR – HP (WATTS)	(49)	(49)
ELECTRICAL – V/ø/Hz	120/1/60	120/1/60
MANUFACTURER	GREENHECK	GREENHECK
MODEL NO.	SP-A110-VG	SP-A110-VG
NOTES	1,2,4,5	1,2,4,5

NOTES:
1. PROVIDE GREENHECK OR APPROVED EQUAL BY COOK, ACME, CARNES, BRIEDERT, OR TWIN CITY FANS.
2. PROVIDE A UNIT MOUNTED DISCONNECT SWITCH, BACKDRAFT DAMPER, AND ENERGY EFFICIENT VARIGREEN MOTOR.
3. CONTROL WITH LOCAL SWITCH.
4. CONTROL WITH LOCAL LIGHT SWITCH.
5. FAN SHALL BE RATED FOR OUTDOOR INSTALLATION.

ELECTRIC UNIT HEATER SCHEDULE

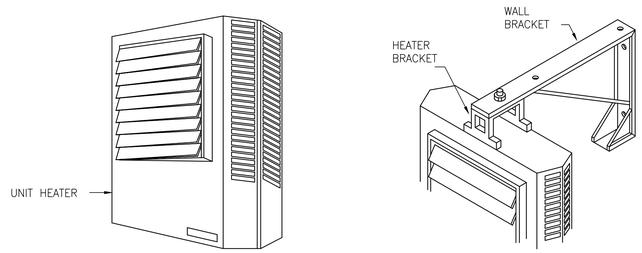
MARK	UH-1	UH-2
TYPE	ELECTRIC	ELECTRIC
ELECTRICAL – V/ø/Hz	240/1/60	240/1/60
HEATER KW/AMPS	3.0/12.5	3.0/12.5
MANUFACTURER	QMARK	QMARK
MODEL NUMBER	MUH03-81	MUH03-81
NOTES	1,2,3	1,2,3

NOTES:
1. PROVIDE WITH A REMOTE MOUNTED THERMOSTAT CONTROL.
2. PROVIDE WITH MOUNTING BRACKET.
3. PROVIDE QMARK OR APPROVED EQUAL.



TYPICAL CEILING MOUNTED EXHAUST FAN

1 / M0-02 DETAIL N.T.S.



SUSPENDED UNIT HEATER

2 / M0-02 DETAIL N.T.S.

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK RENOVATIONS

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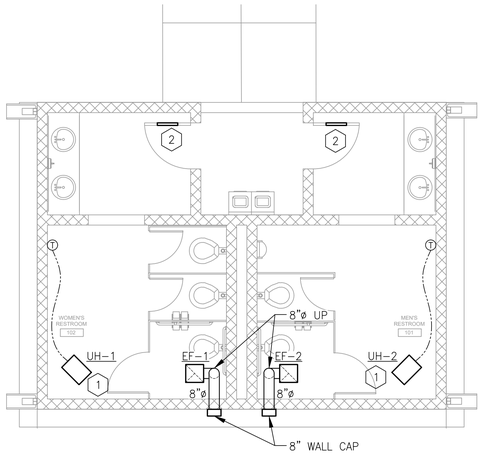
DRAWN: K.STEPHENS
REVISION:

MECHANICAL SCHEDULES

M002

CONSTRUCTION DOCUMENTS



MECHANICAL PLAN - RESTROOMS

SCALE: 1/4"=1'-0"

GENERAL NOTES:

1. REFER TO DRAWING M001 FOR MECHANICAL GENERAL NOTES, LEGENDS, & ABBREVIATIONS.
2. REFER TO DRAWING M002 FOR MECHANICAL SCHEDULES.
3. REFER TO DRAWING M501 FOR MECHANICAL DETAILS.

KEYED NOTES:

1. THE TOP OF THE HEATER IS AT 6" BELOW THE CEILING.
2. PROVIDE A 16x14 TRANSFER GRILLE (PRICE ATG1-BF OR APPROVED EQUAL).

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RESTROOM BUILDING
MECHANICAL PLAN

M101

CONSTRUCTION DOCUMENTS

GENERAL NOTES:

1. POWER DISTRIBUTION: IT IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO AS–BUILT EXISTING POWER PANELS AND MARK–UP (TYPE WRITTEN) PANEL DOOR DIRECTORY SCHEDULES TO REFLECT MODIFICATIONS MADE AS PART OF THIS PROJECT. FOR NEW PANELS: PROVIDE TYPE WRITTEN PANEL DIRECTORIES AND SCHEDULES REFLECTING AS–BUILT CONDITIONS.
2. ALL ELECTRICAL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH APPLICABLE LOCAL AND STATE CODES AND WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE.
3. PROVIDE ADDITIONAL SUPPORT FOR SWITCHES, STARTERS, FIXTURES, RACEWAYS AND OTHER ELECTRICAL EQUIPMENT WHEREVER THE BUILDING STRUCTURE IS NOT SUITABLE FOR DIRECT MOUNTING.
4. DO NOT INSTALL MATERIALS OTHER THAN SPECIFIED EXCEPT FOR ALTERNATES ACCEPTED BY OWNER.
5. FIRESTOP, DRAFT STOP AND/OR PROTECT THE ANNULAR SPACE AROUND ALL PIPE, TUBE, CONDUIT, WIRE, CABLE, VENT AND DUCT PENETRATION THROUGH WALLS, PARTITIONS, FLOORS, CEILINGS AND ROOFS IN ACCORDANCE WITH THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE AND UL LISTING REQUIREMENTS. ALL OPENINGS SHALL BE SEALED TO MATCH FIRE OR SMOKE RATING OF WALL PENETRATIONS.
6. VERIFY CEILING SUSPENSION SYSTEMS IN THE VARIOUS AREAS AND PROVIDE THE PROPER MOUNTING ACCESSORIES, TRIMS, ETC., TO SUIT THE PARTICULAR AREA.
7. SYMBOLS IN THE LEGENDS ARE APPLICABLE GENERALLY. FOR EXACT REQUIREMENTS REFER TO THE SCHEDULES, LAYOUTS, DETAILS AND TO THE SPECIFICATIONS SINCE THE APPEARANCE OF A PARTICULAR SYMBOL IN THE LEGEND DOES NOT NECESSARILY IMPLY THAT THE ITEM IS INCLUDED IN THE CONTRACT.
8. EXCEPT WHERE NOTED OTHERWISE, LIMIT LIGHTING AND RECEPTACLE BRANCH CIRCUIT HOMERUNS TO 7 CONDUCTORS. 3 PHASE WIRES, 3 NEUTRAL AND 1 GROUND.
9. PROVIDE INDEPENDENT NEUTRALS FOR ALL NEW LIGHTING AND RECEPTACLE CIRCUITS.
10. ALL POWER CIRCUITS SHALL CONTAIN AN EQUIPMENT GROUNDING CONDUCTOR (GREEN COLOR INSULATION) ROUTED IN CONDUIT AND SIZED AS INDICATED ON DRAWINGS (MINIMUM SIZE – #12AWG).
11. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE AMERICANS WITH DISABILITIES ACT (ADA).
12. ROUTE CONDUITS CONCEALED IN FINISHED SPACES, UNLESS NOTED OTHERWISE ON PLANS. INSTALL ALL DEVICES RECESSED FLUSH IN WALL, UNLESS NOTED OTHERWISE ON PLANS.
13. PROVIDE EXPANSION JOINT FITTINGS FOR ALL RACEWAYS CROSSING EXPANSION JOINTS.
14. FOR ALL RECEPTACLES: PROVIDE AN EQUIPMENT BONDING JUMPER FROM THE GROUNDING TERMINAL OF THE RECEPTACLE TO THE METAL BOX.
15. DO NOT INSTALL DEVICE OUTLET BOXES BACK–TO–BACK IN COMMON WALL. OFFSET 6". ALTERNATE CIRCUITS TO ADJACENT DEVICES IN MULTI–OUTLET RACEWAY.
16. LABEL ALL RECEPTACLE FACEPLATES WITH PANEL NAME AND CIRCUIT NUMBER FEEDING THAT RECEPTACLE.
17. COORDINATE ALL WORK AND POWER OUTAGES WITH OWNER.
18. PROVIDE STRIPING ON THE FLOOR AROUND ELECTRICAL PANELS TO IDENTIFY THE CODE REQUIRED WORKING CLEARANCE.
19. PHASE IDENTIFICATION FOR CIRCUITS SHALL BE ACCOMPLISHED BY COLOR CODE AS FOLLOWS:

CIRCUITS RATED (480/277V):	CIRCUITS RATED (240/120V):
PHASE "A" = BROWN	PHASE "A" = BLACK
PHASE "B" = ORANGE	PHASE "B" = RED
PHASE "C" = YELLOW	PHASE "C" = BLUE
NEUTRAL = GRAY	NEUTRAL = WHITE

20. ALL WIRING CONDUCTORS SHALL BE COPPER (CU) WITH THWN INSULATION AS A MINIMUM REQUIREMENT.

TYPICAL DEVICE MOUNTING HEIGHT

RECEPTACLES	18" AFF
LIGHT SWITCHES	48" AFF

NOTE: DIMENSIONS ARE TO DEVICE CENTERLINE UNLESS NOTED OTHERWISE.

FIRE ALARM NOTES:

1. PROVIDE RACEWAYS FROM ALL FIRE ALARM DEVICES TO THE FIRE ALARM CONTROL UNIT.
2. ALL FIRE ALARM AND LIFE SAFETY WIRING MUST BE KEPT SEPARATED FROM ALL OTHER WIRING. THIS INCLUDES CONDUITS, JUNCTION BOXES AND PULL BOXES.
3. PROVIDE SUITABLE JUNCTION BOX AT ALL FIRE ALARM DEVICE LOCATIONS.
4. CONTRACTOR SHALL INSTALL PLASTIC BUSHING ON THE ENDS OF CONDUITS TO PREVENT DAMAGE TO CABLES DURING INSTALLATION.
5. ALL FIRE ALARMS RACEWAY, JUNCTION BOXES AND PULL BOXES SHALL BE COLORED RED.
6. SEE FIRE ALARM SPECIFICATIONS DRAWING FOR ADDITIONAL REQUIREMENTS.

ELECTRICAL LEGENDS & ABBREVIATIONS

NOTE: ALL SYMBOL DESCRIPTIONS ARE SUBJECT TO MODIFICATION ON THE DRAWINGS.
ALL SYMBOLS NOT NECESSARILY USED ON THIS PROJECT.

GENERAL SYMBOLS:

- POINT OF CONNECTION
- POINT OF REMOVAL
- 1 KEY NOTE
- 1 DEMOLITION NOTE
- 1 CONSTRUCTION NOTE
- 1 REVISION
- A M501 DETAIL BUBBLE
- 1 M501 SECTION BUBBLE

ELECTRICAL SYMBOLS:

237 CART INDICATES ROOM NUMBER

30/3/3R — DISCONNECT SWITCH. REFER TO PLANS FOR ADDITIONAL INFORMATION.
"30" INDICATES AMPACITY, "3" INDICATES PHASES, "3R" INDICATES NEMA CLASSIFICATION.
WHERE USED ON A MOTOR CIRCUIT, SWITCH SHALL BE HORSEPOWER RATED GREATER THAN THE HORSEPOWER.

A/N a,b — 2' x 4' LED LIGHT FIXTURE. SEE LIGHT FIXTURE SCHEDULE.
'a,b' LOWER CASE LETTERS INDICATES BI–LEVEL SWITCHING SCHEME.
'A' INDICATES FIXTURE TYPE, REFER TO FIXTURE SCHEDULE.
'N' INDICATES NIGHT LIGHT (PERMANENTLY ENERGIZED.)
"H1/1" INDICATES FEEDER CIRCUIT, I.E. FROM PANEL "H1" CKT. NO. "1"

C/N a — 4' LED LIGHT FIXTURE. SEE LIGHT FIXTURE SCHEDULE. SAME AS ABOVE.

P/N a,b — 4' LED HI BAY LIGHT FIXTURE. SEE LIGHT FIXTURE SCHEDULE. SAME AS ABOVE.

B/N a — 2' x 2' LED LIGHT FIXTURE. SEE LIGHT FIXTURE SCHEDULE. SAME AS ABOVE.

E — LED EXIT SIGN WITH BATTERY PACK EMERGENCY LIGHTING UNIT WITH NUMBER OF HEADS INDICATED. SEE LIGHT FIXTURE SCHEDULE. CONNECT TO UN–SWITCHED ROOM LIGHTING CIRCUIT.

EX1 — EMERGENCY LED EXIT LIGHT FIXTURE (CEILING OR WALL MOUNT). SEE LIGHTING FIXTURE SCHEDULE. ARROW INDICATES EGRESS DIRECTION. CONNECT TO UN–SWITCHED ROOM LIGHTING CIRCUIT.

H — RECESSED DOWNLIGHT LED FIXTURE. "H" INDICATES FIXTURE TYPE, REFER TO FIXTURE SCHEDULE.

W — LED WALLPACK LIGHT FIXTURE, "W" INDICATED FIXTURE TYPE, SEE LIGHT FIXTURE SCHEDULE.

$ OSD — TOGGLE TYPE LIGHT SWITCH, 120V/20A. MOUNTED 48" A.F.F. (UNLESS NOTED OTHERWISE).
NONE INDICATES SINGLE–POLE, SINGLE–THROW.
"3" INDICATES THREE WAY.
'a' LOWER CASE LETTER INDICATES SWITCHING SCHEME.
"D" INDICATES DIMMER TYPE SWITCH. (1000 WATTS UNLESS NOTED OTHERWISE) COORDINATE SWITCH TYPE WITH FIXTURE TO BE DIMMED.
"OS" INDICATES PIR OCCUPANCY/SENSOR. MATCH OCCUPANCY SENSOR WITH TYPE OF LIGHTING TO BE CONTROLLED.
"M" INDICATES TO PROVIDE MOTOR–RATED SWITCH WITH OVERLOADS IF REQUIRED

OS b — CEILING MOUNT OCCUPANCY SENSOR.
"b" LOWER CASE LETTER INDICATES SWITCHING SCHEME.

OS b — CEILING MOUNT DAYLIGHT SENSOR.
"b" LOWER CASE LETTER INDICATES SWITCHING SCHEME.

OS — WALL MOUNT OCCUPANCY SENSOR.

GF P1/1,3 — 120V/20A DUPLEX RECEPTACLE. MOUNTED 18" A.F.F. (UNLESS NOTED OTHERWISE).
"GF" INDICATES SELF–TEST GROUND FAULT CIRCUIT INTERRUPTER TYPE.
"WP" INDICATES WEATHER PROOF WHILE IN USE COVER WITH WEATHER RESISTANT RECEPTACLE
"C" COUNTER TOP, MOUNTED 42" UP OR 6" ABOVE COUNTER. USE GFCI TYPE.
"DW" DISHWASHER RECEPTACLE, MOUNTED INSIDE CABINET UNDER SINK, GFCI TYPE.
"M" MICROWAVE RECEPTACLE, COORDINATE MOUNTING HGT. WITH CABINET INSTALLER.
"P1/1" INDICATES FEEDER CIRCUIT, I.E. FROM PANEL "P1" CKT. NO. "1"

220V/30A DUPLEX RECEPTACLE. MOUNTED 18" A.F.F. (UNLESS NOTED OTHERWISE).

120V/20A DUPLEX RECEPTACLE. MOUNTED 6" ABOVE COUNTER–TOP (UNLESS NOTED OTHERWISE).

120V/20A QUAD RECEPTACLE. MOUNTED 18" A.F.F. (UNLESS NOTED OTHERWISE).

COMBINATION TELEPHONE/DATA OUTLET MOUNTED 18" A.F.F (UNLESS NOTED OTHERWISE)
PROVIDE AND INSTALL 4"x4"x1 1/2" BOX WITH SINGLE GANG EXTENSION RING AND 3/4" EMPTY CONDUIT WITH PULLWIRE.

TV — TELEPHONE/TV OUTLET MOUNTED 18" A.F.F (UNLESS NOTED OTHERWISE)
PROVIDE AND INSTALL 4"x4"x1 1/2" BOX WITH SINGLE GANG EXTENSION RING AND 3/4" EMPTY CONDUIT WITH PULLWIRE.
"TV" INDICATES TV OUTLET.

ELECTRIC MOTOR

BRANCH CIRCUIT RACEWAY – CONCEALED IN WALL OR CEILING

P1 — POWER PANEL "P1"

TELEPHONE BACKBOARD (FIRE RESISTANT)

T — DRY TYPE TRANSFORMER

SPECIAL PURPOSE RECEPTACLES

ELECTRICAL ABBREVIATIONS:

A	AMPERES
AFCI	ARC FAULT CIRCUIT INTERRUPTER
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHU	AIR HANDLING UNIT
AIC	AMPS INTERRUPTING CAPACITY
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BOF	BOTTOM OF FIXTURE
BOS	BOTTOM OF STEEL
C	CONDUIT
CAT	CATALOG
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CT	CURRENT TRANSFORMER
CWA	CONSTANT WATTAGE AUTOTRANSFORMER
DTT	DOUBLE TWIN TUBE
DWG(S)	DRAWING(S)
EB	ELECTRONIC BALLAST
EC	EMPTY CONDUIT
ECB	ENCLOSED CIRCUIT BREAKER
EF	EXHAUST FAN
EFF	ENERGY EFFICIENT
EJ	EXPANSION JOINT
EM	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
EQUIP	EQUIPMENT
EWC	ELECTRIC WATER COOLER
EWH	ELECTRIC WATER HEATER
EXIST	EXISTING (E)
ER	EXISTING TO REMAIN
EXP	EXPLOSION PROOF
FAAP	FIRE ALARM ANNUNCIATOR PANEL
FACU	FIRE ALARM CONTROL UNIT
FBO	FURNISHED BY OTHERS
FCU	FAN COIL UNIT
FMS	FACILITY MANAGEMENT SYSTEM
FVNR	FULL VOLTAGE NON–REVERSING
FWE	FURNISHED WITH EQUIPMENT
GFCI/GF	GROUND FAULT CIRCUIT INTERRUPTER
G/GND	GROUND
HP	HORSEPOWER
HPF	HIGH POWER FACTOR
HACR	HEATING/AIR CONDITIONING RATED
INCAN	INCANDESCENT
JB	JUNCTION BOX
KW	KILOWATTS
LTG	LIGHTING
MAG	MAGNETIC
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCCB	MOLDED CASE CIRCUIT BREAKER
MCS	MOLDED CASE SWITCH
MLO	MAIN LUGS ONLY
MTD	MOUNTED
MTG	MOUNTING
N	NEUTRAL
NEC	NATIONAL ELECTRICAL CODE
NF	NON–FUSED
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
NWR	NO WORK REQUIRED
OF	OWNER FURNISHED
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED, OWNER INSTALLED
PB	PUSH BUTTON
PMT	PAD MOUNTED TRANSFORMER
PNL(S)	PANEL(S)
RECEPT	RECEPTACLE
REQD	REQUIRED
RM	ROOM
RGS	RIGID GALVANIZED STEEL CONDUIT
SMR	SURFACE MOUNTED RACEWAY
ST	SHUNT TRIP
RTU	ROOF TOP UNIT
STP	SHIELDED TWISTED PAIR
SPST	SINGLE–POLE, SINGLE–THROW
TBB	TELEPHONE BACKBOARD
TEL	TELEPHONE
TOC	TOP OF CONCRETE
TOF	TOP OF FIXTURE
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSION
TYP	TYPICAL
UH	UNIT HEATER
UNO	UNLESS NOTED OTHERWISE
UG	UNDERGROUND
UP	UNDERGROUND POWER
UT	UNDERGROUND TELEPHONE
UTP	UNSHIELDED TWISTED PAIR
V	VOLTS
VA	VOLT–AMPERES
VFD	VARIABLE FREQUENCY DRIVE
W	WATTS
WP	WEATHERPROOF
XFMR	TRANSFORMER
2S1W	2 SPEED, 1 WINDING

City of Hanahan
Hanahan, South Carolina

STEWARD STREET
PARK RENOVATIONS

HANAHAN
SOUTH CAROLINA

SOUTH CAROLINA LIVE OAK CONSULTANTS LLC CERTIFICATE OF AUTHORIZATION NO. 3886

SOUTH CAROLINA PROFESSIONAL ENGINEER NO. 15521 05/12/23 ROBERT N. BAIRD III

CITY OF HANAHAN SOUTH CAROLINA

ADC ENGINEERING
1226 YEAMANS HALL ROAD
HANAHAN, SC 29410
843-566-0161
ADCENGINEERING.COM

LOC
Live Oak Consultants, LLC
Engineers, Project Managers & Planners
PO Box 60490
North Charleston, SC 29419
MAIN: (843) 529-9428
Email: Info@LiveOakConsultants.com
LOC PROJECT NO.: 20210059

811 Know what's below. Call before you dig.

DATE:	05/12/2023
ADC PROJECT #:	20381
DESIGNED:	J. GERVACIO
CHECKED:	N. BAIRD
DRAWN:	J. GERVACIO
REVISION:	

ELECTRICAL GENERAL NOTES, LEGEND, & ABBREVIATIONS

E001

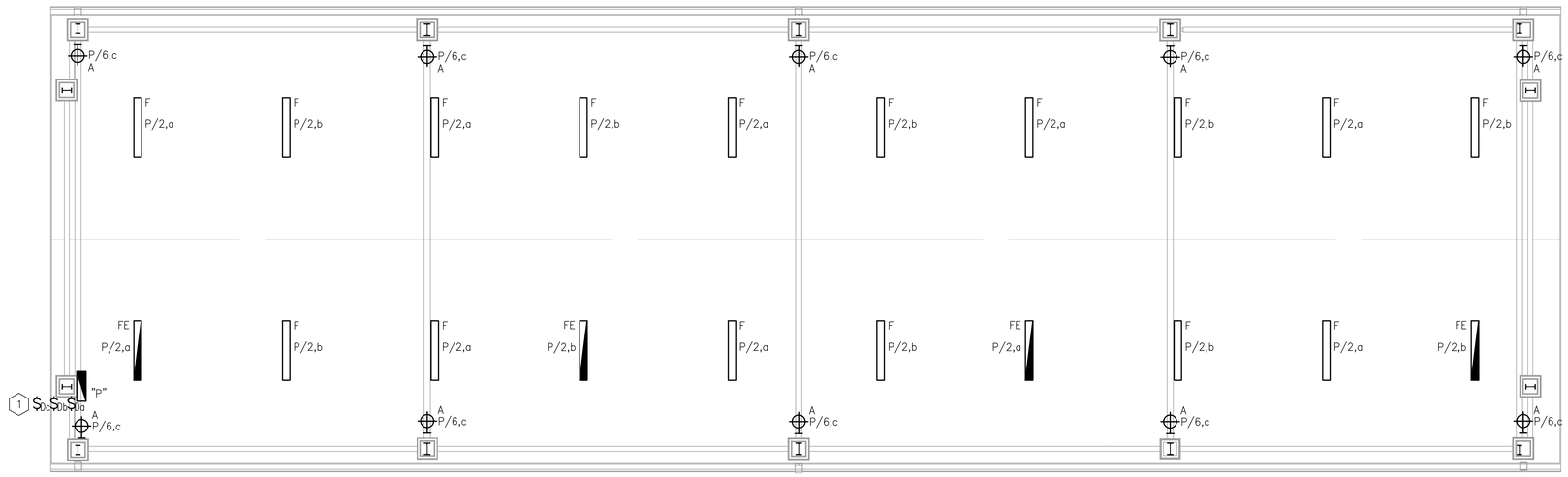
CONSTRUCTION DOCUMENTS

GENERAL NOTES:

1. REFER TO DRAWING E001 FOR ELECTRICAL GENERAL NOTES, LEGENDS, & ABBREVIATIONS.
2. REFER TO DRAWING E501 FOR ELECTRICAL SINGLE LINE DIAGRAM, & DETAILS.
3. REFER TO DRAWING E601 FOR ELECTRICAL PANEL SCHEDULES.
4. MOUNT LIGHT FIXTURES (TYPE 'F') AT BOTTOM OF CEILING JOIST.

KEYED NOTES:

1. PAVILION LIGHT SWITCHES AND CEILING FAN CONTROLLERS TO BE INSTALLED IN A NEMA 3R LOCKABLE ENCLOSURE. MOUNT ENCLOSURE WHERE CENTER OF OPERATIONAL SWITCH HANDLE NOT TO EXCEED 6'-7" AFF.



LIGHTING PLAN - PAVILION

SCALE: 1/4"=1'-0"

City of Hanahan
Hanahan, South Carolina

STEWARD STREET
PARK RENOVATIONS

HANAHAN
SOUTH CAROLINA

SOUTH CAROLINA PROFESSIONAL ENGINEER
No. 15521
05/12/23
ROBERT N. BAIRD

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CHECKED:	N. BAIRD
DRAWN:	J. GERVACIO
REVISION:	

PAVILION
ELECTRICAL LIGHTING
PLAN

E101

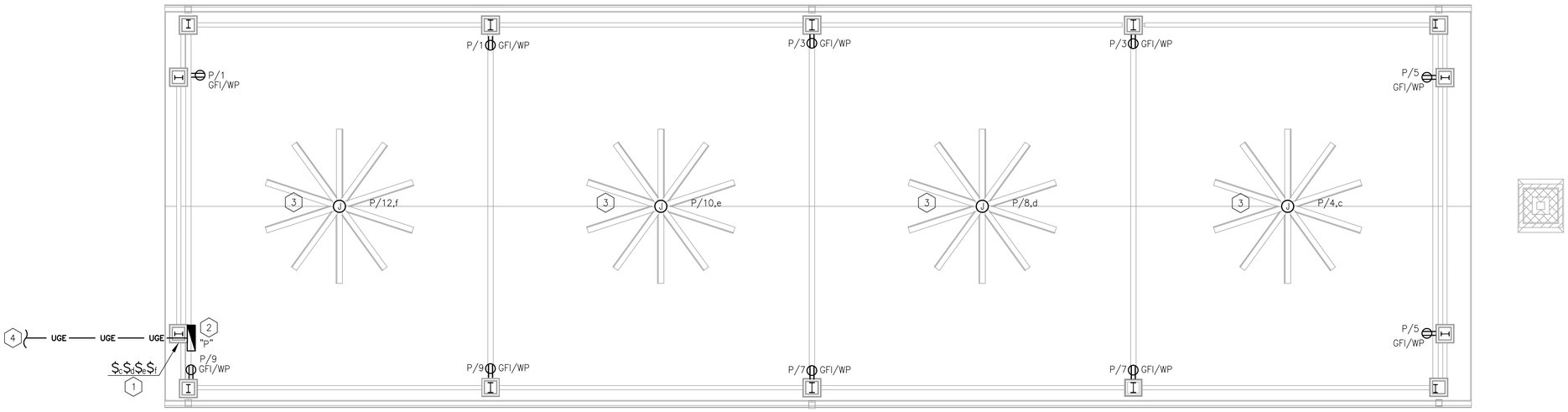
CONSTRUCTION DOCUMENTS

GENERAL NOTES:

1. REFER TO DRAWING E001 FOR ELECTRICAL GENERAL NOTES, LEGENDS, & ABBREVIATIONS.
2. REFER TO DRAWING E501 FOR ELECTRICAL SINGLE LINE DIAGRAM, & DETAILS.
3. REFER TO DRAWING E601 FOR ELECTRICAL PANEL SCHEDULES.
4. INSTALL RECEPTACLES 48" AFF.

KEYED NOTES:

1. PAVILION LIGHT SWITCHES AND CEILING FAN CONTROLLERS TO BE INSTALLED IN A NEMA 3R LOCKABLE ENCLOSURE. MOUNT ENCLOSURE WHERE CENTER OF OPERATIONAL SWITCH HANDLE NOT TO EXCEED 6'-7" AFF.
2. MOUNT PANELBOARD AT HEIGHT WHERE TOP CIRCUIT BREAKER HANDLE NOT TO EXCEED 6'-7" AFF.
3. 12' INDUSTRIAL CEILING FAN (BIG ASS FANS, ESSENCE). MOUNT FAN AT BOTTOM OF CEILING JOIST. FAN'S FINISH TO BE DETERMINED BY OWNER.
4. SEE ELECTRICAL SITE PLAN DWG E104 FOR CONTINUATION.



POWER PLAN - PAVILION

SCALE: 1/4"=1'-0"

City of Hanahan
Hanahan, South Carolina

STEWARD STREET
PARK RENOVATIONS

HANAHAN
SOUTH CAROLINA

SOUTH CAROLINA
LIVE OAK CONSULTANTS LLC
NO. 3886
CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA
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DRAWN:	J. GERVACIO
REVISION:	

PAVILION
ELECTRICAL POWER
PLAN

E102

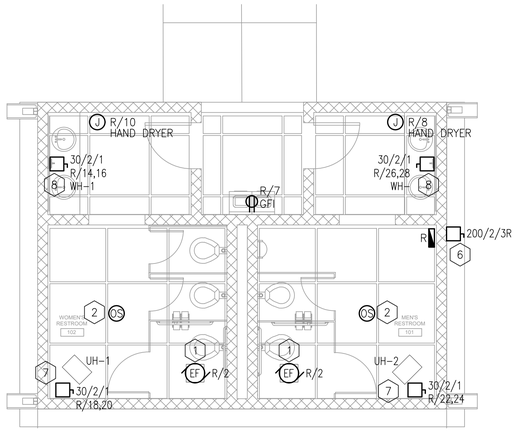
CONSTRUCTION DOCUMENTS

GENERAL NOTES:

1. REFER TO DRAWING E001 FOR ELECTRICAL GENERAL NOTES, LEGENDS, & ABBREVIATIONS.
2. REFER TO DRAWING E501 FOR ELECTRICAL SINGLE LINE DIAGRAM & DETAILS.
3. REFER TO DRAWING E601 FOR ELECTRICAL PANEL & LIGHT FIXTURE SCHEDULES.

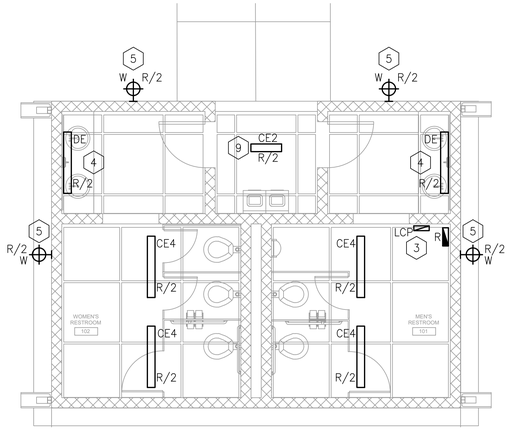
KEYED NOTES:

1. RESTROOM EXHAUST FAN, SEE MECHANICAL SCHEDULE DWG M0-02.
2. CEILING MOUNT OCCUPANCY SENSOR TO CONTROL RESTROOM EXHAUST FAN.
3. LIGHT CONTROL PANEL "LCP", CONTROLLED VIA PHOTOCELL AND ASTRONOMICAL TIMECLOCK WITH INTERNAL HAND-OFF-AUTO (H-O-A) SELECTOR SWITCH. MOUNT PANEL @ 60"AFF.
4. WALL MOUNT VANITY LIGHT FIXTURE @ 12" BELOW CEILING.
5. WALL MOUNT EXTERIOR LIGHT FIXTURE @ 8'-0" AFF. FIXTURE TO BE CONTROLLED VIA LIGHT CONTROL PANEL "LCP".
6. RESTROOM MAIN DISCONNECT, PROVIDE LABEL ON COVER THAT READS "THIS RESTROOM IS FED FROM MAIN PANEL LOCATED IN PAVILION".
7. ELECTRIC SPACE HEATER DISCONNECT, MOUNT DISCONNECT ON WALL ADJACENT TO UNIT HEATER. SEE MECHANICAL DWG M101 FOR EXACT LOCATION OF UNIT HEATER.
8. ELECTRIC WATER HEATER DISCONNECT ABOVE CEILING, MOUNT DISCONNECT ON WALL ADJACENT TO WATER HEATER. SEE PLUMBING DWG P101 FOR EXACT LOCATION OF WATER HEATER.



POWER PLAN - RESTROOMS

SCALE: 1/4"=1'-0"



LIGHTING PLAN - RESTROOMS

SCALE: 1/4"=1'-0"

City of Hanahan
Hanahan, South Carolina

STEWARD STREET
PARK RENOVATIONS

HANAHAN
SOUTH CAROLINA

SOUTH CAROLINA PROFESSIONAL ENGINEER
LIVE OAK CONSULTANTS LLC
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REVISION:	

RESTROOM BUILDING
ELECTRICAL LIGHTING
& POWER PLANS

E103

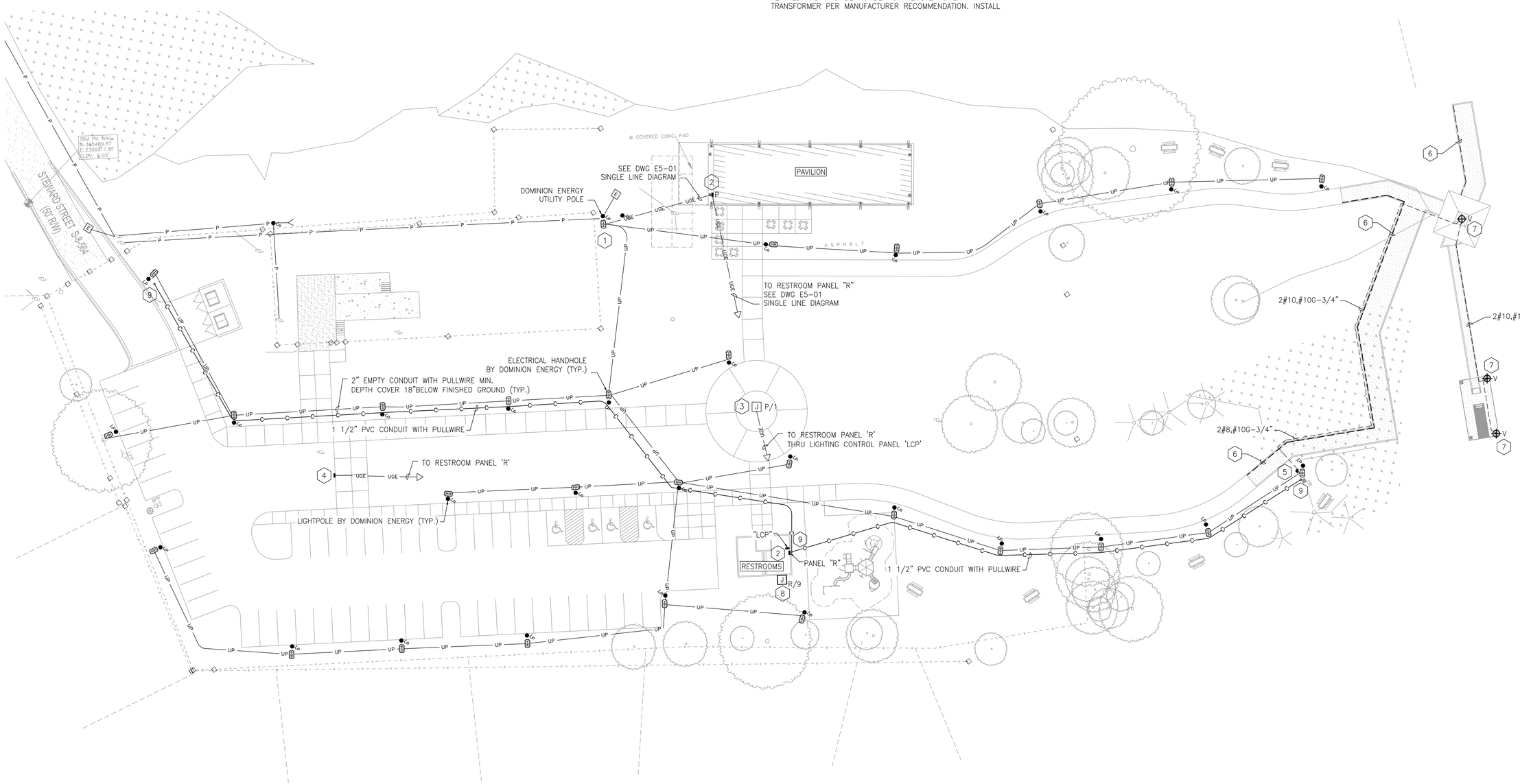
CONSTRUCTION DOCUMENTS

KEYED NOTES:

1. INSTALL UTILITY METER BASE ON POLE PER DOMINION ENERGY SPECIFICATIONS. SEE SINGLE LINE DIAGRAM DWG E5-01.
2. MOUNT PANEL WHERE TOP CIRCUIT BREAKER HANDLE NOT TO EXCEED 6'-7" AFF.
3. FLAG POLE LIGHT, PROVIDE WEATHERPROOF JBOX @ 12" AFG. CIRCUIT CONTROLLED VIA LIGHTING CONTROL PANEL 'LCP'.
4. POWER PEDESTAL DIRECT BURIAL DISTRIBUTION PANEL, 100A, 120/240V ON GALVANIZED NEMA 3R ENCLOSURE. BASIS OF DESIGN: GENERAL ELECTRIC GE1LU532ES EARTH BURIAL PEDESTAL.
5. DOCK LIGHTS POINT OF CONNECTION. PROVIDE PEDESTAL/POLE MOUNT METER BASE WITH 30A, 120V, 1P, NEMA 3R FUSED DISCONNECT WITH 30A FUSE. SEE DWG E5-01 DETAIL #4.
6. ENCAPSULATED FLEXIBLE LINEAR LED LIGHT (TYPE 'Q' – SEE LIGHT FIXTURE SCHEDULE E6-01), TO BE MOUNTED AT BOTTOM OF BOARDWALK RAIL. LENGTH OF FIXTURE SHALL BE FIELD VERIFIED AND PROVIDE NUMBER OF REMOTE POWER TRANSFORMER PER MANUFACTURER RECOMMENDATION. INSTALL REMOTE POWER TRANSFORMER IN A CONCEALED LOCATION. DOCK CANOPY LIGHT (TYPE 'V' SEE LIGHT FIXTURE SCHEDULE E6-01).
7. FLOATING DOCK LIGHT (TYPE 'V' SEE LIGHT FIXTURE SCHEDULE E6-01)
8. IRRIGATION CONTROLLER, PROVIDE WEATHERPROOF JUNCTION BOX @ 24"AFG.
9. SECURITY CAMERA TERMINATION POINT, COORDINATE WITH CITY OF HANAHAN FOR EXACT LOCATION.

GENERAL NOTES:

1. REFER TO DRAWING E001 FOR ELECTRICAL GENERAL NOTES, LEGENDS, & ABBREVIATIONS.
2. REFER TO DRAWING E501 FOR ELECTRICAL SINGLE LINE DIAGRAM, & DETAILS.
3. REFER TO DRAWING E601 FOR ELECTRICAL PANEL SCHEDULES.
4. CONCEAL PVC CONDUIT AT BOTTOM OF BOARDWALK. USE AND INSTALL 2 HOLE PVC CONDUIT CLAMP EVERY 3'-0" AND USE STAINLESS STEEL FASTENERS.



SITE PLAN

SCALE: 1"=20'-0"

CONSTRUCTION DOCUMENTS

City of Hanahan
Hanahan, South Carolina

STEWARD STREET
PARK RENOVATIONS

HANAHAN
SOUTH CAROLINA

SOUTH CAROLINA LIVE OAK CONSULTANTS LLC NO. 3886 CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 15521 05/12/23 ROBERT N. BAIRD

CITY OF HANAHAN SOUTH CAROLINA

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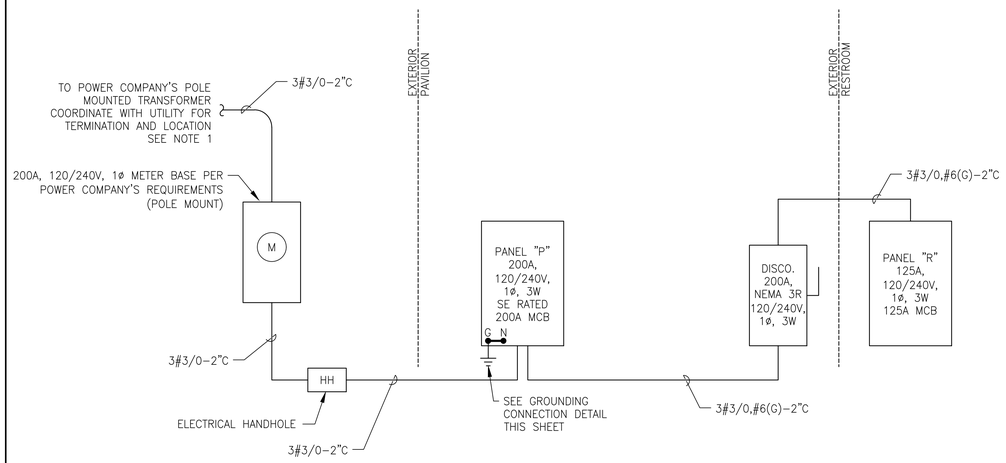
REVISION:	

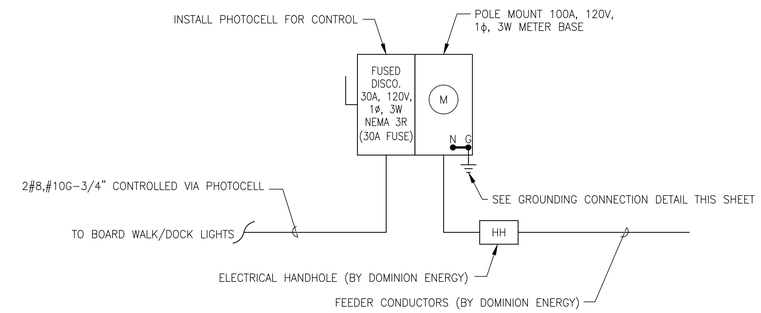
SITE
ELECTRICAL PLAN

E104



PAVILION POWER RISER DIAGRAM

1 E5-01 **DETAIL** SCALE: N.T.S



DOCK POWER POINT OF CONNECTION RISER DIAGRAM

4 E5-01 **DETAIL** SCALE: N.T.S

NOTES:

1. IF UTILITY DETERMINES THAT THIS POLE MOUNTED TRANSFORMER IS REQUIRED TO BE REPLACED WITH A LARGER SIZE, THE CONTRACTOR SHALL NOTIFY THE ENGINEER TO PERFORM A NEW FAULT CURRENT CALCULATION. INCREASING THE SIZE OF THE SERVICE TRANSFORMER IMPACTS THE AVAILABLE SHORT CIRCUIT INTO THIS BUILDING.
2. INSTALL FAULT CURRENT CALCULATION PLACARD PER CALCULATION NOTE, THIS SHEET.

FAULT CURRENT CALCULATION

PER NEC 110.24, LIVE OAK CONSULTANTS HAS PERFORMED A FAULT CURRENT CALCULATION ON THIS PROJECT. CALCULATION IS BASED ON THE FOLLOWING:

ESTIMATED 25 KVA POLE MOUNTED (UTILITY PROVIDED) TRANSFORMER WITH A SECONDARY VOLTAGE OF 120/240V, SINGLE-PHASE, THREE-WIRE. ASSUMED IMPEDANCE IS 2.0%.

THE ESTIMATED 25 KVA TRANSFORMER IS LOCATED APPROXIMATELY 50' AWAY FROM MAIN PANEL "P" MOUNTED IN THE BUILDING.

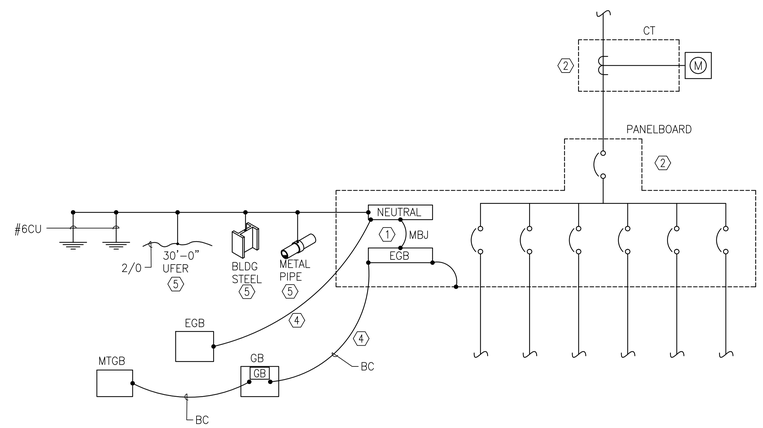
SERVICE ENTRANCE CONDUCTORS ARE COMPRISED OF 3#3/0 AWG COPPER CONDUCTORS OR EQUAL.

BASED ON THE ABOVE DESIGN AND ASSUMPTIONS, WE CALCULATE THE MAXIMUM FAULT CURRENT AT THE SERVICE EQUIPMENT TO BE 4,506 AMPS AT THE METER BASE MOUNTED ON THE BUILDING.

THE ELECTRICAL GEAR SHALL BE RATED FOR 10,000 AMPS OF FAULT CURRENT.

CONTRACTOR SHALL PROVIDE A FIELD MARKING OF SUFFICIENT DURABILITY AND IS SUBJECT TO AUTHORITY HAVING JURISDICTION'S APPROVAL LOCATED AT THE MAIN PANEL. MARKING SHALL READ AS FOLLOWS:

"MAXIMUM AVAILABLE FAULT CURRENT 4,506 AMPS,
CALCULATED 12/10/21"



TYPICAL ELECTRICAL SERVICE GROUNDING/BONDING (SEE GROUNDING NOTES)

3 E5-01 **DETAIL** N.T.S.

GROUNDING LEGENDS:

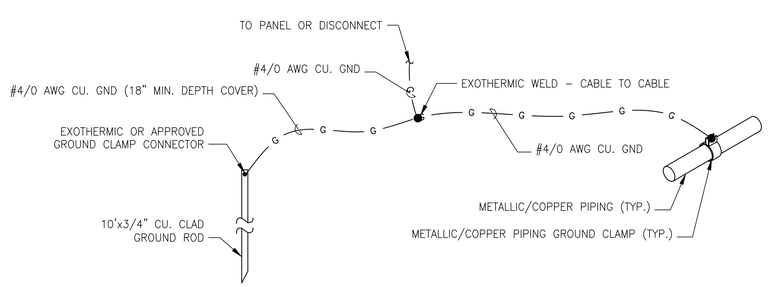
MTGB – MAIN TELECOMMUNICATIONS GROUNDING BUSBAR
GB – INTERSYSTEM BONDING TERMINAL.
BC – BONDING CONDUCTOR.
MBJ – MAIN BONDING JUMPER
EGB – EQUIPMENT GROUNDING BUS
MS – MAIN SERVICE EQUIPMENT
CT – CT / METERING CABINET (IF APPLICABLE)

BC CONDUCTOR SIZE

≤ 25'-#4 CU
≤ 50'-#1 CU
≤ 75'-#2/0 CU
> 75'-#3/0 CU

GROUNDING NOTES:

1. SIZE PER NEC 250.66.
2. PROVIDE GROUNDING/BONDING SYSTEM CONNECTIONS TO MAIN ELECTRICAL SERVICE AT THE LOCATION OF THE MAIN SERVICE DISCONNECT.
3. SEE POWER RISER DIAGRAM FOR GROUNDING SIZING THIS PROJECT.
4. #4/0 COPPER GROUND WIRE WITH GREEN INSULATOR WITH YELLOW STRIPE.
5. PLACEMENT OF BONDING OF GROUNDING CONDUCTOR SHALL BE DONE PRIOR TO POURING OF CONCRETE.



TYPICAL GROUNDING CONNECTION

2 E5-01 **DETAIL** SCALE: N.T.S

CONSTRUCTION DOCUMENTS

City of Hanahan
Hanahan, South Carolina

STEWARD STREET PARK RENOVATIONS

HANAHAN SOUTH CAROLINA

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CHECKED:	N. BAIRD
DRAWN:	J. GERVACIO
REVISION:	

ELECTRICAL
SINGLE LINE DIAGRAM,
DETAILS

E501

PANEL NAME:	P (SURFACE MOUNT, NEMA 3R)	LOCATION:	PAVILLION
VOLTAGE:	240 /120V - 1PH, 3W	AIC:	10KAIC
AMP RATING:	200A	FEEDER CONDUCTOR SIZE:	SEE SINGLE LINE
MLO / MAIN BREAKER:	200A MCB	FED FROM:	SEE SINGLE LINE

LOAD NAME	WIRE SIZE	CONDUIT SIZE	BREAKER SIZE	POLES	CIRCUIT NUMBER	DEMAND FACTOR	LOAD TYPE	PHASE A LOAD (VA)	PHASE A LOAD (VA)	PHASE B LOAD (VA)	PHASE B LOAD (VA)	LOAD TYPE	DEMAND FACTOR	CIRCUIT NUMBER	POLES	BREAKER SIZE	CONDUIT SIZE	WIRE SIZE	LOAD NAME
REC - PAVILLION	2#12, #12G	1/2"	20	1	1	1.00	N	360	1218			C	1.00	2	1	20	3/4"	2#12,#12G	LTS - PAVILLION
REC - PAVILLION	2#12, #12G	1/2"	20	1	3	1.00	N			360	1200	C	1.00	4	1	20	3/4"	2#12,#12G	FAN
REC - PAVILLION	2#12, #12G	1/2"	20	1	5	1.00	N	360	434			N	1.00	6	1	20	3/4"	2#12,#12G	LTS - PAVILLION
REC - PAVILLION	2#12, #12G	1/2"	20	1	7	1.00	N			360	1200	N	1.00	8	1	20	3/4"	2#12,#12G	FAN
			20	1	9	1.00	N		1200			N	1.00	10	1	20	3/4"	2#12,#12G	FAN
SPARE			20	1	11	1.00	N				1200	N	1.00	12	1	20	3/4"	2#12,#12G	FAN
SPARE			20	1	13	1.00	N					N	1.00	14	1	20			SPARE
SPARE			20	1	15	1.00	N					N	1.00	16	1	20			SPARE
SPARE			20	1	17	1.00	N					N	1.00	18	1	20			SPARE
SPARE			20	1	19	1.00	N					N	1.00	20	1	20			SPARE
SPARE			20	1	21	1.00	N					N	1.00	22	1	20			SPARE
SPARE			20	1	23	1.00	N					N	1.00	24	1	20			SPARE
SPARE			20	1	25	1.00	N					N	1.00	26	1	20			SPARE
SPARE			20	1	27	1.00	N				12550	N	1.00	28	2	125	SEE SINGLE LINE DIAGRAM	SEE SINGLE LINE DIAGRAM	PANEL "R" RESTROOM
SPARE			20	1	29	1.00	N		12628			N	1.00	30					

CONNECTED LOAD PER PHASE	16200	16870			
TOTAL CONNECTED LOAD VA		33070		CONNECTED AMPS AT 240V	137.8
DEMAND LOAD PER PHASE	16200	16870			
TOTAL DEMAND LOAD VA		33070		DEMAND AMPS AT 240V	137.8
DIVERSITY		1.0		DEMAND AMPS AT 240V	137.8
LOAD TYPE "C" CONTINUOUS LOAD — DEMAND VOLT AMP (VA) CONTINUOUS	2418				
DEMAND AMPS CONTINUOUS	10.1				
LOAD TYPE "N" NONCONTINUOUS LOAD — DEMAND VOLT AMP (VA) NON-CONTINUOUS	30652				
DEMAND AMPS NON-CONTINUOUS	127.7		140.3	DEMAND FEEDER AMPS = [(1.25 X CONTINUOUS) + NON-CONTINUOUS]	

PANEL NAME:	R (SURFACE MOUNT)	LOCATION:	RESTROOM
VOLTAGE:	240 /120V - 1PH, 3W	AIC:	10KAIC
AMP RATING:	125A	FEEDER CONDUCTOR SIZE:	SEE SINGLE LINE
MLO / MAIN BREAKER:	125A MCB	FED FROM:	SEE SINGLE LINE

LOAD NAME	WIRE SIZE	CONDUIT SIZE	BREAKER SIZE	POLES	CIRCUIT NUMBER	DEMAND FACTOR	LOAD TYPE	PHASE A LOAD (VA)	PHASE A LOAD (VA)	PHASE B LOAD (VA)	PHASE B LOAD (VA)	LOAD TYPE	DEMAND FACTOR	CIRCUIT NUMBER	POLES	BREAKER SIZE	CONDUIT SIZE	WIRE SIZE	LOAD NAME
LGT - FLAGPOLE	2#12, #12G	3/4"	20	1	1	1.00	C	100	278			C	1.00	2	1	20	3/4"	2#12,#12G	LTS - RESTROOM
FOOD TRUCK PANEL	3#8,#10G	3/4"	100	2	3	1.00	N			6000		N	1.00	4	1	20			SPARE
					5	1.00	C	6000				N	1.00	6	1	20			SPARE
ELECTRIC WATER COOLER	2#12, #12G	3/4"	20	1	7	1.00	N			500	1450	N	1.00	8	1	20	3/4"	2#12,#12G	HAND DRYER - MENS
IRRIGATION	2#12, #12G	3/4"	20	1	9	1.00	C	500	1450			N	1.00	10	1	20	3/4"	2#12,#12G	HAND DRYER -WOMENS
SPARE			20	1	11	1.00	N				300	N	1.00	12	1	20	3/4"	2#12,#12G	LCP
SPARE			20	1	13	1.00	N		650			C	1.00	14	2	20	3/4"	2#12,#12G	WATER HEATER (WH-1) WOMEN'S RESTRM
SPARE			20	1	15	1.00	C				650	C	1.00	16					
SPACE				1	17	1.00	N		1500			C	1.00	18	2	20	3/4"	2#12,#12G	UNIT HEATER (UH-1) WOMEN'S RESTRM
SPACE				1	19	1.00	N				1500	C	1.00	20					
SPACE				1	21	1.00	N		1500			C	1.00	22	2	20	3/4"	2#12,#12G	UNIT HEATER (UH-2) MEN'S RESTRM
SPACE				1	23	1.00	N				1500	C	1.00	24					
SPACE				1	25	1.00	N		650			C	1.00	26	2	20	3/4"	2#12,#12G	WATER HEATER (WH-2) MEN'S RESTRM
SPACE				1	27	1.00	C				650	C	1.00	28					
SPACE				1	29	1.00	N					N	1.00	30	1				SPACE

CONNECTED LOAD PER PHASE	12628	12550			
TOTAL CONNECTED LOAD VA		25178		CONNECTED AMPS AT 240V	104.9
DEMAND LOAD PER PHASE	12628	12550			
TOTAL DEMAND LOAD VA		25178		DEMAND AMPS AT 240V	104.9
DIVERSITY		1.0		DEMAND AMPS AT 240V	104.9
LOAD TYPE "C" CONTINUOUS LOAD — DEMAND VOLT AMP (VA) CONTINUOUS	15478				
DEMAND AMPS CONTINUOUS	64.5				
LOAD TYPE "N" NONCONTINUOUS LOAD — DEMAND VOLT AMP (VA) NON-CONTINUOUS	9700				
DEMAND AMPS NON-CONTINUOUS	40.4		121.0	DEMAND FEEDER AMPS = [(1.25 X CONTINUOUS) + NON-CONTINUOUS]	

LIGHT FIXTURE SCHEDULE

SYMBOL	DESCRIPTION	MANUFACTURER	CATALOG NUMBER	VOLTAGE	LAMPS	FIXTURE WATTAGE	NOTES
A	8" ROUND WALL MOUNT UPLIGHT/DOWNLIGHT CYLINDER	SPECTRUM LIGHTING	C0816ADJUDXT20LWD20LWD40KEXWL/TCYGL/WM3/PT	UNV	LED	43.4	MOUNT CENTER OF FIXTURE 8'-0" AFF
BR	44" ALUMINUM BALLARD	KIM LIGHTING	PA7R-FT-CL3-12L-020-4K7-44A-ROP-L–DBS-UNV	UNV	LED	21.7W	LIGHT CONTROLLED VIA LIGHT CONTROL PANEL "LCP", INSTALL 1 - 20A, 120V DUPLEX RECEPTACLE
BG	44" ALUMINUM BALLARD	KIM LIGHTING	PA7R-FT-CL3-12L-020-4K7-44A-2GEB-DBS-UNV	UNV	LED	21.7W	LIGHT CONTROLLED VIA LIGHT CONTROL PANEL "LCP", INSTALL 2 - 30A, 120/240V, 3 POLE, 4W RECEPTACLE FOOD TRUCK HOOK-UP
CE4	4' LED CURVED WRAP	ILP	SQ4-30WLED-UNIV-40EM7-FIOS	UNV	LED	30W	WITH EMERGENCY BATTERY, OCC. SENSOR
CE2	2' LED CURVED WRAP	ILP	SQ2-22WLED-UNIV-40EM7-BDXX	UNV	LED	22W	WITH EMERGENCY BATTERY. OCC. SENSOR
DE	4' LED VANITY LIGHT	COLUMBIA	CWM4-40MWSM-FRFA-EU-ELL4HFU	UNV	LED	32W	WITH EMERGENCY BATTERY, OCC. SENSOR
F	4' LED ENCLOSED GASKETED FIBERGLASS	COLUMBIA	LXEM4-40ML-RFA-E-U	UNV	LED	42W	
FE	4' LED ENCLOSED GASKETED FIBERGLASS	COLUMBIA	LXEM4-40ML-RFA-E-U-ELL14	UNV	LED	42W	WITH EMERGENCY BATTERY
Q	ENCAPSULATED FLEXIBLE LINEAR LED	Q TRAN LED	WURM-SW WSCS WET 35 SO ENC/TL P1 BWBRL BWBRL	120V	LED	3.6W	LENGTH AND SUPPLY TRANSFORMER - FIELD VERIFIED
W	LED WALL MOUNT	SPECTRUM LIGHTING	WJ1LW-27L405K-EX-FJ1-CP104-PT	UNV	LED	18W	CONTROLLED VIA LIGHT CONTROL PANEL "LCP"
V	LED SURFACE MOUNT	SPECTRUM LIGHTING	SJ1GV-27L40K-EX-FJ1-CP104-PT	UNV	LED	18W	
NOTES:	WHERE FIXTURE IS NOTED WITH EMERGENCY BATTERY, PROVIDE UNSWITCHED CIRCUIT TO CHARGE BATTERY						

CONSTRUCTION DOCUMENTS

City of Hanahan
Hanahan, South Carolina

STEWARD STREET
PARK RENOVATIONS

HANAHAN
SOUTH CAROLINA

SOUTH CAROLINA PROFESSIONAL ENGINEER No. 15521 05/12/23 ROBERT N. BAIRD

LIVE OAK CONSULTANTS LLC NO. 3886 CERTIFICATE OF AUTHORIZATION

CITY OF HANAHAN SOUTH CAROLINA

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LOC PROJECT NO.: 20210059

811 Know what's below. Call before you dig.

DATE: 05/12/2023
ADC PROJECT #: 20381
DESIGNED: J. GERVACIO
CHECKED: N. BAIRD
DRAWN: J. GERVACIO
REVISION:

ELECTRICAL
PANEL & LIGHT
FIXTURE SCHEDULES

E601

GENERAL NOTES:

1. PROVIDE ALL MATERIALS AND LABOR NECESSARY FOR COMPLETE AND PROPERLY FUNCTIONING PLUMBING SYSTEMS.
2. WORK SHALL CONFORM TO OR MEET THE REQUIREMENTS OF THE MOST CURRENT EDITION OF:
   A. INTERNATIONAL PLUMBING CODE
   B. ALL FEDERAL, STATE AND LOCAL CODES AND ORDINANCES WHICH APPLY TO THIS WORK.
3. DRAWING IS DIAGRAMMATIC IN NATURE AND IS NOT INTENDED TO BE SCALED FOR DIMENSIONS.
4. ALL MATERIALS SHALL MEET THE REQUIREMENTS OF UL WHERE UL STANDARDS ARE ESTABLISHED FOR THOSE ITEMS. ALL ITEMS SHALL BE CLASSIFIED BY UL AS SUITABLE FOR THE PURPOSE USED.
5. ALL ITEMS SHALL BE NEW AND ALL MATERIALS/EQUIPMENT/DEVICES SHALL BE CURRENT PRODUCTS BY MANUFACTURERS REGULARLY ENGAGED IN THE PRODUCTION OF SUCH PRODUCTS.
6. COORDINATE LOCATION OF PLUMBING WORK WITH OTHER TRADES TO AVOID CONFLICTS AND INTERFERENCES.
7. INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS AND RECOMMENDATIONS.
8. COORDINATE AND OBTAIN PERMITS AND INSPECTIONS FROM AUTHORITY HAVING JURISDICTION.
9. PROVIDE OWNER WITH CERTIFICATE OF FINAL INSPECTION AND ACCEPTANCE FROM AUTHORITY HAVING JURISDICTION.
10. CLEANOUTS, LINE SIZE, UNLESS NOTED OTHERWISE.
11. FLOOR DRAINS, LINE SIZE, UNLESS NOTED OTHERWISE. THE FLOOR DRAINS SHALL BE FLUSH MOUNTED WITH FINISHED FLOOR AND THE FLOOR SHALL SLOPE TO THE DRAINS AT A MINIMUM OF 1/8" PER FOOT. COORDINATE WITH ARCHITECTURAL AND STRUCTURAL.
12. VALVES SHALL BE LINE SIZE UNLESS NOTED OTHERWISE.
13. ABOVE GROUND WATER PIPING SHALL BE TYPE L COPPER. UNDERGROUND WATER PIPING SHALL BE TYPE K COPPER.
14. WASTE, DRAIN, AND VENT PIPING BELOW GRADE SHALL BE STANDARD WEIGHT, TYPE 1, PVC. INSTALLED IN ACCORDANCE WITH ASTM D2321.
15. COLD WATER PIPING SHALL BE INSULATED WITH 1" THICK GLASS FIBER ('K' OF 0.24 AT 75°F) WITH VAPOR BARRIER. HOT WATER PIPING SHALL BE INSULATED WITH 1-1/2" THICK GLASS FIBER ('K' OF 0.24 AT 75°F) WITHOUT VAPOR BARRIER.
16. ALL ROOF PENETRATIONS SHALL BE COORDINATED WITH ROOFING CONTRACTOR TO ENSURE ROOF BOND WILL BE MAINTAINED.
17. PROVIDE ALL OPERATION AND MAINTENANCE MANUALS FOR PLUMBING EQUIPMENT TO BUILDING OWNER.

PLUMBING LEGENDS & ABBREVIATIONS

NOTE: ALL SYMBOL DESCRIPTIONS ARE SUBJECT TO MODIFICATION ON THE DRAWINGS.
ALL SYMBOLS NOT NECESSARILY USED ON THIS PROJECT.

GENERAL SYMBOLS:

- POINT OF CONNECTION
- POINT OF REMOVAL
- KEY NOTE
- DEMOLITION NOTE
- CONSTRUCTION NOTE
- REVISION
- DETAIL BUBBLE (A / M501)
- SECTION BUBBLE (1 / M501)

PLUMBING ABBREVIATIONS:

AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AD	ACCESS DOOR
BLDG	BUILDING
CA	COMPRESSED AIR
CD	CONDENSATE DRAIN
CO	CLEANOUT
CW	DOMESTIC COLD WATER
DCV	DOUBLE CHECK VALVE
Ø or DIA	DIAMETER
DN	DOWN
(E)	EXISTING
EES	EMERGENCY EYE AND SHOWER WASH
EEW	EMERGENCY EYE WASH
EF	EXHAUST FAN
EL	ELEVATION
FCO	FLOOR CLEAN OUT
FCV	FLOOR CLEAN OUT
FD	FLOOR DRAIN
FDC	FIRE DEPARTMENT CONNECTION
FS	FLOOR SINK
GCO	GRADE CLEAN OUT
GT	GREASE TRAP
HB	HOSE BIBB
HD	HUB DRAIN
HW	DOMESTIC HOT WATER
HWR	DOMESTIC HOT WATER RETURN
HWRP	HOT WATER RECIRCULATION PUMP
(N)	NEW
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
P-1	PLUMBING FIXTURE
PIV	POST INDICATING VALVE
PRV	PRESSURE RELIEF VALVE
PSIA	POUNDS PER SQUARE INCH ABSOLUTE
PSIG	POUNDS PER SQUARE INCH GAUGE
PT	PLASTER TRAP
(R)	REMOVE / RELOCATE
R.I.	ROUGH-IN
RPBP	REDUCED PRESSURE BACKFLOW PREVENTER
SAN	SANITARY
SP	SUMP/GRINDER PUMP
SS	SOLIDS SEPARATOR
STM	STEAM
TD	TRENCH DRAIN
TMV	THERMOSTATIC MIXING VALVE
TP	TRAP PRIMER
V	SANITARY VENT
VTR	VENT THROUGH ROOF
WCO	WALL CLEAN OUT
WH-1	WATER HEATER

VALVES & FITTINGS:

- GATE VALVE
- BALL VALVE
- BUTTERFLY VALVE
- CHECK VALVE
- GLOBE VALVE
- BALANCING VALVE
- PLUG VALVE
- CONTROL or SHUT-OFF VALVE
- SOLENOID VALVE
- NEEDLE VALVE
- THERMAL EXPANSION VALVE
- AUTOMATIC FLOW CONTROL VALVE
- BACK FLOW PREVENTER
- DOUBLE CHECK BACK FLOW PREVENTER
- PRESSURE REDUCING, SELF CONTAINED VALVE
- PRESSURE REDUCING, PILOT OPERATED VALVE
- RELIEF, PILOT OPERATED VALVE
- ANGLE GLOBE VALVE
- PRESSURE RELIEF, ANGLE TYPE VALVE
- THREE WAY BALL VALVE
- THREE WAY GLOBE VALVE
- THREE WAY PLUG VALVE
- THREE WAY CONTROL VALVE
- SHUT-OFF VALVE BOX
- PIPE TURN 90°
- LINE BREAK
- PIPE ELBOW UP (RISER)
- PIPE ELBOW DOWN
- PIPE TEE DOWN
- CAP OR PLUG
- REDUCER, CONCENTRIC
- REDUCER, ECCENTRIC
- Y-STRAINER
- FLEXIBLE CONNECTION
- FLANGES

VALVES & FITTINGS (continued):

- UNION
- PIPE GUIDE
- PIPE ANCHOR
- FILTER (INLINE)
- FLOOR CLEAN-OUT
- WALL CLEAN-OUT
- GRADE CLEAN-OUT
- GAUGE
- THERMOMETER
- STEAM TRAP
- PRESSURE SENSOR
- INLINE PUMP
- HOSE BIBB (HB)
- P-TRAP
- "A" WATER HAMMER ARRESTOR (LETTER INDICATES P.D.I. RATING)
- FULL GRATE FLOOR SINK
- 3/4 GRATE FLOOR SINK
- 1/2 GRATE FLOOR SINK
- FLOOR DRAIN WITH FLOOR AREA SLOPED
- VENT THROUGH ROOF
- AUTOVENT
- FLOW or SLOPE DIRECTION
- COLD WATER ROUGH-IN
- HOT WATER ROUGH-IN

PIPING DESIGNATIONS:

- NEW PIPING
- EXISTING PIPING TO REMAIN
- EXISTING PIPING TO BE REMOVED
- SANITARY WASTE (W)
- SANITARY VENT (V)
- POTABLE COLD WATER (CW)
- POTABLE HOT WATER (HW)
- HOT WATER RETURN (HWR)
- FILTERED COLD WATER (FCW)
- PIPE SLOPES IN DIRECTION OF ARROW
- GAS (G)
- NATURAL GAS (NG)
- PROPANE GAS (PG)
- FIRE RISER WATER
- COMPRESSED AIR (CA)

City of Hanahan
Hanahan, South Carolina

STEWARD STREET
PARK RENOVATIONS

HANAHAN
SOUTH CAROLINA

SOUTH CAROLINA LIVE OAK CONSULTANTS LLC NO. 3886 CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA PROFESSIONAL ENGINEER No. 18377 GERALD R. ULMER III 05/12/23

CITY OF HANAHAN SOUTH CAROLINA

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ADC PROJECT #:	20381
DESIGNED:	G. ULMER
CHECKED:	G. ULMER
DRAWN:	K.STEPHENS
REVISION:	

PLUMBING GENERAL NOTES, LEGENDS, & ABBREVIATIONS

P001

CONSTRUCTION DOCUMENTS

PLUMBING FIXTURE SCHEDULE

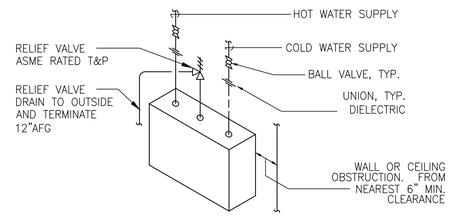
MARK	DESCRIPTION	MODEL NO.	MANUFACTURER	NOTES	ROUGH-IN CONNECTIONS SIZING (INCHES)			
					CW	HW	WASTE	VENT
P-1	WALL MOUNTED WATER CLOSET: TOP SPUD; ELONGATED BOWL; VITREOUS CHINA; PROVIDE WITH WALL CARRIER FOR SUPPORT REINFORCEMENT IN BLOCK WALL; HEAVY DUTY SEAT	AFWALL 3351.101	AMERICAN STANDARD	2,5	1"	–	3"	2"
	BATTERY POWER FLUSH VALVE; 1.6 GPF; TOP SPUD FIXTURE; DIAPHRAGM VALVE; 11-1/2" ROUGH-IN; 1-1/2" SPUD COUPLING; 1" SUPPLY PIPE	G2 8111-1.6	SLOAN					
P-1A	WALL MOUNTED WATER CLOSET (ADA): TOP SPUD; ELONGATED BOWL; VITREOUS CHINA; PROVIDE WITH WALL SUPPORT CARRIER FOR REINFORCEMENT IN BLOCK WALL; HEAVY DUTY SEAT;	AFWALL 3351.101	AMERICAN STANDARD	1,2,5,6	1"	–	3"	2"
	BATTERY POWER FLUSH VALVE; 1.6 GPF; TOP SPUD FIXTURE; DIAPHRAGM VALVE; 11-1/2" ROUGH-IN; 1-1/2" SPUD COUPLING; 1" SUPPLY PIPE	G2 8111-1.6	SLOAN					
P-2	WALL MOUNTED URINAL (ADA): TOP SPUD; 0.125 GPF – 0.5 GPF; WHITE; VITREOUS CHINA; 2 WALL HANGERS FOR SUPPORT IN A BLOCK WALL	PINTBROOK 6002001.020	AMERICAN STANDARD	1,2,5,6	3/4"	–	2"	1-1/2"
	BATTERY POWER FLUSH VALVE; 0.5 GPF; TOP SPUD FIXTURE; SINGLE FLUSH; DIAPHRAGM VALVE; 11-1/2" ROUGH-IN; 3/4" SPUD COUPLING; 3/4" SUPPLY PIPE	SELECTRONIC 6063.051.002	AMERICAN STANDARD					
P-3	DROP-IN or UNDER-MOUNT LAVATORY: SINGLE RECTANGULAR BASIN; 18"x15"x5"; WHITE; ENAMELED CAST IRON; OVERFLOW DRAIN; REQUIRES WALL/COUNTER-MOUNT FAUCET; PROVIDE WITH P-TRAP;	IRON PLAINS K-5400	KOHLER	1,2,5,6	1/2"	1/2"	1-1/2"	1-1/4"
	BATTERY POWERED LAVATORY FAUCET; TOUCH FREE; 4 (AA) BATTERIES; 4" CENTERSET; 5" SPOUT; 0.5 GPM; PROVIDE WITH MIXING VALVE AND DRAIN;	AQUASENSE Z6915-XL	ZURN					
EWC	BOTTLE FILLING STATION WATER COOLER (ADA): WALL MOUNT; PUSH-BUTTON ACTIVATION; BI-LEVEL; INDOOR/OUTDOOR; VANDAL RESISTANT BUBBLER; ELECTRONIC BOTTLE FILLER; NON-FILTERED NON-REFRIGERATED;	VRCTLDDWSK	ELKAY	3,5	1/2"	–	1-1/2"	1-1/4"
FCO	FLOOR CLEANOUT: EXTRA HEAVY DUTY; "LEVEL-TROL" ADJUSTABLE; DURA COATED CAST IRON WITH POLISHED BRONZE LIGHT-DUTY TOP;	ZN1400	ZURN	5	–	–	4"	–
GCO	GRADE CLEANOUT: 6" TOP ASSEMBLY ADJUSTABLE ON GRADE FLOOR DRAIN WITH EZ1 TECHNOLOGY;	EZ-6	ZURN	5	–	–	6"	–
WCO	WALL CLEANOUT: NO-HUB; DURA-COATED CAST IRON BODY; GAS AND WATERTIGHT ABS TAPERED THREAD PLUG, AND ROUND, SMOOTH SS ACCESS COVER WITH SECURING SCREW;	Z1441	ZURN	5	–	–	2"	–

NOTES:
1. PROVIDE "TRUEBRO" INC, HANDI-LAV GUARD INSULATION KITS FOR ADA COMPLIANCE.
2. PROVIDE 17 GAUGE TUBULAR BRASS P-TRAP, OFFSET TAILPIECE, ANGLE STOP VALVES WITH RIGID TUBE RISERS AND ESCUTCHEONS.
3. PROVIDE 17 GAUGE TUBULAR BRASS P-TRAP, TAILPIECE, ANGLE STOP VALVES WITH RIGID TUBE RISERS AND ESCUTCHEONS.
4. PROVIDE ANGLE STOP VALVE AND RIGID TUBE RISER.
5. PROVIDE MODEL SPECIFIED OR APPROVED EQUAL.
6. FOR ADA COMPLIANCE COORDINATE MOUNTING HEIGHT PER ARCHITECTURAL ELEVATIONS.

ELECTRIC WATER HEATER SCHEDULE (MINI-TANK)

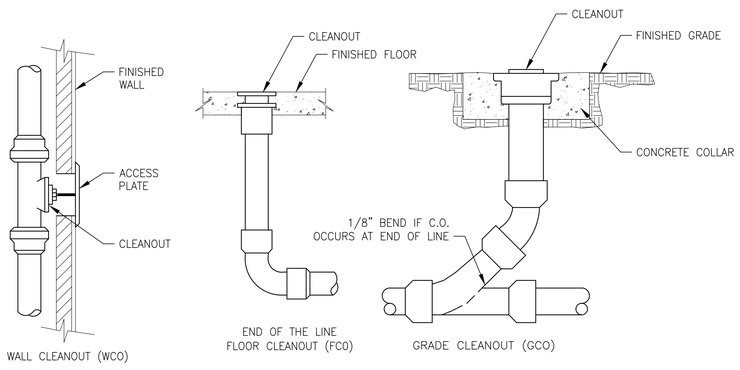
MARK	WH-1	WH-2
STORAGE (GAL)	4	4
RECOVERY (GPH @ Δ.T.)	8.6 @ 60°F	8.6 @ 60°F
TOTAL KW	1.3	1.3
ELECTRICAL V/ø/Hz	240/1/60	240/1/60
MANUFACTURER	STIEBEL ELTRON	STIEBEL ELTRON
MODEL NO.	SHC-4	SHC-4
NOTES:	1	1

NOTES:
1. MOUNT UNIT ON WALL ABOVE THE SINKS. SEE DETAIL THIS SHEET.



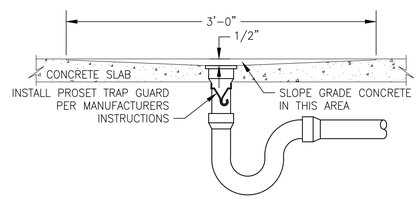
ELECTRIC WATER HEATER

1 P0-02 DETAIL N.T.S.



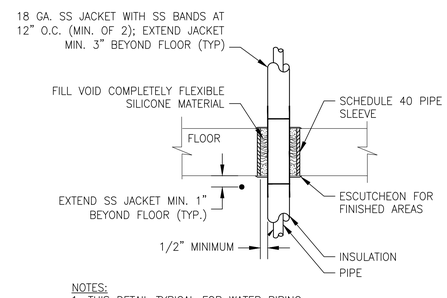
WALL, FLOOR, & GRADE CLEANOUTS

2 P0-02 DETAIL N.T.S.



FLOOR DRAIN WITH TRAP GUARD

3 P0-02 DETAIL N.T.S.



NOTES:
1. THIS DETAIL TYPICAL FOR WATER PIPING.

WATER PIPE THROUGH FLOOR

4 P0-02 DETAIL N.T.S.

City of Hanahan
Hanahan, South Carolina

STEWARD STREET
PARK RENOVATIONS

HANAHAN
SOUTH CAROLINA

SOUTH CAROLINA LIVE OAK CONSULTANTS LLC NO. 3886 CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 18377 GERALD R. ULMER III 05/17/23

CITY OF HANAHAN SOUTH CAROLINA

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DESIGNED:	G. ULMER
CHECKED:	G. ULMER
DRAWN:	K.STEPHENS
REVISION:	1

PLUMBING
SCHEDULES & DETAILS

P002

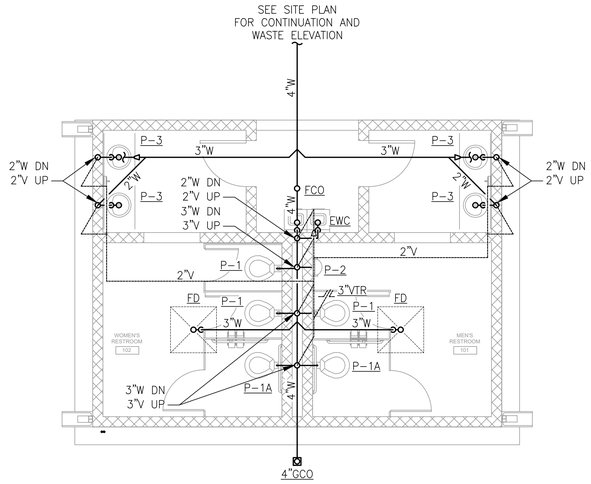
CONSTRUCTION DOCUMENTS

GENERAL NOTES:

1. REFER TO DRAWING P001 FOR PLUMBING GENERAL NOTES, LEGENDS, & ABBREVIATIONS.
2. REFER TO DRAWING P002 FOR PLUMBING SCHEDULES & DETAILS.

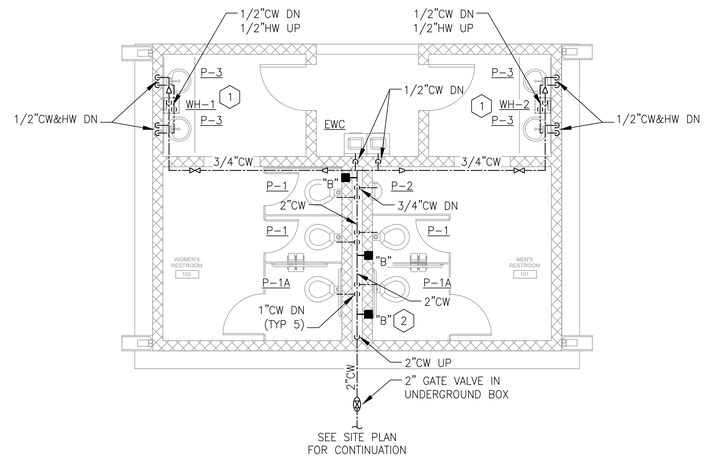
KEYED NOTES:

1. INSTALL WATER HEATERS ON WALL 6" BELOW CEILING. RUN HOT WATER UP THROUGH THE CEILING AND BACK DOWN THE WALL CAVITY.
2. WATER HAMMER ARRESTORS SHALL BE ACCESSIBLE ABOVE CEILING.



SANITARY SEWER PLAN - RESTROOM BUILDING

SCALE: 1/4"=1'-0"



DOMESTIC WATER PLAN - RESTROOM BUILDING

SCALE: 1/4"=1'-0"

City of Hanahan
Hanahan, South Carolina

STEWARD STREET
PARK RENOVATIONS

HANAHAN
SOUTH CAROLINA

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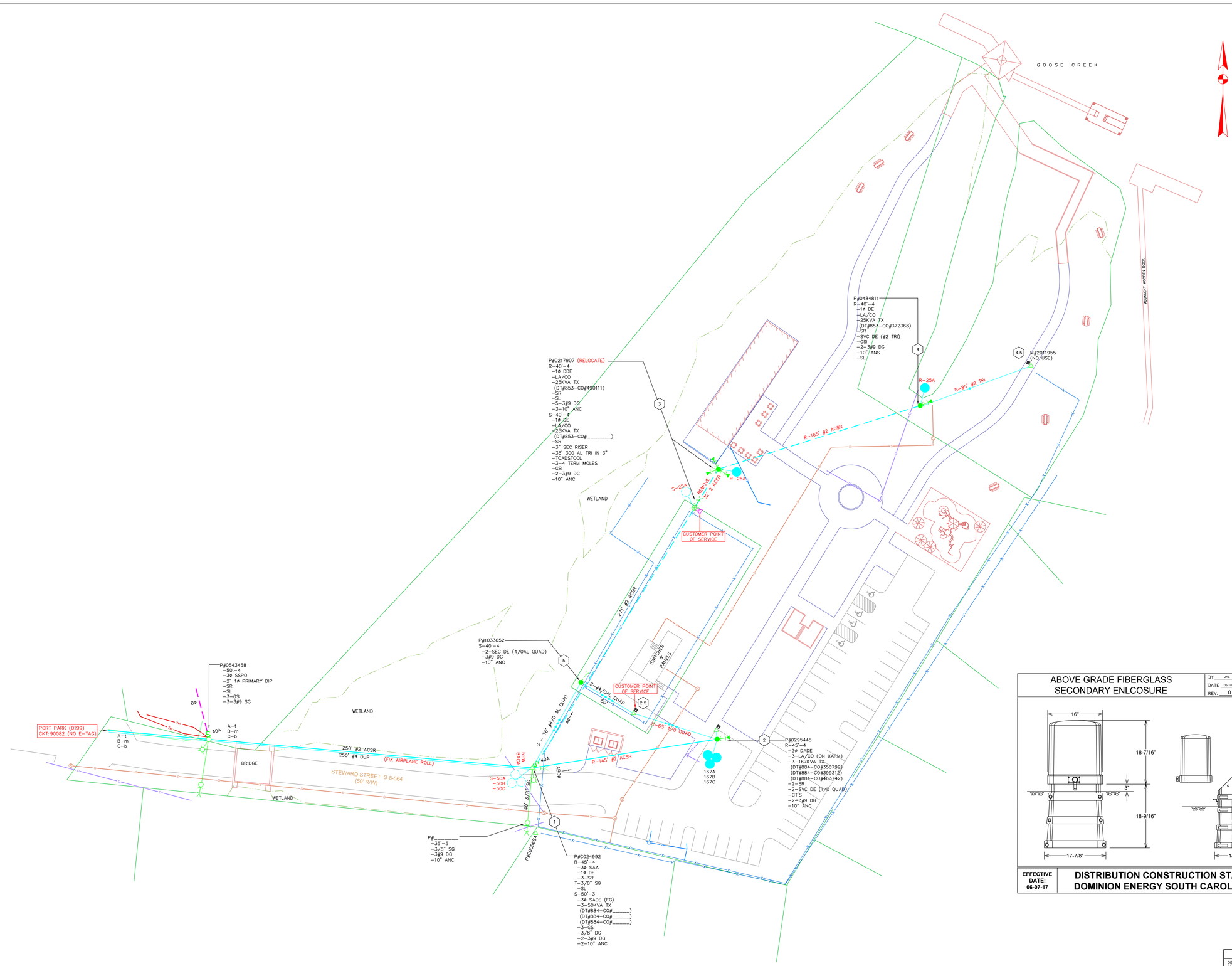
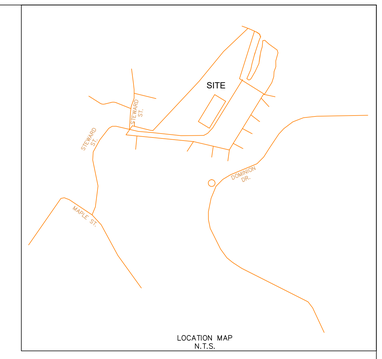
DRAWN:	K.STEPHENS
REVISION:	

RESTROOM BUILDING
SANITARY SEWER &
DOMESTIC WATER
PLUMBING PLANS

P101

CONSTRUCTION DOCUMENTS





LOCATION MAP
N.T.S.

DOMINION ENERGY SOUTH CAROLINA, INC.
ELECTRIC DISTRIBUTION SYMBOLS

POLES
- DISTRIBUTION POLE
- TRANSMISSION POLE
- FOREIGN UTILITY POLE
- ANCHOR & DOWN GUY

OVERHEAD SYMBOLS
- SINGLE PHASE TRANSFORMER
- TWO PHASE TRANSFORMER
- THREE PHASE TRANSFORMER

PRIMARY CONDUCTOR
- SINGLE PHASE
- TWO PHASE
- THREE PHASE
- CONDUIT
- OH SERVICE
- PM PRIMARY METER

SECONDARY CONDUCTOR
- DUPLEX
- TRIPLEX
- QUADRUPLEX

UNDERGROUND SYMBOLS
- SINGLE PHASE PAD MOUNTED TRANSFORMER
- THREE PHASE PAD MOUNTED TRANSFORMER
- SG SWITCH GEAR
- LOOP CABINET
- UG SERVICE
- SECONDARY PEDESTAL/HANDHOLE "P" FOR PERMANENT, "T" FOR TEMPORARY, "M" FOR METERED.

SECTIONALIZING FUSES & SWITCHES
- CUTOUT
- OCR OIL CIRCUIT RECLOSER
- BLADE SWITCH
- GANG SWITCH
- SCADA SWITCH

LIGHTING
- STREET LIGHT
- FLOOD LIGHT
- HAT BOX LIGHT
- SHOE BOX LIGHT
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EXAMPLES OF TYPICAL SYMBOL SCHEMES ARE AS FOLLOWS:
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- EXISTING POLE
- INSTALL POLE
- REPLACE POLE
- REMOVE POLE
- EXISTING PAD MOUNT TRANSFORMER
- INSTALL PAD MOUNT TRANSFORMER
- REPLACE PAD MOUNT TRANSFORMER
- REMOVE PAD MOUNT TRANSFORMER

THIS INDICATES THE LOCATION OF A TRANSMISSION OR PRIMARY DISTRIBUTION LINE CROSSING. FOLLOW "SAFETY" PRECAUTIONS.

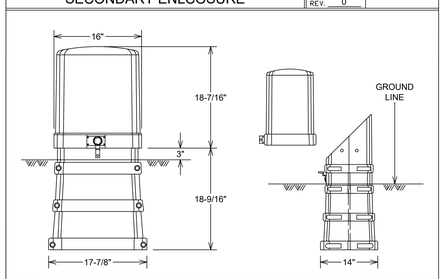
–MISCELLANEOUS UTILITIES–
- CTV CABLE TV
- FO FIBER OPTIC
- GAS GAS MAIN
- S SEWER MAIN
- FM SEWER FORCE MAIN
- SD STORM DRAIN
- TM TELEPHONE CABLE
- W WATER MAIN

THIS LEGEND IS FOR GENERAL DESCRIPTION ONLY. FOR MORE DETAILED INFORMATION, REFER TO THE CONSTRUCTION NOTES SHOWN ON THIS DRAWING OR REFER TO THE DOMINION ENERGY SOUTH CAROLINA, INC. DISTRIBUTION CONSTRUCTION STANDARDS MANUAL.

ABOVE GRADE FIBERGLASS SECONDARY ENLCOSURE

BY JAL
DATE 05-18-17
REV. 0

13.02-01



EFFECTIVE DATE: 06-07-17

DISTRIBUTION CONSTRUCTION STANDARD
DOMINION ENERGY SOUTH CAROLINA, INC.

W.O.# _____ W.R.# E140408
STARTED _____ BY: _____
COMPLETED _____ BY: _____
CLOSED OUT _____ BY: _____
COORDINATOR _____
ELECTRIC ENG.-TECH. ZACHARY SWALHAH
GAS ENG.-TECH. _____

RIGHT OF WAY INFORMATION

R/W AGENT ALAN MYRICK
FILE NUMBER _____
EASEMENT NO. _____

STANDARD DOMINION ENERGY SOUTH CAROLINA, INC. DISTRIBUTION RIGHT OF WAY: OVERHEAD ELECTRIC IS 15' EACH SIDE OF THE POLE. UNDERGROUND ELECTRIC IS 5' EACH SIDE OF THE CABLE. PAD MOUNTED EQUIPMENT IS 12' AROUND THE PERIMETER OF THE EQUIPMENT.

3 DAYS BEFORE DIGGING IN SOUTH CAROLINA

CALL 811
IT'S THE LAW
PALMETTO UTILITY PROTECTION SERVICE

ALL DOMINION ENERGY SOUTH CAROLINA, INC. FACILITY LOCATIONS SHOWN ON THIS DRAWING ARE APPROXIMATE. FINAL LOCATIONS ARE DETERMINED AT THE TIME OF INSTALLATION BY A DOMINION ENERGY SOUTH CAROLINA, INC. REPRESENTATIVE.

THE DEVELOPER SHALL BE FULLY RESPONSIBLE, AS REQUIRED BY LOCAL ORDINANCES, TO ESTABLISH AND MAINTAIN TREE BARRICADES AROUND ALL TREES THAT ARE REQUIRED TO BE PRESERVED. ANY REQUIRED BARRICADES SHALL BE IN PLACE PRIOR TO DOMINION ENERGY SOUTH CAROLINA, INC. BEGINNING DESIGN OR INSTALLATION OF UNDERGROUND FACILITIES. THE STANDARD METHOD OF CONSTRUCTION WILL BE BY AN OPEN TRENCH (TRENCHER OR BACK HOE). ANY ENCROACHMENTS IN BARRICADED AREAS WILL REQUIRE DIRECTIONAL BORES TO PROTECT TREES AND SHALL BE CONSIDERED AS NONSTANDARD SERVICE TO THE DEVELOPER AND AT THE DEVELOPER'S EXPENSE. THE DEVELOPER SHALL BE SOLELY RESPONSIBLE AND LIABLE FOR ANY TREE DAMAGES INCURRED DURING THE INSTALLATION OF UNDERGROUND ELECTRIC FACILITIES WHICH ARE CAUSED BY THE DEVELOPER'S FAILURE TO PROPERLY BARRICADE ANY SIGNIFICANT TREES, AS PRESCRIBED BY LOCAL ORDINANCES.

THE DEVELOPER WILL BE FULLY RESPONSIBLE FOR COMPLIANCE WITH ANY TREE OR BUFFER ORDINANCES AFFECTING DOMINION ENERGY SOUTH CAROLINA, INC. EASEMENTS. ANY FUNDING OR TREE REPLACEMENT WILL BE THE RESPONSIBILITY OF THE DEVELOPER. BUFFER REQUIREMENTS ARE IN ADDITION TO AND SEPARATE FROM DOMINION ENERGY SOUTH CAROLINA, INC. EASEMENTS. THE DEVELOPER SHALL MAKE HIMSELF/HERSELF FULLY AWARE OF ALL APPROPRIATE ORDINANCES WHICH CAN EFFECT DOMINION ENERGY SOUTH CAROLINA, INC. RIGHT OF WAY AND SHOULD TAKE THIS INTO ACCOUNT WHEN ASSIGNING THE EASEMENT.

DEVELOPER/CUSTOMER SIGNATURE REQUIRED

APPROVED BY _____
(PRINT NAME)
TITLE _____ DATE _____

CUSTOMER'S RESPONSIBILITY FOR FINAL GRADE

IT IS THE CUSTOMER'S RESPONSIBILITY TO FURNISH FINAL GRADE FOR ALL DOMINION ENERGY SOUTH CAROLINA, INC. EQUIPMENT. IT IS ESSENTIAL THAT ALL PAD-MOUNTED TRANSFORMERS, HANDHOLES, MANHOLES, AND ANY OTHER EQUIPMENT CRITICAL TO GRADE BE LOCATED CORRECTLY. IF THIS EQUIPMENT HAS TO BE RAISED OR LOWERED DUE TO INSUFFICIENT INFORMATION FROM THE CUSTOMER, THE CUSTOMER WILL BE RESPONSIBLE FOR REIMBURSING DOMINION ENERGY SOUTH CAROLINA, INC. FOR THIS COST.

PRELIMINARY

NO	DATE	BY	REVISION	FOR
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DEVELOPER'S SIGNATURE BLOCK

DEVELOPER HEREBY APPROVES THIS LAYOUT FOR CONSTRUCTION AND CERTIFIES THAT HE/SHE HAS THE AUTHORITY TO DO SO. ANY CHANGE AFFECTING THIS LAYOUT MUST BE REPORTED IMMEDIATELY TO DOMINION ENERGY SOUTH CAROLINA, INC. ALL COST ASSOCIATED WITH ANY REQUESTED CHANGE OR INSUFFICIENT FINAL GRADE INFORMATION WILL BE BORNE BY THE DEVELOPER. DOMINION ENERGY SOUTH CAROLINA, INC. POLICY, STATE AND LOCAL LAW, AS WELL AS REGULATORY RESTRICTIONS AT THE TIME OF CONSTRUCTION WILL PREVAIL. DEVELOPER CERTIFIES THAT HE/SHE HAS REVIEWED THE DOMINION ENERGY SOUTH CAROLINA, INC. DEVELOPERS HANDBOOK AND ALL REQUIREMENTS LISTED IN THE HANDBOOK UNDER DEVELOPER RESPONSIBILITY MUST BE MET BEFORE CONSTRUCTION CAN BE SCHEDULED.

APPROVED BY _____
(SIGNATURE)
(PRINT NAME)
TITLE _____
COMPANY _____ DATE: _____

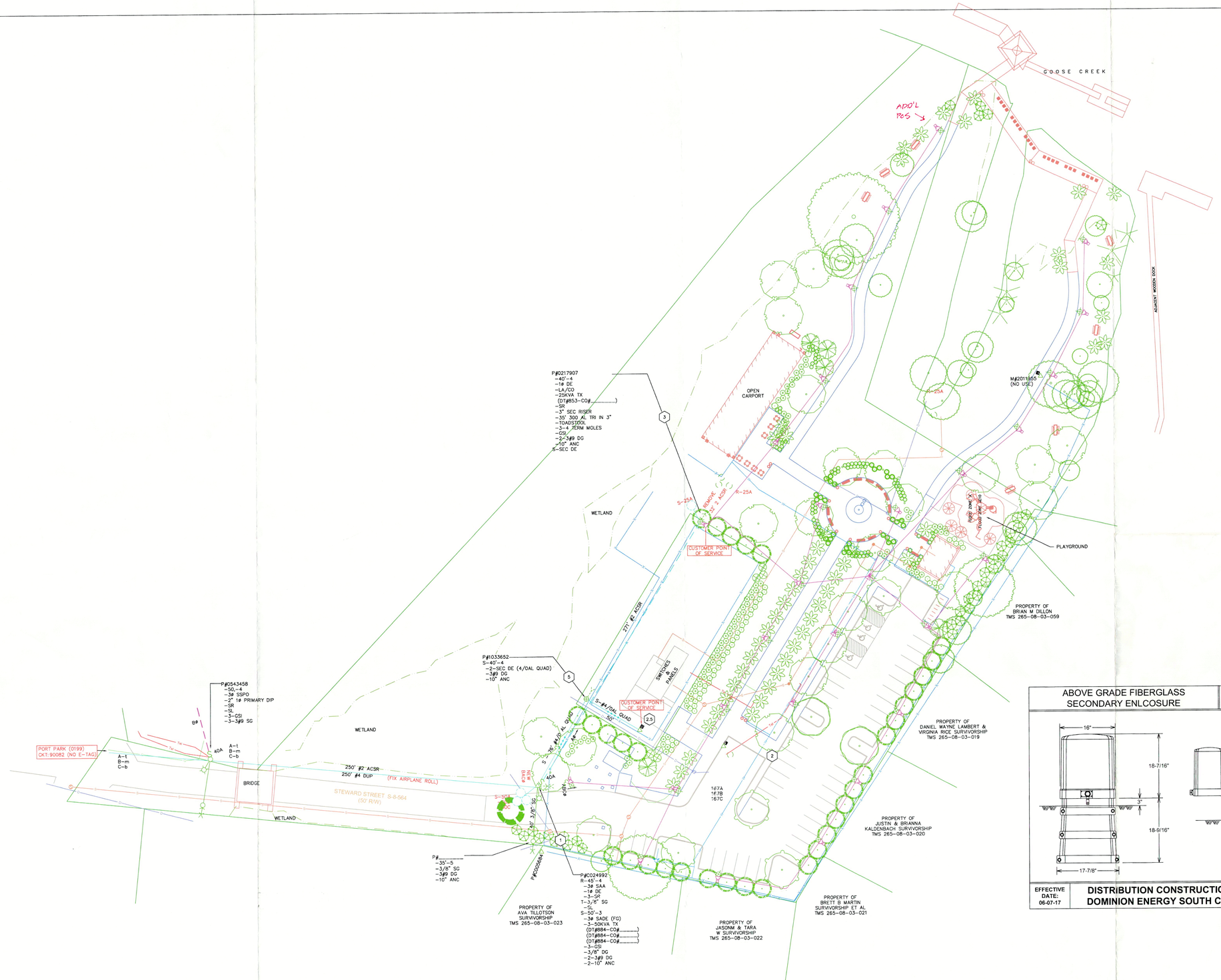
DOMINION ENERGY SOUTH CAROLINA, INC.

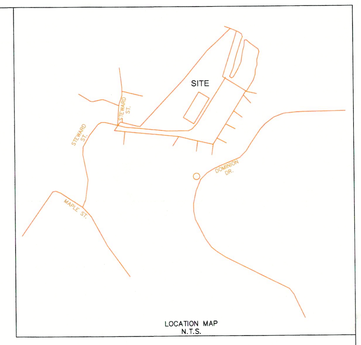
TITLE STEWARD STREET PARK
DETAIL THREE PHASE UNDERGROUND SERVICE — CKT# 90082
SUB. PORT PARK SUB. (199) 23.9KV — DIST# 90
DRN JM 20-09-2021 — SCALE: 1"= 30' — D-84415
APP ZS 02/16/2023 — 084415-01.DWG — SHEET 1 OF 1 SHEETS — DATE PLOTTED 02/20/23

\\scana\shares\Apps\gis\SCANACAD\Drawing\Electric\Construction\084415-01.dwg, Scale=30, Plotted By: ZS1A628, Plotted: Feb 20, 2023 - 9:41am

PLAN "SAFETY" INTO EVERY JOB

ELECTRONIC DRAWING–DO NOT REVISE MANUALLY





LOCATION MAP
N.T.S.

DOMINION ENERGY SOUTH CAROLINA, INC.
ELECTRIC DISTRIBUTION SYMBOLS

POLES
- DISTRIBUTION POLE
- TRANSMISSION POLE
- FOREIGN UTILITY POLE
- ANCHOR & DOWN GUY

PRIMARY CONDUCTOR
- SINGLE PHASE
- TWO PHASE
- THREE PHASE
- CONDUIT

SECONDARY CONDUCTOR
- DUPLEX
- TRIPLEX
- QUADRUPLEX

SECTIONALIZING FUSES & SWITCHES
- CUTOUT
- OCR OIL CIRCUIT RECLOSER
- BLADE SWITCH
- GANG SWITCH
- SCADA SWITCH

OVERHEAD SYMBOLS
- SINGLE PHASE TRANSFORMER
- TWO PHASE TRANSFORMER
- THREE PHASE TRANSFORMER
- OH SERVICE
- PM PRIMARY METER

UNDERGROUND SYMBOLS
- SINGLE PHASE PAD MOUNTED TRANSFORMER
- THREE PHASE PAD MOUNTED TRANSFORMER
- SG SWITCH GEAR
- LOOP CABINET
- UG SERVICE
- SECONDARY PEDESTAL/HANDHOLE "P" FOR PERMANENT, "T" FOR TEMPORARY, "M" FOR METERED.

LIGHTING
- STREET LIGHT
- HAT BOX LIGHT
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- CTV CABLE TV
- FO FIBER OPTIC
- G GAS MAIN
- S SEWER MAIN
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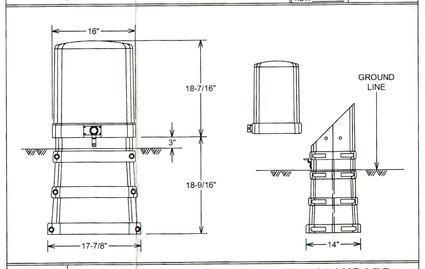
ABOVE GRADE FIBERGLASS SECONDARY ENLCOSURE

BY JAL
DATE 05-18-17
REV. 0
13.02-01



EFFECTIVE DATE: 06-07-17

DISTRIBUTION CONSTRUCTION STANDARD
DOMINION ENERGY SOUTH CAROLINA, INC.

W.O.# _____ W.R.# E140408
STARTED _____ BY: _____
COMPLETED _____ BY: _____
CLOSED OUT _____ BY: _____
COORDINATOR _____
ELECTRIC ENG.-TECH. ZACHARY SWALHAH
GAS ENG.-TECH. _____

RIGHT OF WAY INFORMATION

R/W AGENT ALAN MYRICK
FILE NUMBER _____
EASEMENT NO. _____

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IT'S THE LAW
PALMETTO UTILITY PROTECTION SERVICE

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DEVELOPER'S SIGNATURE BLOCK

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APPROVED BY _____
(SIGNATURE)
_____
(PRINT NAME)
TITLE _____
COMPANY _____ DATE: _____

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LIGHT & TREE APPROVAL FOR CITY OF CHARLESTON, S.C.

LIGHT PLAN APPROVAL _____ CITY OFFICIAL
DATE _____
TREE PLAN APPROVAL _____ CITY OFFICIAL
DATE _____

PRELIMINARY

NO	DATE	BY	REVISION	FOR
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DOMINION ENERGY SOUTH CAROLINA, INC.

TITLE STEWARD STREET PARK
DETAIL LIGHTING LAYOUT — CKT# 90082
SUB. PORT PARK SUB. (199) 23.9KV — DIST# 90
DRN JM 05-09-2023 — SCALE: 1"= 30' — D-84415 — DATE PLOTTED 04/18/23
APP DD 06/09/2000 — 084415-02.DWG — SHEET 2 OF 2 SHEETS

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PLAN "SAFETY" INTO EVERY JOB

ELECTRONIC DRAWING—DO NOT REVISE MANUALLY