

**VOLCANO ISLAND WATER PARK
POOL RENOVATIONS**



PROJECT MANUAL
June 5, 2026



NOVA Parks
Northern Virginia Regional Park Authority
5400 Ox Road
Fairfax Station, Virginia 22039

In coordination with


CHA SOLUTIONS
3 Winners Circle, Suite 100
Albany, New York 12205

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**SECTION 1:
INVITATION TO BID**

INVITATION TO BID
VOLCANO ISLAND WATER PARK POOL RENOVATIONS

Sealed bids will be received by mail or in person at the NOVA Parks Headquarters, 5400 Ox Road, Fairfax Station, Virginia 22039, until the submission deadline of **June 25 , 2026, at 11:00 a.m. EST.** Bids will be opened in public at the NOVA Parks Headquarters on **June 25 , 2026, at 1:00 p.m. EST.**

Bids and bid bonds (if applicable) may be (1) submitted in person at the NOVA Parks Headquarters, (2) sent via U.S. Mail or other delivery service, or (3) electronically transmitted by emailing to NOVAParksBids@nvrpa.org.

Any bid received after the submission deadline as noted above will not be accepted or considered. The time of receipt shall be determined as the time the bid is received by NOVA Parks. Bidders are solely responsible for ensuring that their bid and supporting documents are received by NOVA Parks by the submission deadline. Bidders may request written confirmation of receipt of their bid.

NOVA Parks is not responsible for delays in the delivery of email, or emails misdirected to incorrect email addresses.

For bids submitted in person or via U.S. Mail or other delivery service, bidders should:

- Label bids to the attention of the Director of Planning and Development.
- Include on the outside of the bid the name of the bidder and the project name as noted on the cover sheet of the Project Manual.

For bids submitted via email, bidders should:

- Include in the bid email subject line the name of the bidder and the project name as noted on the cover sheet of the Project Manual.
- Send the bid email with an automated request for a receipt to be sent back to the bidder when the email is read/opened. Bid emails will not be opened by NOVA Parks until the submission deadline.
- Submit the bid Form of Proposal, and any other supporting documents, as PDF attachments to the email. Do not include these documents in the body of the email.
- Notify the NOVA Parks Project Manager of their intent to submit an electronic bid at least 24 hours prior to the bid deadline.

Nova Parks is seeking Bids for improvements at our Algonkian Volcano Island waterpark in Sterling, Virginia.

The Project shall be constructed under a single prime construction contract. The Contractor shall be responsible for the complete, coordinated, code-compliant, fully operational, and warrantable installation of all Work shown or reasonably inferred from the Contract Documents, including but not limited to demolition, removals, temporary protection, pool shell modifications and shallowing, concrete work, pool finish, MLPS installation, anchorage, associated piping, main drains, recirculation/feature piping, electrical work, bonding and grounding, controls, erosion and sediment control measures, testing, inspections, startup, training, closeout documentation, restoration, and coordination with NOVA Parks, the Engineer, authorities having jurisdiction, and the MLPS manufacturer.

The Contractor shall coordinate all trades, subcontractors, suppliers, manufacturer representatives, inspections, and required approvals necessary to deliver the renovated pool and MLPS system complete and ready for NOVA Parks' intended use. No division of the Specifications, separation of Work by trade, or omission of incidental items shall relieve the Contractor of responsibility for providing a complete and functioning system in accordance with the Contract Documents, applicable codes, manufacturer requirements, and authority approvals.

The Contractor shall furnish all equipment, material, and labor in accordance with the project manual and plans.

A Five percent bid bond or certified check must be submitted with the sealed bid for all total bids over \$500,000. The total bid shall be determined by the sum of the base bid and all alternates. All bids and bid bonds shall remain valid for ninety days. Performance and Labor and Material Payment bonds shall be required of the successful bidder for all contracts awarded over \$500,000.

Contract documents may be obtained by visiting the NOVA Parks Website www.novaparks.com at <https://www.novaparks.com/about/bids-proposals>. The Contractor shall be responsible to verify and obtain any addendum prior to the bid date. Project addenda will be posted on the website. Contract documents include the following:

- **Project Manual** dated June 5, 2026
- **Project Plan Sheets:** *2025-07-08_NOVA Volcano Island Permitting Submission Stamped.pdf*
- **Project Plan Sheets:** *UPDATED DEMO PLAN - C-100_POOL DECK DEMOLITION PLAN_2025-09-23.pdf*
- **Project Plan Sheets:** *ESC Approved Plan GRADE-2025-000274*

To schedule a site visit please contact or if you have any questions concerning this project, contact **Tony Canonico**, Project Manager – Nova Parks. All questions regarding the project or bid process shall be in writing and sent via email to

Tony Canonico
Project Manager
703-966-9338
tcanonico@nvrpa.org

All interested Bidders shall formally register with NOVA Parks by contacting Leslie Preble via email at lpreble@nvrpa.org or by calling 703-359-4626. Bidders shall provide Mrs. Preble with the following information:

Company Name
Contact person Name and Title
Phone Number and Email Address
Address

The Project Manual includes Existing Conditions Photographs to orient bidders with the project.

**SECTION 2:
FORM OF PROPOSAL**

FORM OF PROPOSAL - PAGE 1 OF 2
VOLCANO ISLAND WATER PARK POOL RENOVATIONS

PROPOSAL

To furnish all material, labor, tools, equipment and supplies to perform all work specified herein and shown in the contract documents.

Name of Bidder: _____

Address of Bidder: _____

Signature: _____

Print Name and Title: _____

Date: _____

Contact Phone Number: _____

Bidder's Virginia Contractor's License _____

To: Brian Nolan, Director of Planning and Development
Northern Virginia Regional Park Authority
5400 Ox Road Fairfax Station, Virginia 22039

Bidders shall fill in all blank spaces on the Form of Proposal.

Pursuant to and in compliance with the contract documents, the undersigned proposes and agrees, if this proposal is accepted, to furnish all labor, materials, supplies, equipment, and other facilities, and to perform all work described in the project manual in the manner therein prescribed for consideration of the following amount.

FORM OF PROPOSAL - PAGE 2 OF 2
VOLCANO ISLAND WATER PARK
POOL RENOVATIONS

BASE BID: All work as described in the project manual and plans.

_____ Dollars / \$ _____

Bid Breakdown (please provide the following costs for Owner's reference):

Cost of all Demolition Work: _____ Dollars / \$ _____

Ground Work Shallowing Cost: _____ Dollars / \$ _____

Structure Installation Cost: _____ Dollars / \$ _____

Acknowledge Receipt of Addendum # _____ dated _____.

Acknowledge Receipt of Addendum # _____ dated _____.

Acknowledge Receipt of Addendum # _____ dated _____.

Bidder Qualifications (please provide three previous projects having similar scopes of work):

Project #1: _____

Project #2: _____

Project #3: _____

Construction Schedule:

Anticipated Start of Construction: Sept. 15, 2026
Demolition & Groundwork: By or before November 6, 2026
New Construction including Installation & Testing: By or before April 16, 2027
Final Permitting: By or before May 7, 2027

Any delays due to unforeseen circumstances, inclement weather, or change orders approved by Nova Parks that delays the contracted completion dates will be renegotiated between the contractor and Nova Parks to reestablish a new completion date comparable to the number of days delayed.

******END OF FORM OF PROPOSAL******

**SECTION 3:
FORM OF CONTRACT**

CONSTRUCTION CONTRACT

This Construction Contract is made this ____ day of _____, 2026 by and between NOVA Parks, 5400 Ox Road, Fairfax Station, Virginia 22039 ("Authority"), and _____, (Contractor) for the project known as _____.

Article 1.

1.1 The Contract Documents consist of this Construction Contract, the Conditions of the Contract (General Supplementary, Special, and other Conditions), the Drawings, the Specifications, all standard details that apply to any portion of the Work, and all addenda issued prior to, and Change Orders issued after execution of this Construction Contract. The Contract Documents are more specifically listed in Exhibit A. Minimum contractor's liability insurance amounts are listed in Exhibit B.

Article 2. The Work

2.1 The Contractor shall furnish all labor, materials, and equipment necessary to perform _____ as shown, indicated or reasonably implied by the Contract Documents. The Work shall be done in strict accordance with the Contract Documents and all applicable federal, state, and local governmental specifications and requirements.

Article 3. Time of Commencement and Completion

3.1 The Contract Time will begin to run on the date indicated in the Authority's written Notice to Proceed. The Contractor shall start the Work within five (5) days of the date of the Notice to Proceed. The Contractor shall prosecute the work in such a manner as to achieve Substantial Completion of the base portion of the work within the time limits indicated in the Supplemental General Conditions.

3.2 If the Work is not Substantially Completed within the time required, as that time may be adjusted by Change Orders, there shall be imposed on the Contractor Liquidated Damages of \$1000.00 per calendar day for each day beyond the Contract Time it takes to substantially complete the Work. Contractor is specifically referred to the General Conditions regarding its duties to notify the Authority in writing of any delays caused to it during the Work. The Liquidated Damages amount shall, in no event, be considered a penalty or other than the liquidated and adjusted damages to the Authority because of the delay. The Contractor and its surety agree that the stated sum per day shall be deducted and retained out of the monies which may become due hereunder and if not so deducted, the Contractor and its surety shall be liable therefore.

Article 4. Contract Sum

4.1 Authority agrees to pay Contractor _____(Dollars) (\$00.00) for the Work.

4.2 The Authority shall make monthly progress payments on account of the Contract Sum to the Contractor as provided in the Contract Documents for the period ending the last day of each month. Not later than fifteen (15) days after the end of the period covered by the Application for Payment, Contractor will submit to the Architect a Request for Payment based on the payment schedule of values agreed to by the Architect. The Contractor's submission of its Application for Payment, the Authority's and Architect's review, and the Authority's payment of progress and final payments shall all be in accordance with the General Conditions.

Article 5. Miscellaneous Provisions

5.1 This Contract shall be construed and enforced in accordance with the laws of the Commonwealth of Virginia.

5.2 During the performance of this Contract, the Contractor agrees as follows:

A. The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, or national origin, except where religion, sex, or national origin is a bona fide occupation qualification reasonably necessary to the normal operation of the Contractor. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

B. The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, will state that such Contractor is an equal opportunity employer.

C. Notices, advertisements, and solicitations placed in accordance with federal law, rule, or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.

The Contractor will include the provisions of subparagraphs A, B, and C above, in every subcontract or purchase order of over \$10,000 so that the provisions will be binding upon each subcontractor or vendor.

5.3 These terms and provisions supersede all previous communications, representations, or agreements, either oral or written, between the parties with respect to the subject matter of this Contract. This Agreement is entered into as of the day and year first written above.

NOVA Parks

CONTRACTOR

Company: _____

By: _____

By: _____

Title: _____

Title: _____

Date: _____

Date: _____

Exhibit A - Contract Documents

- Form of Contract
- Project Manual with General Conditions
- Project Drawings – “Volcano Island Water Park – Pool Renovations”

Exhibit B - Contractor's Liability Insurance

- General liability in the amount of not less than \$1,000,000 per occurrence and \$2,000,000 aggregate.
- Property damage in the amount of not less than \$1,000,000 for any one accident. Additional limits may be required.
- Umbrella policy for not less than \$1,000,000.
- Auto liability insurance for not less than \$1,000,000 combined single limits.
- Workers’ Compensation per statutory limits and employer’s liability in the following minimum amounts: EL Each Accident - \$500,000, EL Disease Policy Limit - \$500,000, EL Disease Each Employee \$500,000.
- Contractor shall endorse the Authority on its insurance policy as an additional insured using form CG 20 10 11 85 or CG 20 10 07 04.

**SECTION 4:
NOVA PARKS
GENERAL CONDITIONS**

**NVRPA DOCUMENT GC 101
INSTRUCTIONS TO BIDDERS AND
GENERAL CONDITIONS OF THE CONTRACT
FOR CONSTRUCTION**

**THIS DOCUMENT HAS IMPORTANT LEGAL CONSEQUENCES;
CONSULTATION WITH AN ATTORNEY IS ENCOURAGED
2018 EDITION**

ARTICLE NUMBER	TITLE
1.	Definitions
2.	Contract Documents
3.	Laws and Regulations
4.	Conditions at Site or Structure
5.	Explanation to Bidders
6.	Preparation and Submission of Bids
7.	Bid Guarantee
8.	Withdrawal or Modification of Bids
9.	Receipt and Opening of Bids
10.	Errors in Bids
11.	Rejection of Bids
12.	Standard Forms
13.	Award of Contract
14.	Contract Security
15.	Progress Schedules
16.	Shop Drawings, Product Data, Samples
17.	Materials, Services and Facilities
18.	Inspection and Testing
19.	Substitutions
20.	Patents
21.	Surveys, Permits, Regulations
22.	Protection of Work, Property and Persons
23.	Supervision by Contractor
24.	Changes in the Work
25.	Changes in the Contract Sum or Other Relief
26.	Time for Completion and Liquidated Damages
27.	Correction of Work
28.	Suspension of Work, Authority's Right to Stop and Carry Out the Work
29.	Termination
30.	Uses of the Premises
31.	Payment to the Contractor
32.	Substantial Completion of the Work
33.	Final Completion and Final Payment
34.	Insurance
35.	Assignments
36.	Indemnification
37.	Contractor Liability
38.	Separate Contracts
39.	Subcontracting
40.	Engineer
41.	Warranty
42.	Contractual Disputes

**GENERAL CONDITIONS
OF THE CONSTRUCTION CONTRACT WITH
THE NORTHERN VIRGINIA REGIONAL PARK AUTHORITY**

Article 1: DEFINITIONS

- (a) **Addenda – Written or graphic instruments issued prior to the Award of the Contract which modify or interpret the Contract Documents, Drawings, and Specifications by additions, deletions, clarifications, or corrections**
- (b) **Engineer – The design professional, including an architect, that has contracted with the Authority to design the Project and administer the Contract on behalf of the Authority. If no Project Engineer is designated all duties and responsibilities which the Engineer would otherwise have shall be the duties and responsibilities of the Authority.**
- (c) **Authority – The Northern Virginia Regional Park Authority.**
- (d) **Change Order – A written order to the Contractor authorizing an addition, deletion or revision in the Work within the general scope of the Contract Documents or authorizing an adjustment in the Contract Price or Contract Time. A Change Order, which adjusts the Contract Price or Contract Time, must be signed by the Authority, Contractor and Engineer. A Change Order includes a Field Order, as hereafter defined.**
- (e) **Construction Change Directive - A written order to the Contractor signed by the Authority directing an addition, deletion or revision in the Work within the general scope of the Contract Documents prior to an agreement between the Authority and the Contractor as to an adjustment in the Contract Price or Contract Time. Upon receipt of a Construction Changes Directive, the Contractor shall promptly proceed with the change in the Work described therein.**
- (f) **Contract Sum – The total monies payable to the Contractor under the terms and Conditions of the Contract Documents.**
- (g) **Contract Time – The specific date or the number of days stated in the Contract Documents or the Notice to Proceed for Substantial Completion of the Work.**
- (h) **Contractor – Any person or entity who has a contract directly with the Authority for the performance of the Work or a part thereof.**
- (i) **Day – A calendar day of 24 hours lasting from midnight one day to midnight the next day.**
- (j) **Drawings – The graphic and pictorial part of the Contract Documents that show the characteristics and scope of the Work to be performed and that has been prepared by or for the Authority. The term is used interchangeably with the word “Plans” and includes Standard Details.**
- (k) **Field Order – A written order issued by the Engineer or the Authority to the Contractor during construction effecting a change in the Work, but not involving an adjustment in the Contract Price or an extension of the Contract Time.**
- (l) **Inspector – The authorized representative of the Authority assigned to make detailed inspection of any or all portions of the Work. The Inspector is authorized to stop the Work in accordance with Article 29.**
- (m) **Notice of Award – The written notice of the acceptance of the Bid from the Authority to the successful Bidder.**
- (n) **Special Conditions – General requirements that are unique to a particular Contract.**
- (o) **Standard Details – Details showing standard products, methods, and materials contained within the Plans or other agency standards such as the current versions of the Fairfax County Public Facilities Manual or the Virginia Department of Highways and Transportation Road and Bridge standards and specifications.**

- (p) **Specifications – Special Conditions, Standard Specifications and Standard Details.**
- (q) **Subcontractor – An individual, firm or corporation having a direct contract with the Contractor or with any other subcontractor for the performance of a part of the Work at the site.**

Substantial Completion – That date as certified by the Engineer when the construction of the Project or a specified part thereof is sufficiently completed in accordance with the Contract Documents so that the Project or specified part can be utilized for the purposes for which it is intended and when the Contractor has received all final inspections and occupancy permits from the appropriate jurisdictions.
- (r) **Supplementary General Conditions – Modifications to General Conditions required for the Project.**
- (s) **Supplier – Any person or organization who supplies materials or equipment for the Work (including that fabricated to a special design) but who does not perform labor at the site.**
- (t) **Work – Any and all labor, materials, equipment, and all obligations, duties, and responsibilities expressly stated or reasonably implied for the successful completion of the construction required by the Contract Documents. The Contractor’s Work includes payment of all sales, consumer, use, and other similar taxes required by law.**
- (u) **Written Notice – Any notice to any party of the Contract relative to any part of the Contract in writing and considered delivered and the service thereof completed when posted by mail to the party at its last given address, or delivered in person to the party or its authorized representative at the Project.**

Article 2: CONTRACT DOCUMENTS

- (a) **The agreement entered into by the parties shall consist of the Form of Construction Contract, the Form of Proposal submitted by the Contractor, the Supplemental General Conditions, these General Conditions, the specifications and drawings, including all modifications thereof, all of which shall be referred to collectively as the “Contract Documents.” The Form of Construction Contract shall be signed by the Authority and Contractor in as many original counterparts as may be mutually agreed upon. The Contract may be amended only by a written amendment to the Contract or a Change Order signed by both parties.**
- (b) **The Contract Documents are complimentary and what is required by one shall be binding on the Contractor as if required by all. In the event of any inconsistency between the Contract Documents, Contractor shall provide the greater quality or quantity of Work with no increase in the Contract Sum. The intent of the Contract Documents is that the Contractor shall furnish all labor, materials, tools, equipment, utilities, transportation and incidental work necessary for the proper execution of the Work in accordance with, or reasonably inferable from, the Contract Documents. In the event of conflicts among the Contract Documents, the Authority may designate the written or drawn provision or feature which shall be used and no additions to or deductions from the Contract Sum, or modification to the Contract Time, shall result from the choice. In case of conflicts, the Contract Documents shall take precedence in the following order: the Construction Contract; The Supplemental General Conditions; the General Conditions; the Special Conditions; the specifications; and the drawings.**
- (c) **This Contract is an entire and integrated agreement and is not severable.**
- (d) **Contractor shall identify in writing to the Authority and the Engineer, as soon as possible, any discrepancies, errors, omissions and/or inconsistencies or ambiguities, discovered by the Contractor in the Contract Documents. Work done by the Contractor after its discovery of such discrepancies, errors, omissions and/or inconsistencies or ambiguities and prior to response from the Engineer shall be done at the Contractor’s sole risk and cost.**

Article 3: LAWS AND REGULATIONS

- (a) In the performance of the Work, the Contractor shall comply with the requirements of all local, state and federal laws, codes, statutes, ordinances, rules, regulations and lawful orders of any public authority relating to the performance of the Work (the “Legal Requirements”).
- (b) All Contractors and Subcontractors for the Project must be properly licensed under the laws of the Commonwealth of Virginia and in good standing before submitting any bid and before commencing any Work. Upon the request of the Authority, any Contractor or Subcontractor for the Project shall promptly provide proof of its licensure.
- (c) The Contract and all other contracts and subcontracts are subject to the provisions of Article 3 and 5, Chapter 4, Title 40.1, Code of Virginia, 1950, as amended, relating to labor unions and the “right to work,” and all Contractors or Subcontractors, whether residents or nonresidents of the Commonwealth, who perform any work related to the project shall comply with all of the provisions of these code sections.
- (d) The Contractor shall furnish the Authority copies of affidavits upon request giving the original dates, renewal dates and expiration dates of all labor contracts related to any phase of the work to be performed on the project site under this Contract.
- (e) Contractor shall comply with all local, state and federal safety codes, statutes, rules, practices and regulations.

(f) EQUAL OPPORTUNITY EMPLOYMENT

- (1) During the performance of the Agreement, the Contractor agrees as follows:
 - (i) The Contractor shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability or other basis prohibited by federal or state law relating to discrimination in employment, except where there is a bona-fide occupational qualification reasonably necessary to the normal operation of the Contractor. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
 - (ii) The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, shall state that Contractor is an equal opportunity employer.
 - (iii) Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the notice, advertisement, and solicitation requirements of this paragraph.
- (2) The Contractor shall cause to be included the provisions of the foregoing paragraphs a.(i), a.(ii) and a.(iii) (substituting the subcontractor or vendor for Contractor as the obligated party) in every subcontract or purchase order of over \$10,000, so that the provisions will be binding upon each subcontractor or vendor.

(g) DRUG-FREE WORKPLACE

- (1) During the performance of the Agreement, the Contractor agrees to (i) provide a drug-free workplace for the Contractor’s employees, (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the Contractor’s workplace and specifying the actions that will be taken against employees for violations of such prohibition, (iii) state in all solicitations or advertisements for employees placed by or on behalf of the Contractor that the Contractor maintains a drug-free workplace, and (iv) cause to be included the provisions of the foregoing clause (substituting the subcontractor or vendor for the Contractor as the

obligated party) in every subcontract or purchase order of over \$10,000, so that the provisions will be binding upon each subcontractor or vendor.

- (2) For the purposes of this section, “drug-free workplace” means a site for the performance of work done in connection with the Agreement by Contractor where its employees are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the Agreement.

(h) NO EMPLOYMENT OF UNAUTHORIZED ALIENS

Contractor represents and warrants that Contractor does not, and shall not during the performance of this Agreement, knowingly employ any unauthorized alien as defined in the Federal Immigration Reform and Control Act of 1986.

(i) STATEMENT OF NONDISCRIMINATION AGAINST FAITH-BASED ORGANIZATIONS

The Authority does not discriminate against faith-based organizations. (See Va. Code § 2.2-4343.1).

(j) PROMPT PAYMENT REQUIREMENTS

Within seven days after Contractor receives amounts paid for work subject to the Agreement performed by any “subcontractor,” as defined in Code of Virginia § 2.2-4347, Contractor shall take one of the two following actions:

- (1) Pay the subcontractor for the proportionate share of the total payment received from Owner attributable to the work performed by the subcontractor; or
- (2) Notify Owner and the subcontractor in writing of Contractor’s intent to withhold all or part of the subcontractor’s payment and the reason for nonpayment.

- (k) Contractor shall provide its Federal employer identification number with each application to Owner for payment.**

- (l) Contractor shall pay interest to any “subcontractor” on all amounts owed by Contractor that remain unpaid after seven days following receipt by Contractor of payment from Owner for work performed by such subcontractor relating to the Agreement except as to amounts withheld as retainage.**

- (m) Contractor shall include in its subcontracts a provision requiring each subcontractor to include or otherwise be subject to the same payment and interest requirements with respect to each lower-tier subcontractor.**

- (n) No obligation imposed by this section shall be construed to create any obligation of Owner under Code of Virginia § 2.2-4354, no modification to the Agreement may be made for the purpose of providing reimbursement for the interest charge, and Contractor shall not invoice Owner for any such charge.**

(o) LIMITATION ON OWNER’S LIABILITY FOR INTEREST

Owner shall not be liable to pay any interest to Contractor under any circumstance except in the case of amounts that Owner does not dispute to be due and payable to Contractor; interest shall accrue beginning on the 60th day after payment is due at a rate of 3% per annum.

(p) AUTHORIZATION TO CONDUCT BUSINESS IN VIRGINIA

The provisions of Va. Code § 2.2-4311.2 are incorporated by reference. If Contractor is a business entity described in Va. Code § 2.2-4311.2.A, Contractor must be authorized to transact business in Virginia if required by law to be so authorized and shall not allow its existence or certificate authority or registration to transact business to lapse or be revoked or cancelled during the term of the contract.

Article 4: CONDITIONS AT SITE OR STRUCTURE

- (a) All Bidders and Contractors shall visit the site and shall be responsible for having ascertained pertinent local conditions such as location, accessibility and general character of the site or building, and the character and extent of existing work within or adjacent to the site and to compare those conditions with the Contract Documents and the Legal Requirements. Claims, as a result of the Bidder's and/or Contractor's failure to comply with the foregoing, will not be considered by the Authority and are waived by the Contractor.

If in the performance of the Contract the Contractor discovers subsurface or latent conditions at the site that are materially different from those typical for the locality or indicated in the Contract Documents, the Contractor shall report the conditions to the Engineer and the Authority in writing before the conditions are disturbed. Upon such notice, or upon its own observation of such conditions, the Engineer shall promptly make such recommendations as it finds necessary to address the different conditions. Any change in the cost of the work or time needed for completion must be processed pursuant to the requirements of the Contract Documents.

Article 5: EXPLANATION TO BIDDERS

No oral explanation in regard to the meaning of drawings and specifications will be made and no oral instructions will be given before the award of the contract. Bidders shall identify in writing to the Authority and the Engineer any believed discrepancies, omissions, ambiguities or errors in the Contract Documents. Bidders must submit such a writing at least six (6) days prior to the time set for the receipt of bids to allow a sufficient time for a reply to reach them before the submission of their bids, but if there are two (2) weeks or less between the first bid advertisement and the time set for receipt of bids, then bidders may act up to three (3) days prior to the time set for receipt of bids. Any interpretation made will be in the form of an addendum to the specifications, which will be forwarded to all bidders, and its receipt by the bidder shall be acknowledged on the Bid Form.

Article 6: PREPARATION AND SUBMISSION OF BIDS

- (a) Bids shall be submitted in duplicate on the forms furnished, or true copies thereof, and shall be signed in ink. Erasures or other changes in a bid shall be explained or noted over the signature of the bidder. Bids containing any conditions, omissions, unexplained erasures, alterations or items not called for in the proposal, or irregularities of any kind, may be rejected by the Authority as being incomplete.
- (b) Each bid must give the full business address and contact information for the bidder and must be signed by a person with authority to bind the bidder. Bids by partnerships must furnish the full name of all partners and must be signed in the partnership name by one of the members of the partnership or an authorized representative, followed by the signature and designation of the person signing. Bids by corporations must be signed with the legal name of the corporation followed by the name of the state in which they are incorporated and by the signature and designation of the president, secretary or other person authorized to bind it in the matter. The name of each person signing shall also be typed or printed below the signature. A bid by a person who affixes to its signature the word "President," "Secretary," "Agent," or other designation without disclosing its principal, may be held to be the bid of the individual signing. When requested by the Authority, satisfactory evidence of the authority of the officer signing on behalf of the corporation shall be furnished.
- (c) Bids with the bid guarantee shall be enclosed in a sealed envelope, which shall be marked and addressed as indicated by the advertisement or invitation to bid. Prior to submitting a bid, the bidder must be in compliance with and have the licenses required under Virginia Code Section 54.1-

1100, et seq. The bidder shall place on the outside of the envelope containing the bid and shall place in the bid over its signature whichever of the following notations is appropriate, inserting its Contractor license number.

If the bidder shall fail to provide this information on its bid or on the envelope containing the bid and shall fail to promptly provide the Contractor license number to the Authority in writing when requested to do so before the opening of bids, its bid will not be considered.

- (d) The owner reserves the right to disqualify any Contractor and refuse to accept the bid of any bidder which has been convicted, or entered a plea of guilty or nolo contendere in any federal or state court to any charge involving any unlawful, corrupt or collusive practice involving a public contract either federal, state, or local or which has been determined in any judicial proceeding to have violated any antitrust, bid-rigging or collusive practice statute in connection with any public contract, or against whom such formal criminal prosecution or other judicial proceeding has been initiated.

Article 7: BID GUARANTEE

- (a) Any bid exceeding Five Hundred Thousand Dollars (\$500,000) shall be accompanied by a bid guarantee of not less than five percent (5%) of the amount of the bid, which may be certified check or cashier's check, or a Bid Bond made payable to the Authority. Bid Bonds shall be submitted on AIA Document A310. Such Bid Bond or check shall be submitted with the understanding that it shall guarantee that the bidder will not withdraw its bid during the period up to and including ninety (90) days following the opening of bids; that if its bid is accepted, it will enter into a formal contract with the Authority in accordance with the Form of Construction Contract included as a part of the Contract Documents, and that the referenced Performance Bond and Labor and material Payment Bond will be given; and that in the event of the withdrawal of the bid within the period, or failure to enter into the contract and give the bonds within ten (10) days after it has received notice of acceptance of its bid, the bidder shall be liable to the Authority for the difference between the amount of the bidder's bid and the amount of the bid for the next higher bidder to perform the Work but such amount shall not exceed the amount of the bid guarantee.
- (b) The Bid Bonds and checks will be returned to all except the three lowest bidders after the formal opening of the bids. The remaining Bid Bonds and checks will be returned to the lowest bidders after the Authority and the accepted bidder have executed the Contract and the Performance Bond and the Payment Bond have been approved by the Authority.
- (c) If the required Contract and bonds have not been executed within ninety (90) days after the date of the opening of the bids, then the bond or check of any bidder will be returned upon its request, provided it has not been notified of the acceptance of the bid prior to the date of such request.

Article 8: WITHDRAWAL OR MODIFICATION OF BIDS

A bidder may withdraw or modify its bid only by written notice delivered to the Authority prior to the time fixed for receipt of bids.

Article 9: RECEIPT AND OPENING BIDS

- (a) It is the responsibility of the bidder to assure that its bid is delivered to the place designated for receipt of bids and prior to the time set for receipt of bids. The Authority will not consider bids received after the time set for receipt of bids.
- (b) Bids will be opened at the time and place stated in the advertisement and the lowest bidder will be announced. The officer or agent of the Authority, whose duty it is to open the bids, will decide when the specified time has arrived. No responsibility will be attached to any officer or agent for the premature opening of a bid not properly addressed and identified.

Article 10: ERRORS IN BIDS

A bidder may withdraw its bid from consideration if the price bid was substantially lower than the other bids due solely to a mistake in the bid, provided the bid was submitted in good faith, and the mistake was a clerical mistake as opposed to a judgment mistake, and was actually due to an unintentional arithmetic error or an unintentional omission of quantity of work, labor or material made directly in the compilation of a bid, which unintentional arithmetic error or unintentional omission can be clearly shown by objective evidence drawn from inspection of original work papers, documents and materials used in the preparation of the bid sought to be withdrawn. Under this provision a bidder requesting to withdraw its bid shall follow the procedures set forth in Section 2.2-4330 of the Code of Virginia. The bidder must give notice in writing of its claim of right to withdraw its bid within the time frame required by Section 2.2-4330 of the Code of Virginia and shall submit its original work papers to the Authority in compliance with the requirements of Section 2.2-4330 of the Code of Virginia. Failure to strictly comply with the requirements of Section 2.2-4330 of the Code of Virginia shall constitute a waiver of the right to withdraw the bid.

No bid may be withdrawn when the result would be the awarding of the Contract on another bid of the same bidder. No bidder who is permitted to withdraw a bid shall for compensation supply any material or labor to or perform any subcontract or other work agreement for the person or firm to whom the contract is awarded or otherwise benefit, directly or indirectly, from the performance of the project for which the withdrawn bid was submitted, without the approval of the Authority. The person or firm to whom the Contract was awarded and the withdrawing bidder are jointly liable to the Authority in an amount equal to any compensation paid to or for the benefit of the withdrawing bidder without such approval.

If a bid is withdrawn under authority of this section, the next higher bidder shall be deemed to be the low bidder on the project.

Article 11: REJECTION OF BIDS

The Authority reserves the right to reject any and all bids when such rejection is in the interest of the Authority, and will reject the bid of a bidder who is not a responsible bidder. (See § 2.2-4319, Code of Virginia, 1950, as amended.)

Article 12: STANDARD FORMS

The copies of the Form of Construction Contract, and AIA Document A312, Performance Bond and the Labor and Material Payment Bond are incorporated into the General Conditions by reference and are made a part hereof to the same extent as though fully set forth herein.

Article 13: AWARD OF CONTRACT

- (a) The Contract will be awarded as soon as possible to the lowest responsive and responsible bidder, provided its bid is reasonable and it is in the interest of the Authority to accept it. The Authority reserves the right to waive any informality in bids received when such waiver is in the interest of the Authority; also to accept any item in the bid unless otherwise specified by the Authority. Each bidder shall be prepared, if so requested by the Authority, to present evidence of its experience, qualifications and financial ability to carry out the terms of the Contract.
- (b) If the bid forms contain alternate prices, the Authority may in its sole discretion, unless otherwise specified in the invitation for bid, select whatever alternates it chooses to accept subsequent to the bid opening but prior to the determination of the low bidder. The low bidder shall be determined by comparing each bidder's bid total based on the sum of the base bid and the alternates selected by the Authority.
- (c) Pursuant to the Virginia Public Procurement Act, in the event the lowest responsible bid exceeds available funds for the project, the Authority may enter into negotiations with the lowest responsible bidder in an effort to arrive at a contract amount within the limits of available funds. In such event, the Authority will inform the bidder of the amount of funds available, and will negotiate in good faith toward achieving the funding limit, preferably without any change in the scope or other change in the Contract Documents. However, negotiations may include change in scope, quantity of materials, or other changes, so long as any such changes are within the general scope of the original design. If the Authority and bidder reach agreement, the Authority may award a contract in accordance with

procedures or actions approved by the Authority Board. The Authority may terminate negotiations at any time prior to the award of a contract, and proceed as otherwise permitted by the Virginia Public Procurement Act.

Article 14: CONTRACT SECURITY

For all contracts of Five Hundred Thousand Dollars (\$500,000.00) or more, the Contractor shall deliver to the Authority or its designated representative, an AIA Document A312, Performance Bond and Labor and Material Payment Bond, each fully executed by one or more surety companies legally authorized to do business in Virginia and each in an amount equal to one hundred percent (100%) of the original Contract Sum. The bonds shall be conditioned as set forth in § 2.2-4337 of the Code of Virginia, as amended. Sureties shall be selected by the Contractor subject to approval by the Authority. No contract shall be deemed to be in effect until the bonds have been approved by the Authority. For the purposes of all Labor and Material Payment Bonds entered into pursuant to this Article, the term “subcontractors” as used in § 2.2-4337 A.2 of the Code of Virginia is interpreted to mean any contractors who participated in the prosecution of the Work undertaken by the Contractor, whether such subcontractor had a direct contract with the Contractor or whether there were one or more other intervening subcontractors.

Article 15: PROGRESS SCHEDULES

- (a) The Contractor shall, within ten (10) days of receipt of notice of award, prepare and submit to the Authority and Engineer a schedule for the completion of the Work within the timeframe set forth in the Contract Documents. This progress schedule shall be related to the entire Project; shall include all the Work; and shall meet the time for completion requirements of the Contract. It shall include an allowance for anticipated delay caused by ordinary adverse weather conditions and shall provide for the expeditious and practical execution of the Work within the time requirements of the Contract Documents. The schedule shall set forth as much detail as deemed necessary by the Authority.
- (b) The Authority’s acceptance of the schedule is not a representation or agreement that the schedule is logical or can be performed in the time or sequence indicated, but only that the Authority approves of the construction in that time and in that sequence.

Article 16: SHOP DRAWINGS, PRODUCT DATA and SAMPLES

- (a) Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or any Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.
- (b) Product Data are illustrations, standard schedules, performance charts, instruction, brochures, diagrams and other information furnished by the Contractor to illustrate a material, product or system for some portion of Work.
- (c) Samples are physical examples, which illustrate materials, equipment or workmanship and establish standards of quality and esthetics by which the Work will be judged.
- (d) The Contractor shall review, approve and submit, with reasonable promptness and in such sequence as to cause no delay in the Work or in the work of the Authority or any separate contractor, all Shop Drawings, Product Data and Samples required by the Contract Documents.
- (e) By preparing and submitting Shop Drawings, Product Data and Samples, the Contractor represents that it has determined and verified all materials, field measurements, and field construction criteria related thereto, or will do so, and that it has checked and coordinated the information contained within such submittals with the requirements of the Work and the Contract Documents.
- (f) The Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the Engineer’s approval of Shop Drawings, Product Data or Samples unless the Contractor had specifically informed the Engineer in writing of such deviation at the time of submission and the Engineer has given written approval to the specific deviation. The Contractor shall not be relieved from responsibility of errors or omissions in the Shop Drawings, Product Data or Samples by the Engineer’s approval thereof.

- (g) The Contractor shall direct specific attention, inviting or on resubmitted Shop Drawings, Product Data or Samples, to revisions other than those requested by the Engineer on previous submittals.
- (h) No portion of the Work requiring submission of a Shop Drawing, Product Data or Sample shall be commenced until the submittal has been approved by the Engineer. All such portions of the Work shall be in accordance with approved submittals.

Article 17: MATERIALS, SERVICES, AND FACILITIES

- (a) Materials and equipment shall be so stored as to insure the preservation of their quality and fitness for the work. Stored materials and equipment to be incorporated in the Work shall be located so as to facilitate prompt inspection.
- (b) Manufactured articles, materials, and equipment shall be stored, applied, installed, connected, erected, used, cleaned, and conditioned as directed by the manufacturer, and as approved by the Engineer.
- (c) Materials, supplies, and equipment shall be in accordance with samples, shop drawings, and catalogue cuts submitted by the Contractor and approved by the Engineer and Authority.
- (d) Materials, supplies, or equipment to be incorporated into the work shall not be purchased by the Contractor or the Subcontractor subject to a chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller.
- (e) All Work included in this Contract shall be performed to the standards specified. The Contractor shall employ no plant, equipment, materials, methods or persons to which the Engineer or the Authority reasonably objects, and shall remove no plant, equipment or other facilities from the site of the work without permission of the Engineer and the Authority. The Contractor's failure to comply with these requirements will constitute a breach of Contract and as such may result in a termination of the Contractor by the Authority.

Article 18: INSPECTION AND TESTING

- (a) All materials and equipment used in the construction of the Project shall be subject to adequate inspection and testing in accordance with generally accepted industry standards and the Legal Requirements as defined in the Contract Documents.
- (b) If the Contract Documents or the Legal Requirements require any part of the Work to specifically be inspected, tested or approved by someone other than the Contractor, the Contractor shall initiate and coordinate those inspections, test, or approvals with the proper authorities and shall give the Engineer and the Authority three (3) working days written notice of each such inspection. The Contractor shall then furnish the Engineer and the Authority with the required certificates of inspection, testing or approval. Unless otherwise specifically provided for, the Contractor shall bear all costs of such inspections, tests or approvals.
- (c) Inspection, test, or approvals by the Engineer or others will not relieve the Contractor from its obligations to perform the Work in accordance with the requirements of the Contract Documents.
- (d) The Authority, the Engineer and their representatives shall at all times have access to the Work. In addition, authorized representatives and agents of any participating federal, state or local agency shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials, and other relevant data and records. All such records shall remain available and accessible during performance of the Contract and until three years from the date of Final Payment, or, in case of dispute, for a period of three years after resolution of the dispute, whichever is later. The Contractor shall provide proper facilities for such access and observation of the Work and also for any inspection or testing thereof.
- (e) If any work is covered without the approval of the Engineer contrary to requirements of the Contract Documents, it must, if requested by the Engineer or the Authority, be uncovered for its observation and then recovered at the Contractor's expense.

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

Article 19: SUBSTITUTIONS

- (a) After the Contract has been executed, the Authority and the Engineer will consider a written request for the substitution of products or materials specified by the Contract Documents. The Authority is not obligated to consider substitutions and such consideration is the Authority's sole discretion. By making requests for substitutions, the Contractor represents and certifies:
- (1) that the Contractor has personally investigated the proposed substitute product or material and determined that it is equal or superior in all respects to that specified by the Contract Documents.
 - (2) that the Contractor will provide the Authority with a warranty of the substituted product equal or superior to the warranty furnished in connection with the product or material originally specified by the Contract Documents.
 - (3) that the cost data presented is complete and includes all related costs under this Contract and Contractor waives all claims for any additional costs related to the substitution; and
 - (4) that the Contractor will coordinate the installation of the substituted product or material and that the Contractor will make all changes necessitated by the use of the substituted product without any additional cost to the Authority.

Article 20: PATENTS

The Contractor shall pay all applicable royalties and license fees. It shall defend all suits or claims for infringement of any patent rights and save the Authority harmless from loss on account thereof, except that the Authority will be responsible for any such loss when a particular process, design or the product of a particular manufacturer or manufacturers as specified is an infringement of a patent. However, if the Contractor has reason to believe that such particular process, design or product is an infringement, he shall be responsible for such loss unless he gives written notice to the Authority and the Engineer of the possible infringement.

Article 21: SURVEYS, PERMITS, REGULATIONS

- (a) The Authority will furnish all boundary surveys and establish all baselines for locating the principal component parts of the Work together with suitable number of benchmarks adjacent to the Work as shown in the Contract Documents.
- (b) Permits and licenses of a temporary nature necessary for the prosecution of the work, such as building, plumbing, and electrical permits, shall be secured and paid for by the Contractor unless otherwise stated in the Contract Documents. Permits, licenses, and easements for permanent use of structures or permanent changes in existing facilities shall be secured and paid for by the Authority unless otherwise specified.
- (c) The Contractor shall give all notices and comply with all permits and the Legal Requirements in the performance of the Work. The Contractor shall promptly notify the Engineer in writing if it comes to its attention that the Contract Documents are at variance with any such requirement.

- (d) If any permit, license or certificate expire, be revoked, terminated or suspended because of any act or omission of the Contractor, it shall not be entitled to any additional compensation for direct costs or to an extension of the Contract Time.
- (e) Permits obtained by the Authority for this Project are available for inspection in the Authority's offices.

Article 22: PROTECTION OF WORK, PROPERTY AND PERSONS

- (a) The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work, in compliance with industry standards and the Legal requirements. Contractor shall take all necessary precautions for the safety of and shall provide the necessary protection to prevent damage, injury or loss to all employees on the work and other persons who may be affected thereby, all the work and all materials or equipment to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation or replacement in the course of construction. In case of suspension of work for any cause whatever, the contractor shall be responsible for the Project and shall take such precautions as may be necessary to prevent damage to the Work, provide for proper drainage and shall erect any necessary temporary structures, signs, or other facilities at its expense. During such period or suspension of work, the Contractor shall properly and continuously maintain in acceptable growing condition all living material in newly established plantings, seedings, and sodding furnished under this Contract, and shall take adequate precautions to protect new growth and other important growth against injury. Contractor shall also notify owners of adjacent utilities when prosecution of the Work may affect them.
- (b) In emergencies affecting the safety of persons or the Work or property at the site or adjacent thereto, the Contractor shall act, at its discretion, to prevent threatened damage, injury or loss. Any additional compensation or extension of time claimed by the Contractor on account of emergency work shall be determined as provided in the Contract Documents.

Article 23: SUPERVISION BY CONTRACTOR

- (a) The Contractor shall supervise and direct the work. It shall be solely responsible for the means, methods, techniques, sequencers and procedures of construction. The Contractor shall employ and maintain on the work a qualified supervisor or superintendent ("Supervisor") and provide a resume of its experience. This Supervisor shall have been designated in writing as the Contractor's representative at the site and shall not thereafter be changed unless such change is approved by or directed by the Authority. The Authority shall have the right to approve this Supervisor or order its removal from the job site, which right shall not be unreasonably exercised. This Supervisor shall have full authority to act on behalf of the Contractor and all communications given to the Supervisor shall be as binding as if given to the Contractor. This Supervisor shall be present on the site at all times as required to perform adequate supervision, control and coordination of the Work as determined by the Engineer or the Authority.
- (b) The Contractor shall be responsible to the Authority for the acts and omissions of its employees, Subcontractors and their agents and employees, and other persons performing any of the Work under a contract with the Contractor.
- (c) The Contractor shall not be relieved from its obligations to perform the Work in accordance with the Contract Documents either by the activities or duties of the Engineer and the Authority in their administration of the Contract or by inspections, tests, or approvals required or performed by persons other than the Contractor.
- (d) Prior to commencing work, the Contractor shall check all work performed by others that is necessary for the execution of the Contractor's work and shall promptly report to the Engineer in writing any deficiencies in such work which render it unacceptable or unsuitable for the Contractor's Work or which will increase the cost of the Work. Failure to give such written notice shall relieve the Authority of any responsibility therefore. The Contractor shall be responsible for all elevations, grades, and proper fitting of its Work.

Article 24: CHANGES IN THE WORK

- (a) The Authority, without invalidating the Contract, may order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, with the Contract Sum and the Contract Time being adjusted accordingly. All such changes in Work shall be authorized by written Change Order signed by the Authority and the Engineer, and shall be performed under the applicable conditions of the Contract Documents.
- (b) The cost or credit to the Authority resulting from a change in the Work shall be determined in one or more of the following ways:
- (1) by mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
 - (2) by unit prices stated in the Contract Documents or subsequently agreed upon;
 - (3) by cost to be determined in a manner agreed upon by the parties and a combined overhead and profit of 15% of such costs if the Contractor performs the work with its own forces, or 15% for the combined overhead and profit of a Subcontractor performing the work with its own forces and 5% for the Contractor; in no event shall the total mark-up for overhead and profit exceed 20% of the cost; or
 - (4) by the method provided in Article 25(c).
- (c) If none of the methods set forth above is agreed upon, the Contractor, provided it receives a Construction Change Directive signed by the Authority, shall promptly proceed with the Work involved. The cost of such Work shall then be determined by the Engineer on the basis of the reasonable expenditures and savings of those performing the Work attributable to the change, including, in the case of an increase in the Contract Sum, a reasonable allowance for overhead and profit. In such case, and also under Article 25(b)(3) above, the Contractor shall keep and present, in such form as the Engineer may prescribe, an itemized accounting together with appropriate supporting data of the costs for inclusion in a Change Order. Unless otherwise provided in the Contract Documents, costs shall be limited to the following: cost of materials, including sales tax and cost of delivery,, cost of labor, including social security, unemployment insurance, and fringe benefits required by agreement or custom; workers' or workmen's compensation insurance; bond premiums; and rental value of equipment and machinery. The amount of credit to be allowed by the Contractor to the Authority for any deletion or change that results in a net decrease in the Contract Sum will be the amount of the actual net cost as confirmed by the Engineer. When both additions and credits covering related Work or substitutions are involved in any one change, the allowance for overhead and profit shall be figured on the basis of the net increase, if any, with respect to that change.
- (d) The Engineer or the Authority also may at any time by issuing a Field Order, make changes in the details of the Work. The Contractor shall proceed with the performance of any changes in the work so ordered and should the Contractor believe that such Field Order entitles it to a change in Contract Price or Time, or both, it shall give the Engineer and the Authority Written Notice thereof within ten days after the receipt of the Field Order. Failure to provide such written notice shall be deemed a waiver of any claims arising from or relating to the Field Order. Failure to proceed with work changed by a Field Order or a Change Order shall constitute a breach of contract and shall be cause for the termination of the Contract. All requests for a Change Order arising out of a Field Order must have a copy of the referenced Field Order attached.
- (e) Where the Work is contracted for on a unit price basis and the actual quantity of work for any pay item exceeds the estimated quantity by more than 25% of that amount stated in the Contract Documents, a Change Order will be issued for any increase or decrease in unit cost, which results from the increased work. If the quantity variation is such as to cause an increase in the time necessary for completion, the Authority shall, upon receipt of a written request for an extension of time, make an appropriate adjustment for extending the completion date in accordance with Article 26.

Article 25: CHANGES IN THE CONTRACT SUM OR OTHER RELIEF

If the Contractor wants to make a claim for an increase in the Contract Sum, or for any other relief under the Contract, it shall give the Engineer and the Authority written notice of the claim within ten (10) days after the occurrence of the event giving rise to such claim. This notice shall be given by the Contractor before proceeding to execute any additional Work, except in an emergency endangering life or property. The notice shall set forth the basis for the claim and the relief or increase in the Contract Sum requested by the Contractor. After providing notice of its claim, Contractor shall provide the Authority and the Engineer with any information and/or documents requested by them to evaluate the claim. No such claim shall be valid unless so made. If the Authority and the Contractor cannot agree on the amount of the adjustment in the Contract Sum, it shall be determined by the Engineer in accordance with Article 40(e). Any change in the Contract Sum resulting from such claim shall be authorized by Change Order.

- (a) If the Contractor claims that additional cost is required because of, but not limited to,
 - (1) any written interpretation of the Contract Documents;
 - (2) any order by the Authority to stop the Work where the Contractor was not at fault; or
 - (3) any Field Order directed change in the Work; the Contractor shall make such claim as provided in Article 25(a).

Article 26: TIME FOR COMPLETION AND LIQUIDATED DAMAGES

- (a) All time limits stated in the Contract Documents are of the essence of the Contract.
- (b) The Contractor shall proceed with the Work with the diligence necessary to insure Substantial Completion within the Contract Time. It is expressly understood and agreed by and between the Contractor and the Authority that the Contract Time for the completion of the Work described herein is a reasonable and adequate time, taking into consideration the average climate and economic conditions and other factors prevailing in the locality of the Work.
- (c) If the Contractor shall fail to Substantially Complete the Work within the Contract Time, or extension of time granted by the Authority, then the Contractor shall pay to the Authority liquidated damages as specified in the Contract Documents for each calendar day after the date of Substantial Completion until the Work achieves Substantial Completion. Contractor agrees that the amount of liquidated damages is reasonable and waives any right it may have to contest the amount of liquidated damages as being unreasonable or a penalty. If liquidated damages are not set forth in the Contract Documents, Contractor shall be liable to Owner for any loss or damage arising from the Contractor's failure to complete the Work by the date of Substantial Completion.
- (d) If the Contractor is delayed at any time in the progress of the Work by any act or neglect of the Authority or the Engineer, or by any employee of either, or by any separate contractor employed by the Authority, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in transportation, unusual and adverse weather conditions that could not be reasonably anticipated, unavoidable casualties, or any causes beyond the Contractor's control, or by delay authorized by the Authority, then the Contract Time shall be extended by Change Order for such reasonable time as the Engineer may determine.
- (e) Any claim for extension of time shall be made in writing to the Engineer and the Authority within (10) days after the commencement of the event giving rise to or causing the claimed delay; otherwise it shall be waived. The notice shall set forth the basis for the extension of time and any other relief requested by the Contractor. After providing notice of its claim, Contractor shall provide the Authority and the Engineer with any information and/or documents requested by them to evaluate the claim. In the case of a continuing delay only one notice of claim is necessary. The Contractor shall precisely identify the delay and its cause, and provide an estimate of the probable effect of such delay on the progress of the Work.
- (f) Contractor hereby expressly waives any claims against the Authority and the Engineer for any indirect or direct damages, costs or expenses which the Contractor or its Subcontractors may incur

as a result of any delay in the performance of the Contract, except and then only to the extent that the delay is caused by any act or omission of the Authority or the Engineer, or their agents or employees, and is due to causes within their control. In such event, Contractor may seek direct costs arising solely from the delay but shall not be entitled to any indirect costs including, without limitation, home office overhead costs. It is understood and agreed that the Contractor's sole and exclusive remedy in case of any noncompensable delay shall be an extension of the Contract Time, but only as determined in accordance with the provisions of the Contract Documents.

- (g) In the event that Contractor has incurred a delay for which it believes it is entitled to compensation under this Contract, it shall give the Authority written notice of that claim within ten (10) days of the commencement of the delay, and shall identify what it considers to be the cause of and expected duration of the delay.

Article 27: CORRECTION OF WORK

- (a) The Contractor shall promptly remove from the premises all work rejected by the Engineer or the Authority for failure to comply with the Contract Documents whether incorporated in the construction or not, and the Contractor shall promptly replace and re-execute the work in accordance with the Contract Documents and without expense to the Authority and shall bear the expense of making good all work of other Contractors destroyed or damaged by such removal or replacement.
- (b) Unauthorized work shall be any work done or materials ordered by the Contractor prior to receipt of the Notice to Proceed, previously rejected work incorporated into the Project, work done contrary to or regardless of the instructions of the Engineer, extra work performed without proper written authority, work done beyond the limits shown on the Plans, except as herein specified, any extra work done without written authority from the Engineer or the Authority, or any work done after discovery of a discrepancy, ambiguity, or inconsistency and before the Engineer provides any necessary instructions to the Contractor. The Authority shall not pay for unauthorized work. Unauthorized work may, at the Authority's sole discretion, be ordered removed or replaced at the Contractor's expense.

Article 28: SUSPENSION OF WORK; THE AUTHORITY'S RIGHT TO STOP AND CARRY OUT THE WORK

- (a) The Authority may order the Contractor in writing to suspend, delay, or interrupt all or any part of the Work for such period of time as it may determine to be appropriate for the convenience of the Authority.
- (b) **The Authority's Right to Stop the Work**

If the Contractor fails to correct defective Work as required, fails to carry out the Work in accordance with the Contract Documents, or if an emergency situation exists that threatens the safety of persons or property, the Authority, in addition to any other remedies it may have, by a written notice direct the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated. Contractor shall be liable to the Authority for any loss of damages arising from the stoppage of the Work including, without limitation, any loss or damage arising from a delay in the completion of the Work.

- (c) **Authority's Right to Carry Out the Work**

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within two (2) days after receipt of written notice from the Authority to commence and continue correction for such default or neglect with diligence and promptness, the Authority may, after two (2) days following receipt by the Contractor of an additional written notice of its decision to do so, make good such deficiencies without prejudice to any other remedy it may have. In such case an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Engineer's additional services or other services as may be required and made necessary by such default, neglect or failure. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Authority. All charges and back

charges made against monies otherwise owed to or due to the Contractor shall be deemed accepted unless the Contractor rejects them in writing to the Authority within ten (10) days of receipt and states fully its reasons for rejecting them.

Article 29: TERMINATION

- (a) If the Contractor is adjudged a bankrupt or insolvent, or if it makes a general assignment for the benefit of its creditors, or if a trustee or receiver is appointed for the Contractor or for any of its property, or if it files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or applicable laws, or if it fails to supply sufficient skilled workmen or suitable materials or equipment, or if it fails to make prompt payments to subcontractors or for labor, materials or equipment, or if it refuses or fails to prosecute the Work or any separable part thereof, with such diligence as will insure its completion within the Contract Time, or if it fails to complete the Work within the Contract Time required, or if it disregards laws, ordinances, rules, regulations, directions or orders of any public body having jurisdiction over the Work, or if it disregards the authority of the Engineer, or if it otherwise violates any provision of the Contract Documents, then the Authority may, without prejudice to any other right or remedy, seven (7) days after delivery of a written notice to the Contractor and its surety, terminate the services of the Contractor and take possession of the Project and of all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor, and finish the Work by whatever method it may deem expedient. In such case, the Contractor will not be entitled to receive any future payment until the Work is finished. If the unpaid balance of the Contract Price exceeds the direct and indirect costs of completing the Project, including compensation for additional professional services, such excess will be paid to the Contractor. If such costs exceed such unpaid balance, the Contractor shall pay the difference to the Authority. Such cost incurred by the Authority will be determined by the Engineer and incorporated in a Change Order.
- (b) If termination for cause by the Authority is deemed to be improper, it shall be deemed a termination for convenience.
- (c) Where the Contractor's services have been so terminated by the Authority, the termination shall not affect any rights the Authority then has or that may thereafter accrue against the Contractor. Any retention or payment of monies by the Authority due the Contractor will not release the contractor from compliance with the Contract Documents.
- (d) **Termination for Convenience**

The Authority may, effective not less than after seven (7) days from delivery of a written notice to the Contractor, without cause and without prejudice to any other rights or remedies it may have, terminate this Construction Contract for its own convenience for any reason. When this Construction Contract has been terminated for convenience, the Contractor shall be paid only for Work performed through the date of termination. The Contractor shall not be entitled to anticipated profits on unperformed portions of the Work.

Article 30: USE OF THE PREMISES

- (a) The Authority will have the right to enter the premises for the purpose of doing work not covered by the Contract Documents. This provision shall not be construed as relieving the Contractor of the sole responsibility for the care and protection of the Work or the restoration of any damaged work, except such as may be caused by agents or employees of the Authority.
- (b) Prior to Substantial Completion, the Authority, with the concurrence of the Contractor, may use any completed or substantially completed portion of the Work. Such use shall not constitute a final acceptance of such portions of the Work unless otherwise stated so in writing.

Article 31: PAYMENTS TO THE CONTRACTOR

- (a) Prior to submitting its first application for payment, the Contractor shall submit to the Authority and the Engineer a schedule of values allocating the costs of the various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as may be required by the Authority and the Engineer. This schedule, as approved, shall be used as a basis for

Contractor's applications for payment, which shall be submitted on the current edition of the AIA Application and Certification for Payment ("Application for Payment"), AIA Document G702.

- (b) At least twenty days before each progress payment falls due (but not more than once a month), the Contractor, the Engineer, and the Authority shall meet at the Project to determine the percentage of completion of the individual items in the schedule of values. If no agreement is reached, the Contractor shall prepare its Application for Payment using percentages it considers correct. Thereafter, the Contractor shall submit to the Engineer three (3) copies of its completed and signed Applications for Payment covering the work performed during the period of the Application for Payment and supported by such data as the Engineer may reasonably require. If payment is requested on the basis of materials and equipment not incorporated in the Work, the Application for Payment shall also be accompanied by such supporting data, satisfactory to the Engineer, as will protect the Authority's interests therein, including applicable insurance. See Article 32(c). The Engineer will, within fifteen days after receipt of each Application for Payment, either certify in writing its approval of payment for an amount based either on the agreed percentages of completion or the percentages the Engineer considers correct and present the Application for Payment to the Authority, or return the Application for Payment to the contractor stating in writing its reasons for refusing to approve payment. If payment has been refused, the Contractor may make the necessary corrections and resubmit the Application for Payment to the Engineer. The Authority will, within thirty days of its receipt of an approved Application for Payment, pay the Contractor a progress payment in the amount certified by the engineer, unless the Authority has reason to refuse payment of that amount in whole or in part, in which event it shall state its reasons in writing to the Contractor. The Authority will retain five (5) percent of the amount of each payment due until final completion and acceptance of all work. However, the Authority may, in its sole discretion, reduce the amount retained to 150% of the value of work remaining when the work is substantially complete. The decision to reduce retainage and the amount of such reduction shall be solely that of the Authority. On completion and acceptance of a part of the Work on which the price is stated separately in the Contract Documents, payment may be made in full, including retained percentages less authorized deductions. Prior to receiving each payment, and as part of its Applications for Payment, the Contractor shall certify in writing that it has made payment from the proceeds of prior payments and that it will make timely payments from the proceeds of progress and final payment then due it, to its subcontractors and suppliers in accordance with its contractual arrangement with them. If requested by the Authority, the Contractor shall provide evidence of such payments, including affidavits by subcontractors and suppliers.
- (c) The Application for Payment may also include an allowance for the cost of major materials and equipment not yet incorporated in the Work. When requested in writing by the Contractor and approved in writing by the Authority, payment will be made for nonperishable major material and equipment delivered and properly stored at the Work site or other approved site. Material for which payment has been made, wholly or partially, shall not be removed from the Work site or other approved site unless authorized by the Authority in writing.
- (d) The Contractor shall indemnify and save the Authority and its agents harmless from all losses, damages, liabilities, including attorney's fees, arising out of the demands of Subcontractors, laborers, workmen, mechanics, materialmen and furnishers of machinery parts thereof, equipment, tools, and all supplies incurred in the furtherance of the performance of the Work. The Contractor shall, at the Engineer's request, furnish satisfactory evidence that all obligations of the nature designated above have been paid, discharged, or waived. If the Contractor fails to do so, the Authority may, after having notified the Contractor, either pay unpaid bills or withhold from the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the Contractor will be resumed in accordance with the terms of the Contract Documents. In no event, however, shall the provisions of the foregoing sentence be construed to impose any obligations upon the Authority to either the Contractor, its Surety, or any third party. In paying any unpaid bills of the Contractor, any payment so made by the Authority will be considered as a payment made under the Contract Documents by the Authority to the Contractor and the Authority will not be liable to the Contractor for any such payments in good faith.
- (e) If the Authority fails to make a payment when due under the terms of this Contract, interest shall accrue on monies due and owing at the rate of 3% per annum commencing sixty (60) days after the date the payment was due.

- (f) The Authority may reduce in whole or in part any approved Application for Payment, whether or not it has been paid, to the extent necessary to protect the Authority from loss because of:
- (1) defective Work not remedied;
 - (2) failure to timely or properly pay Subcontractors;
 - (3) evidence that the Work cannot be completed for the amount remaining to be paid; or
 - (4) damage to the Authority;
 - (5) a persistent failure to carry out the Work in accordance with the Contract Documents.

Article 32: SUBSTANTIAL COMPLETION OF THE WORK

- (a) When the Contractor considers that the Work or, if agreed to by the Authority, a designated portion thereof is Substantially Complete as defined in Article 1, the Contractor shall prepare for submission to the Engineer a list of items to be completed or corrected. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. When the Engineer on the basis of its inspection determines that the Work or designated portion thereof is Substantially Complete, it will then prepare a Certificate of Substantial Completion which shall establish the Date of Substantial Completion, shall state the responsibilities of the Authority and the Contractor for security, maintenance, heat, utilities, damage to the Work, and insurance, and shall fix the time within which the Contractor shall complete the items listed therein. Warranties required by the Contract Documents shall commence on the Date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion. The Certificate of Substantial Completion shall be submitted to the Authority and the Contractor for their written acceptance of the responsibilities assigned to them in such Certificate.
- (b) Upon Substantial Completion of the Work or designated portion thereof and upon application by the Contractor and certification by the Engineer, the Authority shall make payment, reflecting adjustment in retainage, if any, for such Work or portion thereof, as provided in the Contract Documents.

Article 33: FINAL COMPLETION AND FINAL PAYMENT

- (a) Upon receipt of written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Engineer will promptly make such inspection and, when it finds the Work acceptable under the Contract Documents and the Contract fully performed, it will promptly issue a final Certificate for Payment stating that to the best of its knowledge, information, and belief, and on the basis of its observations and inspections, the Work has been completed in accordance with the terms and conditions of the Contract Documents and that the entire balance stated therein is due and payable to the Contractor. If the Contractor has completed all of the requirements and conditions, Final Payment shall be made within 30 days of receipt of the Contractor's Application. The Engineer's Final Certificate for Payment will constitute a further representation that the conditions precedent to the Contractor's being entitled to final payment as set forth in Article 32(b) have been fulfilled.
- (b) Neither the final payment nor the remaining retained percentage shall become due until the Contractor submits to the Engineer (1) an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Authority or its property might in any way be responsible, have been paid or otherwise satisfied, (2) consent of surety, if any, to final payment, (3) if required by the Authority, other data establishing payment or satisfaction of all such obligations, such as receipts, release and waivers of liens arising out of the Contract, to the extent and in such form as may be designated by the Authority, (4) two (2) binders containing all product and equipment manuals, warranties and guarantees, and (5) as-built drawings. If any Subcontractor refuses to furnish a release or waiver required by the Authority, the Contractor may furnish a bond satisfactory to the Authority to indemnify it against any such lien. If any such lien remains unsatisfied after all payments are made, the Contractor shall refund to the Authority all

monies that the latter may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

- (c) If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by the issuance of Change Orders affecting final completion, and the Engineer so confirms, the Authority shall, upon application by the Contractor and certification by the Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance of the Contract Sum is less than the retainage stipulated in the Contract Documents, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Engineer prior to certification of such payment. Such payment shall then be made under the terms and conditions governing final payment. However, that payment shall not constitute a waiver of any claims the Authority may then or thereafter have.
- (d) The acceptance of final payment shall constitute a waiver of all claims by the Contractor except those previously made in writing, properly reserved pursuant to these General Conditions, and identified by the Contractor as unsettled at the time of the final Application for Payment. Such contractual claims, whether form money or other relief, shall be submitted in writing not later than 60 days after final payment. The Authority's Capital Programs Director shall review such contractual claims and issue a final decision in writing within 90 days after receipt.

Article 34: INSURANCE

(a) Contractor's Liability Insurance

The Contractor shall purchase and maintain such insurance as will protect it from claims set forth below which may arise out of or result from the Contractor's operations under the Contract, whether such operations be by itself or by any Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- (1) claims under workers' or workmen's compensation, disability benefit and other similar employee benefit acts;
- (2) claims for damages because of bodily injury, occupational sickness or disease, or death of its employees;
- (3) claims for damages because of bodily injury, sickness or disease, or death of any person other than its employees;
- (4) claims for damages insured by usual personal injury liability coverage, which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person by the Contractor, or (2) by any other person;
- (5) claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting there from; and
- (6) claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

Liability insurance shall include all major divisions of coverage and be on a comprehensive basis including:

- (1) Premises Operations (including X, C and U coverage);
- (2) Independent Contractor's Protective;
- (3) Products and Completed Operations;
- (4) Personal Injury Liability with Employment Exclusions deleted;
- (5) Contractual, including provisions for indemnity obligations under this Agreement;

- (6) Owned, non-owned and hired motor vehicles;
- (7) Broad Form Property Damage including Completed Operation

Contractor shall have and maintain the following insurance in the amounts set forth below unless otherwise agreed to by the Owner in writing:

- (1) Workers' Compensation Insurance in an amount as required by state law. Workers' Compensation per statutory limits and employer's liability in the following minimum amounts: EL Each Accident - \$500,000, EL Disease Policy Limit - \$500,000, EL Disease Each Employee - \$500,000.
- (2) Commercial General Liability Insurance including coverage for bodily injury, property damage, contractual liability and products/completed operations with a minimum coverage of \$1,000,000 per occurrence and \$2,000,000 in the aggregate. Property damage coverage shall include coverage for explosion, collapse and underground hazards. Coverage for products/completed operations shall extend for a period of three (3) years after the date of substantial completion. Property damage in the amount of not less than \$1,000,000 for any one accident. Additional limits may be required.
- (3) Comprehensive Automobile Liability Insurance for bodily injury and property damage with a minimum coverage of \$1,000,000 per occurrence and \$1,000,000 in the aggregate.
- (4) Excess or Umbrella insurance supplementing coverage under the Commercial General Liability, Comprehensive Automobile Liability Insurance and Employer's Liability Insurance policies with a minimum coverage of \$1,000,000 per occurrence and \$1,000,000 in the aggregate

The Contractor shall endorse the Authority on its insurance policy as an additional insured to protect the interests of the public. Certificates of Insurance and Additional Insured Endorsements acceptable to the Authority shall be filed with the Authority prior to commencement of the Work. These Certificates and Endorsements shall contain a provision that coverages afforded under the policies will not be cancelled until at least thirty days prior written notice has been given to the Authority. Insurance certificates must include an additional insured endorsement naming the following as an additional insured: "The Northern Virginia Regional Park Authority, its officers, directors, agents, employees, and volunteers." The endorsement must be completed on endorsement form CG 20 10 11 85 or CG 20 10 07 04 or such other form acceptable to the Authority.

(b) **The Authority's Liability Insurance**

The Authority shall be responsible for purchasing and maintaining its own liability insurance and, at its option, may purchase and maintain such insurance as will protect it against claims that may arise from operations under the Contract.

(c) **Property Insurance**

Unless otherwise provided, the Authority shall purchase and maintain property insurance upon the entire Work at the site to the full insurable value thereof. This insurance shall include the interests of the Authority, the Contractor, Subcontractors, and Sub-subcontractors in the Work and shall insure against the perils of fire and extended coverage and shall include "all risk" insurance for physical loss or damage including, without duplication of coverage, theft, vandalism and malicious mischief. If the Authority does not intend to purchase such insurance for the full insurable value of the entire Work, it shall inform the Contractor in writing prior to commencement of the Work. The Contractor may then affect insurance that will protect the interests of itself, its Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Authority. If not covered under the all risk insurance or otherwise provided in the Contract Documents, the Contractor shall effect and maintain similar property insurance on portions of the

Work stored off the site or in transit when such portions of the Work are to be included in an Application for Payment.

- (d) The Authority shall purchase and maintain such boiler and machinery insurance as may be required by the Contract Documents or by law. This insurance shall include the interests of the Authority, the Contractor, Subcontractor and Sub-subcontractors in the Work
- (e) Any loss insured under Article 34(c) is to be adjusted with the Authority and made payable to the Authority as trustee for the insured's, as their interests may appear. The Contractor shall pay each Subcontractor a just share of any insurance monies received by the Contractor, and by appropriate agreement, written where legally required for validity, shall require each Subcontractor to make payments to its Sub-subcontractors in similar manner.
- (f) If the Contractor requests in writing that insurance for risks other than those described in Article 34(c) or (d) or other special hazards be included in the property insurance policy, the Authority may, if possible and in its sole discretion, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.
- (g) The Authority and the Contractor waive all rights against (1) each other and the Subcontractors, Sub-subcontractors, agents and employees each of the other, and (2) the Engineer and separate contractors, if any, and their subcontractors, sub-contractors, agents and employees, for damages caused by fire or other perils to the extent covered by insurance obtained pursuant to Article 34(c) or (d) or any other property insurance applicable to the Work, except such rights as they may have to the proceeds of such insurance held by the Engineer as trustee. The foregoing waiver afforded the Engineer, its agents and employees shall not extend to the liability imposed by Article 36(a). The Authority or the Contractor, as appropriate, shall require of the Engineer, separate contractors, Subcontractors and Sub-subcontractors by appropriate agreements, written where legally required for validity, similar waivers each in favor of all other parties enumerated in this Article 34(g).
- (h) If required in writing by the Contractor, the Authority as trustee shall, upon the occurrence of an insured loss, deposit in a separate account any money so received, and shall distribute it in accordance with the interests of the parties. If after such loss no other special agreement is made, replacement of damaged work shall be covered by an appropriate Change Order.
- (i) The Authority as trustee shall have power to adjust and settle any loss with the insurers.
- (j) If the Authority finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion thereof, such occupancy or use shall not commence prior to a time mutually agreed to by the Authority and the Contractor and to which the insurance company or companies providing the property insurance have consented by endorsement to the policy or policies. This insurance shall not be cancelled or lapsed on account of such partial occupancy or use. Consent of the Contractor and of the insurance company or companies to such occupancy or use shall not be unreasonably withheld.

Article 35: ASSIGNMENTS

Neither the Contractor nor the Authority shall sell, transfer, assign, or otherwise dispose of the Contract or any portion thereof, or of its rights, title, or interest therein, or its obligations thereunder, without written consent of both parties.

Article 36: INDEMNIFICATION

- (a) To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Authority, the Engineer and their agents, officers, directors and employees from and against all claims, damages, losses and expense, including but not limited to attorney's fees, arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss or expense (1) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including the loss of use resulting therefrom and (2) is caused in whole or in part by any negligent act or omission of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be

liable, regardless of whether or not it is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity that would otherwise exist as to any party or person described in this Article.

- (b) In any and all claims against the Authority or the Engineer or any of their agents or employees by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone whose acts any of them may be liable, the indemnification obligation under this Article shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under workers' or workmen's compensation acts, disability benefit acts or other employee benefit act.
- (c) The Authority shall retain such monies due or to become due the Contractor under the Contract as considered necessary by the Authority until such suits, claims for damages costs or losses have been settled or otherwise disposed of or satisfactory evidence to that effect has been furnished to the Authority.

Article 37: CONTRACTOR LIABILITY

The Contractor shall be liable to Authority for all costs the Authority incurs as a result of the Contractor's failure to perform this Contract in accordance with its terms. The Contractor's failure to perform shall include the failure of its suppliers and or Subcontractors of any tier to perform. Contractor's liability shall include, but not be limited to, (1) damages, liquidated damages, and other delay costs payable to the Authority; (2) the Authority's increased costs of performance, such as extended overhead and increased performance costs resulting from Contractor-caused delays, improper Contractor work, or termination of the Contractor; (3) warranty and rework costs; (4) liability to third parties; (5) excess costs; and (6) attorney's fees and related costs.

Article 38: SEPARATE CONTRACTS

- (a) The Authority reserves the right to let other contracts in connection with this Project. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work and shall properly connect and coordinate its work with theirs. If the proper execution or results of any part of the Contractor's work depends upon the work of any other contractor, the Contractor shall inspect and promptly report to the Engineer any defects in such work that render it unsuitable for such proper execution and results. The commencement of work by the Contractor shall indicate an acceptance of the previous contractor's work.
- (b) The Authority may perform additional work related to the Project by itself, or it may let other contracts containing provisions similar to these. The Contractor shall afford the other contractors who are parties to such contracts, the Authority, if it is performing the additional work itself, reasonable opportunity for the introduction and storage of materials and equipment and the execution of work and shall properly connect and coordinate it Work with theirs.
- (c) If the performance of additional work by other contractors or the Authority is not specified in the Contract Documents prior to the execution of the Contract, Written Notice thereof shall be given to the Contractor prior to starting any such additional work. If the Contractor believes that the performance of such additional work by the Authority or others will result in additional expense to the Contractor or entitle it to an extension of the Contract Time, it may make a claim therefore as provided in Articles 25, 26 and 27.

Article 39: SUBCONTRACTING

- (a) The Contractor may utilize the services of Subcontractors – which will have been approved by the Authority prior to commencement of the work – on those parts of the Work that, under normal contracting practices are performed by Subcontractors. The Contractor shall submit a list of proposed Subcontractors prior to commencement of the Work for the Authority's review and approval. The Contractor shall not employ a Subcontractor to which the Authority may object. The Authority shall not withhold its approval unreasonably.
- (b) The Contractor shall not award work to a single Subcontractors in excess of 50 percent of the

Contract Price without prior written approval of the Authority.

- (c) The Contractor shall be fully responsible to the Authority for the acts and omissions of its Subcontractors and of persons either directly or indirectly employed by them, as it is for the acts and omissions of person directly employed by it. The Contractor shall be fully responsible for the coordination of the work of the trades, Subcontractors and suppliers, and their officers, agents and employees.**
- (d) By an appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by the terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities that the Contractor, by the Contract Documents, assumes toward the Authority and the Engineer. The agreement shall preserve and protect the rights of the Authority and the Engineer under the Contract Documents with respect to the Work to be performed by the Subcontractor so that the subcontracting thereof will not prejudice such rights, and shall allow the Subcontractor, unless specifically provided otherwise in the Contractor-Subcontractor agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by these Documents, has against the Authority. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with its Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the Subcontract, copies of the Contract Documents to which the Subcontractor will be bound by this Paragraph and identify to the Subcontractor any terms and conditions of the proposed Subcontract that may be at variance with the Contract Documents. Each Subcontractor shall similarly make copies of such Documents available to its Sub-subcontractors.**
- (e) Nothing contained in the Contract Documents shall create any contractual arrangement between any Subcontractor and the Authority.**
- (f) Within seven (7) days after receipt of amounts paid to it, contractor shall either:**

 - (1) Pay its subcontractors for the proportionate share of the total payment received attributable to the work performed by the subcontractor under the contract; or**
 - (2) Notify the Authority and subcontractor in writing of his intentions to withhold all or part of the subcontractor's payment with the reasons for the nonpayment.**
- (g) Contractor shall include in each of its subcontracts a provision requiring each subcontractor to include or otherwise be subject to the same payment and interest requirements with respect to each lower-tier subcontractor that the contractor is subject to in subparagraph (f) and Article 32(e).**

Article 40: ENGINEER

- (a) The Engineer will act as the Authority's representative during the construction period and until final payment.**
- (b) The Engineer will visit the site at intervals appropriate to the stage of construction to familiarize itself and determine in general if the work is proceeding in accordance with the Contract Documents. However, the Engineer will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of its on-site observations, it will keep the Authority informed of the progress of the Work, and will endeavor to guard the Authority against defects and deficiencies in the Work of the Contractor.**
- (c) The Engineer will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, and it will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Engineer will not be responsible for or have control or charge over the acts or omissions of the Contractor, Subcontractors, or any of their agents or employees, or any other persons performing any of the Work. This Article shall in no way change the Engineer's responsibilities or liability to Authority.**

- (d) The Engineer will render interpretations necessary for the proper execution or progress of the Work, with reasonable promptness and in accordance with any time limit agreed upon. Either party to the Contract may make a written request to the Engineer for such interpretations.
- (e) Claims, disputes, and other matters in question between the Contractor and the Authority relating to the execution or progress of the Work or the interpretation of the Contract Documents shall be referred initially to the Engineer for decision, which it will render in writing within a reasonable time. Unless the Contractor provides written notice to the Authority and the Engineer of any objection to the Engineer's decision, the Engineer's decision shall be final and binding.
- (f) All interpretations and decisions of the Engineer shall be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. The Engineer will endeavor to secure faithful performance by both the Authority and The Contractor, will not show partiality to either, and will not be liable for the result of any interpretation or decision rendered in good faith in such capacity.
- (g) The Engineer's decisions in matters relating to artistic effect will be final if consistent with the intent of the Contract Documents and agreed to by the Authority.
- (h) The parties agree to perform the Work, accept the interpretation or otherwise follow the decision of the Engineer so as to not delay the progress of the Work. Notwithstanding this provision, the Authority may stop the Work pending a judicial review of the Engineer's decision.
- (i) The Engineer will have authority to reject Work, which does not conform to the Contract Documents.
- (j) The Engineer will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for conformance with the design concept of the Work and with the information given in the Contract Documents. Such action shall be taken with reasonable promptness so as to cause no delay. The Engineer's approval of a specific item shall not indicate approval of an assembly of which the item is a component.
- (k) The Engineer will conduct inspections to determine the dates of Substantial Completion and final completion, will receive and forward to the Authority for the Authority's review written warranties and related documents required by the Contract and assembled by the Contractor, and will issue a final Certificate for Payment upon compliance with the requirements of Article 34.
- (l) Notwithstanding any other provision to the contrary, Article 40(e) to (h) shall not apply to this project if there IS no Project Engineer.

Article 41: WARRANTY

- (a) The Contractor warrants to the Authority and the Engineer that all materials and equipment furnished under this Contract will be new unless otherwise specified and that all Work will be performed in a good and workmanlike manner and will be of good quality, free from faults and defects and in conformance with the Contract Documents and the Legal Requirements. All Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. If required by the Engineer, the Contractor shall furnish satisfactory evidence of the kind and quality of materials and equipment.
- (b) The Contractor shall promptly correct all Work rejected by the Engineer as defective or as failing to conform to the Contract Documents whether observed before or after substantial Completion and whether or not fabricated, installed, or completed. The Contractor shall bar all costs of correcting such rejected Work, including compensation for the Engineer's additional services made necessary thereby.
- (c) If, within one year after the Date of Substantial Completion of the Work or designated portion thereof or within one year after acceptance by the Authority of designated equipment or within such longer period of time as may be prescribed by law or by the terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be defective or not in accordance

with the Contract Documents, the Contractor shall correct it promptly after receipt of a written notice from the Authority to do so unless the Authority has previously given the Contractor a written acceptance of such condition. This obligation shall survive termination of the Contract. The Authority shall give such notice promptly after discovery of the condition.

Article 42: CONTRACTUAL DISPUTES

Contractual claims, whether for money or for other relief, shall be submitted in writing not later than (60) sixty days after final payment; however, written notice of the Contractor's intention to file such claim must be given at the time of the occurrence or beginning of the work upon which the claim is based. A written decision upon any such claims will be made by the Authority within thirty (30) days after submittal. The Contractor may not institute legal action prior to receipt of the Authority's decision on the claim unless it fails to render such decision within 120 days. The decision of the Capital Programs Director or other signatory on the Contract shall be final and conclusive unless the Contractor within six (6) months of the date of the final decision on a claim, initiates legal action as provided in § 2.2-4364 of the Code of Virginia. Failure of the Authority to render a decision within 120 days shall not result in the Contractor being awarded the relief claimed nor shall it result in any other relief or penalty. The sole result of the Authority's failure to render a decision within the time allotted shall be the Contractor's right to immediately institute legal action. No administrative appeals procedure pursuant to § 2.2-4365 of the Code of Virginia has established for contractual claims under this Contract.

Revised 1/10/18

**SECTION 5:
SUPPLEMENTAL
GENERAL CONDITIONS &
SPECIFICATIONS DIVISION**

GENERAL CONDITIONS AND SPECIFICATIONS DIVISIONS 0-32

JUNE 5, 2026
VOLCANO ISLAND WATER PARK – POOL RENOVATION
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SECTION 011000 – SUMMARY

PART 1 - GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification:
 - 1. Project Location: 20015 Volcano Island Drive, Sterling, VA 20165
 - 2. Owner: NOVA Parks – 5400 Ox Road, Fairfax Station, VA 22039
- B. Engineer Identification: The Contract Documents were prepared for Project by CHA Consulting, Inc., III Winners Circle, Albany NY 12205.
- C. The Work consists of providing all the labor, materials, tools, equipment, and other means necessary and incidental to the completion of work shown on the plans and as described in the specifications as follows:
- D. Provide all necessary mobilization, site preparation, demolition, construction and cleanup work associated with the Pool renovations and reconstruction as detailed in the bid documents. Work scope defined under the Base Bid shall include but is not necessarily limited to erection and delivery onto the premises of any equipment or apparatus furnished, preparations of site access, all necessary demolition work and new equipment / systems identified within the bid documents. This shall include mobilization, demobilization and site preparation, provide/install new MLPS and water play features, pool decking, modifications including repairs to the pool shell, select replacement of various recirculation, filtration, and chemical systems / equipment for the MLPS pool, all electrical work for newly installed items per NEC 680 code, pool equipment modifications, pool piping improvements, new main drains, piping and pressure testing of main drain, piping, and new pool plaster with quartz aggregate finish. Scope shall include temporary storage and protection, progress inspection approvals, replacement of any landscape areas that was destroyed during mobilization/demolition/construction, pressure testing of pool piping, and filling of the pool along with the final testing and calibration of pool equipment after construction.

1.2 CONTRACT

- A. Project will be constructed under one prime construction contract which shall be as follows:
 - 1. Pool Construction contract (shall be responsible for all work outlined in this bid package).

1.3 WORK SEQUENCE

- A. The work awarded shall be conducted in a single phase.

1.4 USE OF PREMISES

- A. Contractor shall have full use of premises for construction operations on or around September 15, 2026, including use of Project site. Contractor's use of premises during non-operating times will be unencumbered. Site access shall be coordinated with NOVA during the preconstruction meeting (to be scheduled prior to start date). All construction activities shall be coordinated and approved by the Engineer and NOVA using an approved logistics plan prepared by the Contractor.

1.5 CONSTRUCTION MILESTONES

- A. Anticipated Start of Construction: September 15, 2026
- B. Demolition & Groundwork: By or before November 6, 2026
- C. New Construction including Installation & Testing: By or before April 16, 2027
- D. Final Permitting: By or before May 7, 2027
- E. Any delays due to unforeseen circumstances, inclement weather, or change orders approved by Nova Parks that delays the contracted completion dates will be renegotiated between the contractor and Nova Parks to reestablish a new completion date comparable to the number of days delayed.

1.6 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 48-division format and CSI/CSC's "Master Format" numbering system.
- B. Section Identification: The Specifications use section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.
- C. 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. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 - 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be

performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

3. 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 011400 - WORK RESTRICTIONS

PART 1 - GENERAL

1.1 USE OF PREMISES

- A. Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of site beyond areas in which the Work is indicated.
 - 1. Limits: Confine constructions operations to areas within the contract limits indicated. Report any discrepancies to Engineer prior to beginning work.
 - 2. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to NOVA Parks, Parks' employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- B. Use of Existing Building: Maintain existing equipment building in a weathertight condition throughout construction period. Repair damage caused by construction operations. Protect building and its occupants during construction period. Contractor shall take any means necessary to prevent any debris from falling into any open pool areas.
- C. Restroom: Contractors are required to supply and maintain porta-john rentals at the Contractor's expense. Porta-john location shall be determined at the pre-construction meeting.

1.2 OCCUPANCY REQUIREMENTS

- A. Partial NOVA Parks Occupancy: NOVA Parks reserves the right to occupy and to place and install equipment in completed areas of site, before Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total Work.
 - 1. A Certificate of Substantial Completion will be prepared for each specific portion of the Work to be occupied before Parks occupancy.
 - 2. If necessary, obtain a Certificate of Occupancy from authorities having jurisdiction before Parks occupancy.
 - 3. Before partial Parks occupancy, pool recirculation, filtration, mechanical and chemical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, NOVA Parks will provide, operate, and maintain pool systems serving occupied portions of site.
 - 4. On occupancy, NOVA will assume responsibility for maintenance and operation of the pool system.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 012600 – CONTRACT MODIFICATION PROCEDURES

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.

1.2 MINOR CHANGES IN THE WORK

- A. Engineer will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time.

1.3 PROPOSAL REQUESTS

- A. NOVA Parks-Initiated Proposal Requests: Engineer will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Proposal Requests issued by Engineer are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
 - 2. Within 7 days 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 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 unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Engineer.
 - 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 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.
 5. Comply with requirements in Division 1 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.
- C. Proposal Request Form: For Change Order Proposals, use CSI Change Order Request (proposal format).

1.4 CHANGE ORDER PROCEDURES

- A. On NOVA's approval of a Proposal Request, Engineer will issue a Change Order for signatures of NOVA and Contractor.
- B. Any additional work as it pertains to unforeseen circumstances or changes not identified in the original scope of work will be proposed by the contractor via a Change Proposal/ or Change order to be approved by NOVA Parks.

1.5 WORK CHANGE DIRECTIVE

- A. Work Change Directive: Engineer may issue a Work Change Directive which instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 1. Work 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.
 2. Documentation: Maintain detailed records on a time and material basis of work required by the Work Change Directive.
 3. 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

SECTION 012900 – PAYMENT PROCEDURES

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.1 DEFINITIONS

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

1.2 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.

- 1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:

- a. Contractor's progress schedule.
- b. Application for Payment form.
- c. List of subcontractors.
- d. Schedule of allowances.
- e. Schedule of alternates.
- f. List of products.
- g. List of principal suppliers and fabricators.
- h. Schedule of submittals.

- 2. Submit the Schedule of Values to Engineer at earliest possible date but no later than 21 days before the date scheduled for submittal of initial Applications for Payment.

- 3. Sub-schedules: Where the Work is separated into phases requiring separately phased payments, provide sub-schedules showing values correlated with each phase of payment.

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

- 1. Identification: Include the following Project identification on the Schedule of Values:

- a. Project name and location.
- b. Name of Engineer.
- c. Project number.

- d. Contractor's name and address.
 - e. Date of submittal.
2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Generic Name
 - b. Related Specification Section or Division.
 - c. Description of the Work.
 - d. Name of subcontractor.
 - e. Name of manufacturer or fabricator.
 - f. Name of supplier.
 - g. Change Orders (numbers) that affect value.
 - h. Dollar value.
 - 1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 6. Differentiate between items stored on-site and items stored off-site. Include evidence of insurance or bonded warehousing if required.
 7. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 8. 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.
 9. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 10. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.

11. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.3 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Engineer and paid for by NOVA.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between NOVA and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets or EJCDC Form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Engineer 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 of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment to Engineer 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 every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
 1. Submit partial waivers on each item for amount requested, before deduction for retainage, on each item.
 2. When an application shows completion of an item, submit final or full waivers.
 3. NOVA reserves the right to designate which entities involved in the Work must submit waivers.

4. Waiver Delays: Submit each Application for Payment with Contractor's waiver of mechanic's lien for construction period covered by the application.
 - a. Submit final Application for Payment with or preceded by 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 waivers of lien on forms, executed in a manner acceptable to NOVA.
- H. 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.
 5. Schedule of unit prices.
 6. Submittals Schedule (preliminary if not final).
 7. List of Contractor's staff assignments.
 8. List of Contractor's principal consultants.
 9. Copies of building permits.
 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 11. Initial progress report.
 12. Report of preconstruction conference.
 13. Certificates of insurance and insurance policies.
 14. Performance and payment bonds.
 15. Data needed to acquire NOVA' insurance.
 16. Initial settlement survey and damage report if required.
- I. Application for Payment at Substantial Completion: After issuing 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 Certificates of Partial Substantial Completion issued previously for NOVA occupancy of designated portions of the Work.

- J. Final Payment Application: 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. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 6. AIA Document G707, "Consent of Surety to Final Payment."
 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 NOVA 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

SECTION 013000 – PROJECT MANAGEMENT AND COORDINATION

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. Coordination.
 - 2. Submittals.
 - 3. Administrative and supervisory personnel.
 - 4. Project meetings.
 - 5. General installation provisions.
 - 6. Cleaning and protection.
- B. Where applicable, each prime Contractor shall participate in these coordination requirements, even though certain areas of responsibility are assigned to a specific prime Contractor.

1.2 COORDINATION

- A. Coordination: Coordinate construction activities included under various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections of these Specifications that are dependent upon each other for proper installation, connection, and operation.
- B. Coordination: Each prime contractor shall cooperate with NOVA, coordinate construction activities to assure efficient and orderly installation of each part of the Work.
 - 1. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, cooperate with scheduled construction activities in the sequence required to obtain the best results.
 - 2. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
 - 4. Coordinate construction activities with public and private utilities.
 - a. Notify “Underground Facilities Protective Organizations” (UFPO) a minimum of 48 hours prior to excavation or blasting.
 - b. Notify NOVA and Engineer of any utility locations encountered which conflict with the work. Coordinate with NOVA and Utility Company in the protection, removal, relocation or replacement of conflicting utility locations.

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

1.3 SUBMITTALS

- A. Coordination Drawings: Prepare and submit coordination Drawings where close and careful coordination is required for installation of products and materials fabricated off site by separate entities, and where limited space availability necessitates maximum utilization of space for efficient installation of different components.
 - 1. Show the interrelationship of components shown on separate Shop Drawings.
 - 2. Indicate required installation sequences.
 - 3. Comply with requirements contained in Section "Submittals Procedures."
 - 4. Refer to Division 13, Section 131100 – MLPS GENERAL CONDITIONS for specific coordination Drawing requirements for MLPS installations.
- B. Staff Names: Within 15 days of starting construction operations, submit a list of principal staff assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and

telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone.

1.4 PROJECT MEETINGS

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

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify NOVA and Engineer of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including NOVA and Engineer, within 3 days of the meeting.

B. Preconstruction Conference: Schedule a preconstruction conference / organizational meeting at the Project site or other convenient site prior to commencement of construction activities. Conduct the meeting to review responsibilities and personnel assignments.

1. Attendees: Authorized representatives of NOVA; Engineer and their consultants; the Contractor and its superintendent; major subcontractors; manufacturers; suppliers and other concerned parties shall each be represented at the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing.
 - d. Designation of responsible personnel.
 - e. Procedures for processing field decisions and Change Orders.
 - f. Procedures for processing Applications for Payment.
 - g. Distribution of the Contract Documents.
 - h. Submittal procedures.
 - i. Preparation of Record Documents.
 - j. Use of the premises.
 - k. Responsibility for temporary facilities and controls.
 - l. Parking availability.
 - m. Office, work, and storage areas.

- n. Equipment deliveries and priorities.
 - o. Safety procedures.
 - p. First aid.
 - q. Security.
 - r. Progress cleaning.
 - s. Working hours.
 - t. Housekeeping.
 - u. Subcontractors.
 - v. Preliminary Schedule of Shop Drawings and Samples.
 - w. Minority Business Enterprise Goals.
 - x. Co-ordination with other contractors.
 - y. Insurance in Force.
 - z. Contractor's Schedule of Values.
- C. Pre-installation Conferences: Conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction.
- 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Engineer of scheduled meeting dates.
 - 2. Agenda: Review progress of other construction activities and preparations for the activity under consideration at each pre-installation conference, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related Change Orders.
 - d. Purchases.
 - e. Deliveries.
 - f. Shop Drawings, Product Data and quality control Samples.
 - g. Review of mockups.
 - h. Possible conflicts.
 - i. Compatibility problems.
 - j. Time schedules.
 - k. Weather limitations.
 - l. Manufacturer's written recommendations.
 - m. Warranty requirements.

- n. Compatibility of materials.
 - o. Acceptability of substrates.
 - p. Temporary facilities and controls.
 - q. Space and access limitations.
 - r. Governing regulations.
 - s. Testing and inspecting requirements.
 - t. Required performance results.
 - u. Protection of construction and personnel.
 - v. Safety.
 - w. Recording requirements.
3. Record significant discussions and agreements and disagreements of each conference, along with the approved progress schedule. Distribute the record of the meeting to everyone concerned, promptly, including NOVA and Engineer.
4. 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 the Project Site at regularly scheduled intervals. Coordinate dates of meetings with preparation of payment requests.
- 1. Attendees: In addition to representatives of NOVA and Engineer, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current 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.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Time.
 - 3) Sequence of operations.
 - 4) Status of submittals.

- 5) Deliveries.
 - 6) Off-site fabrication.
 - 7) Access.
 - 8) Site utilization.
 - 9) Temporary facilities and controls.
 - 10) Work hours.
 - 11) Hazards and risks.
 - 12) Progress cleaning.
 - 13) Quality and work standards.
 - 14) Change Orders.
 - 15) Documentation of information for payment requests.
3. Reporting: No later than 3 days after each progress meeting date, distribute copies of minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
 - a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.
- E. Coordination Meetings: Conduct Project coordination meetings at regularly scheduled intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and pre-installation conferences.
1. Attendees: In addition to representatives of NOVA and Engineer, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work
 2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to Combined 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.
 - b. Schedule Updating: Revise Combined Contractor's Construction Schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.

- c. Review present and future needs of each contractor present, including the following:
 - 1) Interface requirements.
 - 2) Time.
 - 3) Sequence of operations.
 - 4) Status of submittals.
 - 5) Deliveries.
 - 6) Off-site fabrication.
 - 7) Access.
 - 8) Site utilization.
 - 9) Temporary facilities and controls.
 - 10) Work hours.
 - 11) Hazards and risks.
 - 12) Progress cleaning.
 - 13) Quality and work standards.
 - 14) Change Orders.
3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION

3.1 GENERAL INSTALLATION PROVISIONS

- A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.
- C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.
- D. Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.
- E. Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Engineer for final decision.

- F. Recheck measurements and dimensions, before starting each installation.
- G. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.
- H. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.
- I. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Engineer for final decision.

3.2 CLEANING AND PROTECTION

- A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- B. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- C. Limiting Exposures: Supervise construction activities 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. Where applicable, such exposures include, but are not limited to, the following:
 - 1. Excessive static or dynamic loading.
 - 2. Excessive internal or external pressures.
 - 3. Excessively high or low temperatures.
 - 4. Thermal shock.
 - 5. Excessively high or low humidity.
 - 6. Air contamination or pollution.
 - 7. Water or ice.
 - 8. Solvents or Chemicals.
 - 9. Light.
 - 10. Radiation.
 - 11. Puncture.
 - 12. Abrasion.
 - 13. Heavy traffic.
 - 14. Soiling, staining and corrosion.
 - 15. Bacteria.

16. Rodent and insect infestation.
17. Combustion.
18. Electrical current.
19. High speed operation,
20. Improper lubrication,
21. Unusual wear or other misuse.
22. Contact between incompatible materials.
23. Destructive testing.
24. Misalignment.
25. Excessive weathering.
26. Unprotected storage.
27. Improper shipping or handling.
28. Theft.
29. Vandalism.

END OF SECTION

SECTION 013200 – CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Preliminary Construction Schedule.
 - 2. Contractor's Construction Schedule.
 - 3. Submittals Schedule.
 - 4. Daily construction reports.
 - 5. Material location reports.
 - 6. Field condition reports.
 - 7. Special reports.
 - 8. Construction photographs.

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 activities are activities on the critical path. They must start and finish on the planned early start and finish times.
 - 2. Predecessor activity is an activity that must be completed before a given activity can be started.
- 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 continuous chain of 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 NOVA 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 following activity.

3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- F. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.
- G. Major Area: A story of construction, a separate building, or a similar significant construction element.
- H. Milestone: A key or critical point in time for reference or measurement.
- I. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.

1.3 SUBMITTALS

- A. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and NOVA, and other information specified.
- B. Submittals Schedule: Submit a submittal schedule in pdf format. Arrange the following information in a tabular format:
 1. Scheduled date for first submittal.
 2. Specification Section number and title.
 3. Submittal category (action or informational).
 4. Name of subcontractor.
 5. Description of the Work covered.
 6. Scheduled date for Engineer's final release or approval.
- C. Preliminary Construction Schedule: Submit a preliminary construction schedule in pdf format.
- D. Contractor's Construction Schedule: Submit a construction schedule in pdf format. Include type of schedule (Initial or Updated) and date on label.
- E. Construction Photographs: Submit a digital photo of each view within 7 days of taking photographs.
 1. Format: Digital JPG image with minimum resolution of 2584x1936 and image quality set to fine/high or better.
 2. Identification: A photo-log shall be provided containing a record for each submitted photo with the following information:
 - a. File Name of Photo.
 - b. Name of Project.

- c. Name and address of photographer.
- d. Name of Engineer.
- e. Name of Contractor.
- f. Date photograph was taken.
- g. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

Photo-logs may be scanned hard-copy forms, though digital formats such as MS Word, MS Excel or MS Access are preferred. If the delivery method for the photos is via an online file management system, photo-log records should be entered into that system provided it supports entering the above information.

3. Delivery: If an online document management system or project collaboration website is used on the project, all photos and accompanying identification will be uploaded to it. Otherwise, digital photos will be delivered via traditional media such as thumb drive or uploaded to an FTP site.

- F. Daily Construction Reports: Submit 3 copies at weekly intervals.
- G. Material Location Reports: Submit 3 copies at weekly intervals.
- H. Field Condition Reports: Submit 3 copies at time of discovery of differing conditions.
- I. Special Reports: Submit 3 copies at time of unusual event.

1.4 QUALITY ASSURANCE

- A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting.
- B. Photographer Qualifications: An individual of established reputation who has been regularly engaged as a professional photographer for not less than three years.
- C. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section "Project Management and Coordination." Review methods and procedures related to the Preliminary Construction Schedule and Contractor's Construction Schedule, including, but not limited to, the following:
 1. Review software limitations and content and format for reports.
 2. Verify availability of qualified personnel needed to develop and update schedule.
 3. Discuss constraints, including phasing work, stages, interim milestones, and partial NOVA occupancy.
 4. Review delivery dates for NOVA-furnished products.
 5. Review schedule for work of NOVA' separate contracts.
 6. Review time required for review of submittals and resubmittals.
 7. Review requirements for tests and inspections by independent testing and inspecting agencies.

8. Review time required for completion and startup procedures.
9. Review and finalize list of construction activities to be included in schedule.
10. Review submittal requirements and procedures.
11. Review procedures for updating schedule.

1.5 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
 1. Secure time commitments for performing critical elements of the Work from parties involved.
 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.
- C. Auxiliary Services: Cooperate with photographer and provide auxiliary services requested, including access to Project site and use of temporary facilities including temporary lighting.

PART 2 – PRODUCTS

2.1 SUBMITTALS SCHEDULE

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

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."

- B. Time Frame: Extend schedule from date established for the Notice of Award 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.
- C. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Engineer.
 2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 3. Submittal Review Time: Include review and resubmittal times indicated in Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
 4. Startup and Testing Time: Include not less than 7 days for startup and testing.
 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion and allow time for Engineer's administrative procedures necessary for certification of Substantial Completion.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule and show how the sequence of the Work is affected.
1. Phasing: Arrange list of activities on schedule by phase.
 2. Work under More Than One Contract: Include a separate activity for each contract.
 3. Work by NOVA: Include a separate activity for each portion of the Work performed by NOVA.
 4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 5. NOVA-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 6. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.

- d. Partial occupancy before Substantial Completion.
 - e. Use of premises restrictions.
 - f. Provisions for future construction.
 - g. Seasonal variations.
 - h. Environmental control.
7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
- a. Subcontract awards.
 - b. Submittals.
 - c. Purchases.
 - d. Mockups.
 - e. Fabrication.
 - f. Sample testing.
 - g. Deliveries.
 - h. Installation.
 - i. Tests and inspections.
 - j. Adjusting.
 - k. Curing.
 - l. Startup and placement into final use and operation.
8. Area Separations: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
- a. Structural completion.
 - b. Permanent space enclosure.
 - c. Completion of mechanical installation.
 - d. Completion of electrical installation.
 - e. Substantial Completion.
- E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to the Notice to Proceed, Substantial Completion, and Final Completion.
- F. Cost Correlation: At the head of schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of the Work performed as of dates used for preparation of payment requests.
1. Refer to Section "Payment Procedures" for cost reporting and payment procedures.

- G. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall project schedule.
- H. Computer Software: Prepare schedules using a program that has been developed specifically to manage construction schedules.

2.3 PRELIMINARY CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Submit preliminary horizontal bar-chart-type construction schedule within 7 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. Outline significant construction activities for first 60 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

2.4 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- 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 of Award. Base schedule on the Preliminary Construction Schedule and whatever updating, and feedback was received since the start of Project.
- 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 3 months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

2.5 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. High and low temperatures and general weather conditions.
 - 5. Accidents.
 - 6. Meetings and significant decisions.
 - 7. Unusual events (refer to special reports).
 - 8. Stoppages, delays, shortages, and losses.
 - 9. Meter readings and similar recording.
 - 10. Emergency procedures.
 - 11. Orders and requests of authorities having jurisdiction.

12. Change Orders received and implemented.
 13. Work Change Directives received.
 14. Service connected and disconnected.
 15. Equipment or system tests and startups.
 16. Partial Completions and occupancies.
 17. Substantial Completions authorized.
- B. Material Location Reports: At weekly intervals, prepare a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.
- C. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare a detailed report. Submit with a request for information on CSI Form 13.2A. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.6 SPECIAL REPORTS

- A. General: Submit special reports directly to NOVA within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise NOVA in advance when these events are known or predictable.

PART 3 – EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At by-weekly intervals, update schedule to reflect actual construction progress and activities. Issue schedule 1 day before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 3. As the Work progresses, indicate Actual Completion percentage for each activity.

- B. Distribution: Distribute copies of approved schedule to Engineer, NOVA, 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.

3.2 CONSTRUCTION PHOTOGRAPHS

- A. Photographer: Engage a qualified commercial photographer to take construction photographs.
- B. Date Stamp: Unless otherwise indicated, date and time stamp each photograph as it is being taken so stamp is integral to photograph.
- C. Preconstruction Photographs: Before starting construction, take 10 photographs of Project site and surrounding properties from different vantage points, as directed by Engineer. Show existing conditions adjacent to property.
- D. Periodic Construction Photographs: Take 10 color photographs monthly, coinciding with cutoff date associated with each Application for Payment. Photographer shall select vantage points to best show status of construction and progress since last photographs were taken.
 - 1. Field Office Prints: Retain an electronic set of photographs in field office at Project site, available at all times for reference. Identify photographs the same as for those submitted to Engineer.
- E. Final Completion Construction Photographs: Take 10 photographs after date of Substantial Completion for submission as Project Record Documents. Engineer will direct photographer for desired vantage points.

END OF SECTION

SECTION 013300 – SUBMITTAL PROCEDURES

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Engineer's responsive action.
- B. Informational Submittals: Written information that does not require Engineer's approval. Submittals may be rejected for not complying with requirements.
- C. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.
 - 1. Submittal Administrative Requirements:
 - a. Engineer's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Engineer for Contractor's use in preparing submittals.
 - 1) Engineer will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings and Project record drawings.
 - a) Engineer makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
 - b) Digital Drawing Software Program: The Contract Drawings are available in AutoCAD 2024.
 - c) Contractor shall execute data licensing agreement.
 - 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.
 - 4) Retain subparagraph below if one submittal has an impact on another submittal. Submittals that require concurrent review should be so indicated in those Sections.

- 5) Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a) Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
 - c. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer'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. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
 - 2) Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 - 3) Resubmittal Review: Allow 15 days for review of each resubmittal.
 - 4) Sequential Review: Where sequential review of submittals by Engineer's consultants, NOVA, or other parties is indicated, allow 21 days for initial review of each submittal.
- D. Paper Submittals: Place a permanent label or title block on each submittal item for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Engineer
 3. Include the following information for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name of Engineer.
 - d. Name of Construction Manager.
 - e. Name of Contractor.
 - f. Name of subcontractor.
 - g. Name of supplier.
 - h. Name of manufacturer.
 - i. Submittal number or other unique identifier, including revision identifier.
 - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).
 - j. Number and title of appropriate Specification Section.
 - k. Drawing number and detail references, as appropriate.
 - l. Location(s) where product is to be installed, as appropriate.
 - m. Other necessary identification.

4. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Engineer or Construction Manager observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
 - a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Engineer.
 5. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Engineer and Construction Manager will return without review discard submittals received from sources other than Contractor.
 - a. Transmittal Form for Paper Submittals: Use facsimile of sample form included in Project Manual.
- E. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 2. Name file with submittal number or other unique identifier, including revision identifier.
 - a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).
 3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Engineer.
 4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to NOVA, containing the following information:
 - a. Project name.
 - b. Date.
 - c. Name and address of Engineer.
 - d. Name of Construction Manager.
 - e. Name of Contractor.
 - f. Name of firm or entity that prepared submittal.
 - g. Names of subcontractor, manufacturer, and supplier.
 - h. Category and type of submittal.
 - i. Submittal purpose and description.
 - j. Specification Section number and title.
 - k. Specification paragraph number or drawing designation and generic name for each of multiple items.
 - l. Drawing number and detail references, as appropriate.
 - m. Location(s) where product is to be installed, as appropriate.
 - n. Related physical samples submitted directly.
 - o. Indication of full or partial submittal.
 - p. Transmittal number, numbered consecutively.

- q. Submittal and transmittal distribution record.
 - r. Other necessary identification.
 - s. Remarks.
5. Metadata: Include the following information as keywords in the electronic submittal file metadata:
- a. Project name.
 - b. Number and title of appropriate Specification Section.
 - c. Manufacturer name.
 - d. Product name.
 - a. Options: Identify options requiring selection by Engineer.
- F. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Engineer on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
- G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
- 1. Note date and content of previous submittal.
 - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 - 3. Resubmit submittals until they are marked with approval notation from Engineer's action stamp.
- H. 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.
- I. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Engineer's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
- 1. Submit electronic submittals via email as PDF electronic files.
 - a. Engineer will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
 - 2. Action Submittals: Submit 3 paper copies of each submittal unless otherwise indicated. Engineer will return 2 copies.
 - 3. Informational Submittals: Submit 2 paper copies of each submittal unless otherwise indicated. Engineer will not return copies.
 - 4. Certificates and Certifications Submittals: Provide 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.

- a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
 - b. Provide a notarized statement on original paper copy certificates and certifications where indicated.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's 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 showing 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 or concurrent with Samples.
 6. Submit Product Data in the following format:
 - a. PDF electronic file.
 - b. Three paper copies of Product Data unless otherwise indicated. Engineer, through Construction Manager, will return two copies.

- a. 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.
 7. 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.
 8. 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.
 9. Submit Shop Drawings in the following format:
 - a. PDF electronic file.
 - b. Three opaque copies of each submittal. Engineer will retain 2 copies; remainder will be returned.
- C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of applicable Specification Section.
 - e. Specification paragraph number and generic name of each item.
 3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
 4. 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.

- F. Application for Payment and Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."
- G. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Division 01 Section "Quality Requirements."
- H. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."
- I. 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 Engineers and NOVA, and other information specified.
- J. 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.
- K. 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.
- L. 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.
- M. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- N. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- O. 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.
- P. 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.

- Q. 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:
1. Name of evaluation organization.
 2. Date of evaluation.
 3. Time period when report is in effect.
 4. Product and manufacturers' names.
 5. Description of product.
 6. Test procedures and results.
 7. Limitations of use.
- R. 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.
- S. 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 primers and substrate preparation needed for adhesion.
- T. 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.
- U. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- V. Engineer Construction Photographs: Comply with requirements in Division 1 Section "Construction Progress Documentation."

2.2 CONTRACTOR'S PROJECT HEALTH & SAFETY PLAN

- A. No later than the Pre-construction meeting, the Contractor shall submit to the Engineer a written Project Health & Safety Plan which states the Contractor's company policy relative to safety. The plan must also address specific health and safety concerns which are expected to be encountered on the project. As a minimum this plan shall include:
1. Listing of project and company safety officers
 2. Specific company safety policies
 3. Employee Safety Training Program
 4. Administrative procedures to handle employee health & safety concerns.
 5. Procedures for insuring worker compliance with health and safety requirements.
- B. The Contractor shall be responsible to ensure that each Subcontractor employed on the project complies with the requirements of this section either by submitting a copy of the subcontractor's Project Health & Safety Plan or by submitting a letter from the

Subcontractor stating that they will comply with the provisions of the Contractor's Project Health & Safety Plan.

- C. Submission of the required Project Health & Safety Plan by the Contractor is primarily for information or record purposes and shall not be construed to imply approval by the Engineer or to relieve the Contractor from the responsibility to adequately protect the health & safety of all workers involved in the project.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

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

3.2 ENGINEER'S ACTION

- A. General: Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Engineer will review each submittal, make marks to indicate corrections or modifications required, and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
 - 1. Final Unrestricted Release: Where submittals are marked "No Exceptions Taken," that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.
 - 2. Final-But-Restricted Release: When submittals are marked "Make Corrections Noted," that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.
 - 3. Returned for Resubmittal: When submittal is marked "Revise and Resubmit," "Rejected," or "Submit Specified Item," do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.
 - a. Do not permit submittals marked "Revise and Resubmit," "Rejected," or "Submit Specified Item" to be used at the Project site, or elsewhere where Work is in progress.

4. Other Action: Where a submittal is primarily for information or record purposes, special processing or other activity, the submittal will be returned, marked "Action Not Required."
- C. Informational Submittals: Engineer will review each submittal and will not return it or will reject and return it if it does not comply with requirements. Engineer will forward each submittal to appropriate party.
- D. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION

SECTION 014000 – QUALITY REQUIREMENTS

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-control services required by Engineer, NOVA, or authorities having jurisdiction are not limited by provisions of this Section.

1.2 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Engineer.
- C. Mockups: Full-size, physical example assemblies to illustrate finishes and materials. Mockups are used to verify selections made under Sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples.
- D. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

1.3 DELEGATED DESIGN

- 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 Engineer.

1.4 SUBMITTALS

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, 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.
- C. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 1. Specification Section number and title.
 2. Description of test and inspection.
 3. Identification of applicable standards.
 4. Identification of test and inspection methods.
 5. Number of tests and inspections required.
 6. Time schedule or time span for tests and inspections.
 7. Entity responsible for performing tests and inspections.
 8. Requirements for obtaining samples.
 9. Unique characteristics of each quality-control service.
- D. Reports: Prepare and submit certified written reports, that include the following:
 1. Date of issue.
 2. Project title and number.
 3. Name, address, and telephone number of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Ambient conditions at time of sample taking and testing and inspecting.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.

12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and reinspecting.
- E. Permits, Licenses, and Certificates: For NOVA's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.5 QUALITY ASSURANCE

- A. 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.
- B. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- C. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- D. 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.
- 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 products that are similar to those indicated for this Project in material, design, and extent.
- F. Specialists: Certain sections of the Specifications 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. Requirement for specialists shall not supersede building codes and similar regulations governing the Work, nor interfere with local trade-union jurisdictional settlements and similar conventions.
- G. Testing Agency Qualifications: An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed. Each testing agency shall be authorized by the authorities having jurisdiction in the state in which the project is located.
- H. Preconstruction Testing: Testing agency shall perform preconstruction testing for compliance with specified requirements for performance and test methods.

1. Contractor responsibilities include the following:
 - a. Provide test specimens and assemblies representative of proposed materials and construction. Provide sizes and configurations of assemblies to adequately demonstrate capability of product to comply with performance requirements.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Fabricate and install test assemblies using installers who will perform the same tasks for Project.
 - d. When testing is complete, remove assemblies; do not reuse materials on Project.
 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Engineer through Construction Manager, 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.
- I. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location and of size indicated or, if not indicated, as directed by Engineer.
 2. Notify Engineer (7) days in advance of dates and times when mockups will be constructed.
 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 4. Obtain Engineer's approval of mockups before starting work, fabrication, or construction.
 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 6. Demolish and remove mockups when directed, unless otherwise indicated.

1.6 QUALITY CONTROL

- A. NOVA Responsibilities: Where quality-control services are indicated as NOVA's responsibility, NOVA will assist in locating a qualified testing agency to perform these services.
1. NOVA and/or Engineer will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.
- B. Contractor Responsibilities: Unless otherwise indicated, provide quality-control services specified (including concrete testing) and required by authorities having jurisdiction.
1. Engage a qualified testing agency to perform these quality-control services.

2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
 6. Payment for all Testing services will be included in Contractor's submitted Base Bid.
 7. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be the responsibility of the Contractor.
- C. Special Tests and Inspections: Contractor will engage a testing agency to conduct special tests and inspections required.
1. Testing agency will notify Engineer and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 2. Testing agency will submit a certified written report of each test, inspection, and similar quality-control service to Engineer with copy to Contractor and to authorities having jurisdiction.
 3. Testing agency will submit a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 4. Testing agency will interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 5. Testing agency will retest and reinspect corrected work.
 6. Payment for these services will be included in Contractor's submitted Base Bid.
- D. 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.
- E. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.
- F. Testing Agency Responsibilities: Cooperate with Engineer and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Engineer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.

3. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
 5. Do not perform any duties of Contractor.
- G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field-curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- 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 inspecting.
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. Submit schedule within 30 days of date established for commencement of the Work (i.e., Notice to Proceed).
1. Distribution: Distribute schedule to NOVA, Engineer, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 REPAIR AND PROTECTION

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

1. Provide materials and comply with installation requirements specified in other Sections of these Specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.
 2. Comply with the Contract Document requirements for Division 1 Section "Cutting and Patching."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

SECTION 014200 – REFERENCES

PART 1 – GENERAL

1.1 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": The term "approved," when used in conjunction with Engineer's action on Contractor's submittals, applications, and requests, is limited to Engineer's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by Engineer, requested by Engineer, and similar phrases.
- D. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on Drawings; or to other paragraphs or schedules in Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference.
- E. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": The term "furnish" is used to mean supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": The term "install" is used to describe operations at Project site including unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.
- I. "Installer": An installer is the Contractor, or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction operation, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.
- J. The term "experienced," when used with the term "installer," means having successfully completed previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.
 - 1. Trades: Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.

2. Assignment of Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in the operations to be performed. The specialists must be engaged for those activities, and assignments are requirements over which the Contractor has no choice or option. Nevertheless, the ultimate responsibility for fulfilling Contract requirements remains with the Contractor.
 - a. This requirement shall not be interpreted to conflict with enforcement of building codes and similar regulations governing the Work. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.
- K. "Project site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction with others performing other work as part of Project. The extent of Project site is shown on the Drawings and may or may not be identical with the description of the land on which Project is to be built.
- L. Testing Laboratories: A "testing laboratory" is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.2 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of the date of the Contract Documents, unless otherwise indicated.
- C. Conflicting Requirements: Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Engineer for a decision before proceeding.
 1. 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. In complying with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to Engineer for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 1. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source and make them available on request.

- E. Abbreviations and Names: Abbreviations and acronyms are frequently used in the Specifications and other Contract Documents to represent the name of a trade association, standards-developing organization, authorities having jurisdiction, or other entity in the context of referencing a standard or publication. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they mean the recognized name of these entities. Refer to Gale Research's "Encyclopedia of Associations" or Columbia Books' "National Trade & Professional Associations of the U.S.," which are available in most libraries.
- F. Government Agencies: The following government agencies develop standards referenced in the Contract Documents:
1. Commonwealth of Virginia
 2. VA Department of Health
 3. Virginia Uniform Statewide Building Code & Virginia Swimming Pool & Spa Code

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements
1. The Engineer has contacted authorities having jurisdiction where necessary to obtain information necessary for preparation of Contract Documents. Contact authorities having jurisdiction directly for information and decisions having a bearing on the Work.
 2. Copies of Regulations: Obtain copies of the following regulations and retain at the Project Site, available for reference by parties who have a reasonable need for such reference.

1.4 SUBMITTALS

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

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

SECTION 015000 – TEMPORARY FACILITIES AND CONTROLS

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes requirements for temporary services, facilities and controls, including temporary utilities, support facilities, and security and protection facilities.
- B. Temporary utilities include, but are not limited to, the following:
 - 1. Sewers and drainage.
 - 2. Water service and distribution.
 - 3. Sanitary facilities, including toilets, wash facilities, and drinking-water facilities.
 - 4. Heating and cooling facilities.
 - 5. Ventilation.
 - 6. Electric power.
 - 7. Lighting.
 - 8. Telephone.
- C. Temporary construction and support facilities include, but are not limited to, the following:
 - 1. Temporary roads and paving.
 - 2. Dewatering facilities and drains.
 - 3. Project identification and temporary signs.
 - 4. Waste disposal facilities.
 - 5. Field offices.
 - 6. Storage and fabrication sheds.
 - 7. Lifts and hoists.
 - 8. Temporary stairs.
 - 9. Construction aids and miscellaneous services and facilities.
 - 10. Temporary enclosures.
 - 11. Temporary heat.
- D. Security and protection facilities include, but are not limited to, the following:
 - 1. Environmental protection.
 - 2. Stormwater control.
 - 3. Tree and plant protection.
 - 4. Sidewalk bridge and/or site enclosure fence.
 - 5. Security enclosure and lockup.

6. Barricades, warning signs, and lights.
7. Covered walkways.
8. Temporary enclosures.
9. Temporary partitions.
10. Fire protection.

1.2 DEFINITIONS

- A. Permanent Enclosure: As determined by Engineer, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.3 USE CHARGES

- A. General: The cost of all use charges for temporary facilities are not chargeable to NOVA or Engineer and shall be included in the Contract Sum. The contractor shall be responsible for paying all use charges until the project is substantially complete. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the following:
 1. NOVA' construction forces.
 2. Occupants of Project.
 3. Engineer.
 4. Testing agencies.
 5. Personnel of authorities having jurisdiction.
- B. Sewer Service: Pay sewer service use charges for sewer usage, by all parties engaged in construction, at Project site.
- C. Water Service: Pay water service use charges, whether metered or otherwise, for water used by all entities engaged in construction activities at Project site.
- D. Electric Power Service: Pay electric power service use charges, whether metered or otherwise, for electricity used by all entities engaged in construction activities at Project site.

1.4 SUBMITTALS

- A. Temporary Utility Reports: Submit reports of tests, inspections, utility billings, and similar procedures performed on temporary utilities.
- B. Implementation and Termination Schedule: Within 15 days of date established for submittal of Contractor's Construction Schedule, submit a schedule indicating implementation and termination of each temporary utility.

1.5 QUALITY ASSURANCE

- A. Standards: Comply with ANSI A10.6, NECA's "Temporary Electrical Facilities," and NFPA 241.

1. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with trade regulations and union jurisdictions.
 2. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
 3. Refer to Guidelines for Bid Conditions for Temporary Job Utilities and Services, prepared jointly by AGC and ASC, for industry recommendations.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to:
1. Building Code requirements.
 2. Health and safety regulations.
 3. Utility company regulations.
 4. Police, Fire Department and Rescue Squad rules.

1.6 PROJECT CONDITIONS

- A. Temporary Utilities: At earliest feasible time, when acceptable to NOVA, change over from use of temporary service to use of permanent service. Prepare a schedule indicating date for implementation and terminations of each temporary facility.
1. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before NOVA' acceptance, regardless of previously assigned responsibilities.
- B. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:
1. Keep temporary services and facilities clean and neat.
 2. Relocate temporary services and facilities as required by progress of the Work.
 3. Operate in a safe and efficient manner.
 4. Take necessary fire prevention measures.
 5. Do not overload facilities or permit them to interfere with progress.
 6. Do not allow hazardous, dangerous or unsanitary conditions or public nuisances to develop or persist on the site.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. General: Provide new materials. Undamaged, previously used materials in serviceable condition may be used if approved by Engineer. Provide materials suitable for use intended.

2.2 EQUIPMENT

- A. General: Provide new equipment; if acceptable to the Engineer, undamaged, previously used equipment in serviceable condition may be used. Provide equipment suitable for use intended.
- B. Fire Extinguishers: Provide hand-carried, portable UL-rated, class "A fire extinguishers for temporary offices and similar spaces. In other locations provide hand-carried, portable, UL-rated, class "ABC dry chemical extinguishers, or a combination of extinguishers of NFPA recommended classes for the exposures.
 - 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.
- C. Self-Contained Toilet Units: Single-occupant units of chemical, aerated recirculation, or combustion type; vented; fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
- D. Drinking-Water Fixtures: Containerized, tap-dispenser, bottled-water or drinking-water units, including paper cup supply.
 - 1. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 deg F.
- E. Heating Equipment: Unless NOVA authorizes use of permanent heating system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use for type of fuel being consumed.
- F. Electrical Outlets: Properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.
- G. Power Distribution System Circuits: Where permitted and overhead and exposed for surveillance, wiring circuits, not exceeding 125-V ac, 20-A rating, and lighting circuits may be nonmetallic sheathed cable.
- H. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered glass enclosures, where exposed to breakage. Provide exterior fixtures where exposed to moisture.
- I. Water Hoses: Provide 3/4" heavy-duty, abrasion-resistant, flexible rubber hoses 100 ft. long, with pressure rating greater than the maximum pressure of the water distribution system; provide adjustable shut-off nozzles at hose discharge.
- J. First Aid Supplies: Comply with governing regulations.

- K. Storage and Fabrication Sheds: Install storage and fabrication sheds, sized, furnished and equipped to accommodate materials and equipment involved, including temporary utility service. Sheds may be open shelters or fully enclosed spaces within the building or elsewhere on the site.

PART 3 – EXECUTION

3.1 INSTALLATION, GENERAL

- A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Engage appropriate local utility company to install temporary service or connect to existing service. Where utility company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.
 - 1. Arrange with utility company, NOVA, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
 - 2. Provide adequate capacity at each stage of construction. Before temporary utility is available, provide trucked-in services.
 - 3. Obtain easements to bring temporary utilities to Project site where NOVA' easements cannot be used for that purpose.
- B. Sewers and Drainage: If sewers are available, provide temporary connections to remove effluent that can be discharged lawfully. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds, and similar facilities. If neither sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off-site in a lawful manner.
 - 1. Filter out excessive soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.
 - 2. Connect temporary sewers to municipal system as directed by sewer department officials.
 - 3. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. After heavy use, restore normal conditions promptly.
 - 4. Provide temporary filter beds, settlement tanks, separators, and similar devices to purify effluent to levels acceptable to authorities having jurisdiction.

- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction until permanent water service is in use. Sterilize temporary water piping before use.
- D. Water Service: Use of NOVA' existing water service facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to NOVA. At Substantial Completion, restore these facilities to condition existing before initial use.
 - 1. Provide rubber hoses as necessary to serve Project site.
 - 2. As soon as water is required at each level, extend service to form a temporary water- and fire-protection standpipe. Provide distribution piping. Space outlets so water can be reached with a 100-foot (30-m) hose. Provide one hose at each outlet.
 - 3. Where installations below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize water damage. Drain accumulated water promptly from pans.
 - 4. Provide pumps to supply a minimum of 30-psi static pressure at highest point. Equip pumps with surge and storage tanks and automatic controls to supply water uniformly at reasonable pressures.
- E. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
 - 1. Disposable Supplies: Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Maintain adequate supply. Provide covered waste containers for disposal of used material.
 - 2. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy.
 - 3. Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel who handle materials that require wash up. Dispose of drainage properly. Supply cleaning compounds appropriate for each type of material handled.
 - a. Provide safety showers, eyewash fountains, and similar facilities for convenience, safety, and sanitation of personnel.
 - 4. Drinking-Water Facilities: Provide bottled-water, drinking-water units.
 - a. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 deg F.
 - 5. Locate toilets and drinking-water fixtures so personnel need not walk more than two stories vertically to facilities.
- F. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed

construction from adverse effects of low temperatures or high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed.

1. Maintain a minimum temperature of 50 deg F in permanently enclosed portions of building for normal construction activities, and 65 deg F for finishing activities and areas where finished Work has been installed.
2. Before building is considered enclosed, each Contractor shall provide temporary heat and enclosure for purposes as follows:
 - a. To heat materials and maintain proper temperatures in connection with the installation and curing of concrete, mortar and masonry.
 - b. To provide sufficient heat and protection so the Work can be accomplished to the standards set forth in the Contract Documents.
3. After building is considered enclosed, the Construction Contractor shall provide temporary heat to maintain temperature of at least 40°F for the period of the working hours of the day or as required by the Engineer. Heat may be provided at this time by mobile oil or gas fired temporary units equipped with proper controls and safety devices approved by the Underwriters Laboratories.
4. The building shall be considered enclosed when the exterior construction is completed sufficiently to exclude the elements and retain heat.
5. After building is considered permanently enclosed the Construction Contractor shall maintain temperature of at least 50°F throughout the spaces for twenty-four (24) hours a day. Provide higher temperatures if required to perform or protect the work. At this time, heat shall be provided by semi-permanently installed gas or oil-fired space heaters which are thermostatically controlled, vented properly to the outside and provided with piped fuel.
6. The building is considered permanently enclosed when:
 - a. All exterior walls are insulated with permanent or temporary insulation.
 - b. Permanent glazed windows are in place.
 - c. Roof is permanently insulated.
 - d. Door openings are provided with permanent doors or temporary plywood panels.
7. The permanent heating system may be used with approval of the Engineer, to provide temporary heat provided that all equipment is left in proper and acceptable condition on completion of the Work and all equipment construction filters have been replaced. Operating of heating plant during this temporary heating period shall be under the supervision of the Heating Contractor.

8. The period of the guarantee of the system will commence at the time of the NOVA's occupancy of the structure.
 9. The costs of temporary heat shall be paid by the Construction Contractor until NOVA occupancy of the structure.
- G. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
- H. Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnecting means, automatic ground-fault interrupters, and main distribution switchgear.
1. Install electric power service underground, unless overhead service must be used.
 2. Install power distribution wiring overhead and rise vertically where least exposed to damage.
 3. Connect temporary service to NOVA' existing power source, as directed by electric company officials.
- I. Electric Power Service: Use of NOVA' existing electric power service will be permitted, as long as equipment is maintained in a condition acceptable to NOVA.
- J. Electric Distribution: Provide receptacle outlets adequate for connection of power tools and equipment.
1. Provide waterproof connectors to connect separate lengths of electrical power cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
 2. Provide warning signs at power outlets other than 110 to 120 V.
 3. Provide metal conduit, tubing, or metallic cable for wiring exposed to possible damage. Provide rigid steel conduits for wiring exposed on grades, floors, decks, or other traffic areas.
 4. Provide metal conduit enclosures or boxes for wiring devices.
 5. Provide 4-gang outlets, spaced so 100-foot extension cord can reach each area for power hand tools and task lighting. Provide a separate 125-V ac, 20-A circuit for each outlet.
- K. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
2. Provide one 100-W incandescent lamp per 500 sq. ft., uniformly distributed, for general lighting, or equivalent illumination.
3. Provide one 100-W incandescent lamp every 50 feet in traffic areas.
4. Provide one 100-W incandescent lamp per story in stairways and ladder runs, located to illuminate each landing and flight.
5. Install exterior-yard site lighting that will provide adequate illumination for construction operations, traffic conditions, and signage visibility when the Work is being performed.
6. Install lighting for Project identification sign.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Locate field offices, storage sheds, sanitary facilities, and other temporary construction and support facilities for easy access.
2. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet of building lines. Comply with NFPA 241.
3. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to NOVA.

B. Dewatering Facilities and Drains: Comply with requirements in applicable Division 2 Sections for temporary drainage and dewatering facilities and operations not directly associated with construction activities included in individual Sections. Where feasible, use same facilities. 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 property nor endanger permanent Work or temporary facilities.
2. Before connection and operation of permanent drainage piping system, provide temporary drainage where roofing or similar waterproof deck construction is completed.
3. Remove snow and ice as required to minimize accumulations.

C. Project Identification and Temporary Signs: Prepare Project identification and other signs in sizes indicated. Install signs where indicated to inform public and persons seeking entrance to Project. Do not permit installation of unauthorized signs.

1. Engage an experienced sign painter to apply graphics for Project identification signs. Comply with details indicated.
 2. Prepare temporary signs to provide directional information to construction personnel and visitors.
 3. Construct signs of exterior-type Grade B-B high-density concrete form overlay plywood in sizes and thicknesses indicated. Support on posts or framing of preservative-treated wood or steel.
 4. Paint sign panel and applied graphics with exterior-grade alkyd gloss enamel over exterior primer.
- D. Waste Disposal Facilities: Collect waste from construction areas and elsewhere daily. Provide waste-collection containers in sizes adequate to handle waste from construction operations. Containerize and clearly label hazardous, dangerous, or unsanitary waste materials separately from other waste. Comply with Division 1 Section "Execution Requirements" for progress cleaning requirements.
1. If required by authorities having jurisdiction, provide separate containers, clearly labeled, for each type of waste material to be deposited.
 2. Develop a waste management plan for Work performed on Project. Indicate types of waste materials Project will produce and estimate quantities of each type. Provide detailed information for on-site waste storage and separation of recyclable materials. Provide information on destination of each type of waste material and means to be used to dispose of all waste materials.
- E. Janitorial Services: Provide janitorial services on a daily basis for temporary offices, first-aid stations, toilets, wash facilities, lunchrooms, and similar areas.
- F. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility services. Sheds may be open shelters or fully enclosed spaces within building or elsewhere on-site.
1. Construct framing, sheathing, and siding using fire-retardant-treated lumber and plywood.
 2. Paint exposed lumber and plywood with exterior-grade acrylic-latex emulsion over exterior primer.
- G. Lifts and Hoists: Provide facilities for hoisting materials and personnel. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- H. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate. Cover finished, permanent stairs with protective covering of plywood or similar material so finishes will be undamaged at time of acceptance.

- I. Existing Stair Usage: Use of NOVA' existing stairs will be permitted, as long as stairs are cleaned and maintained in a condition acceptable to NOVA. At Substantial Completion, restore stairs to condition existing before initial use.
 - 1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If, despite such protection, stairs become damaged, restore damaged areas so no evidence remains of correction work.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects. Avoid using tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near Project site.
- B. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
 - 1. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.
- C. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erecting structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and public of possible hazard. Where appropriate and needed, provide lighting, including flashing red or amber lights.
 - 1. For safety barriers, sidewalk bridges, and similar uses, provide minimum 5/8-inch- thick exterior plywood.
- D. 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 not complete, provide insulated temporary enclosures. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
 - 2. Vertical Openings: Close openings of 25 sq. ft. or less with plywood or similar materials.
 - 3. Horizontal Openings: Close openings in floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
 - 4. Install tarpaulins securely using fire-retardant-treated wood framing and other materials.
 - 5. Where temporary wood or plywood enclosure exceeds 100 sq. ft. in area, use fire-retardant-treated material for framing and main sheathing.

- E. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.
1. Construct dustproof partitions of not less than nominal 4-inch studs, 5/8-inch gypsum wallboard with joints taped on occupied side, and 1/2-inch fire-retardant plywood on construction side.
 2. Construct dustproof, floor-to-ceiling partitions of not less than nominal 4-inch studs, 2 layers of 3-mil polyethylene sheets, inside and outside temporary enclosure. Cover floor with 2 layers of 3-mil polyethylene sheets, extending sheets 18 inches up the side walls. Overlap and tape full length of joints. Cover floor with 3/4-inch fire-retardant plywood.
 - a. Construct a vestibule and airlock at each entrance to temporary enclosure with not less than 48 inches between doors. Maintain water-dampened foot mats in vestibule.
 3. Insulate partitions to provide noise protection to occupied areas.
 4. Seal joints and perimeter. Equip partitions with dustproof doors and security locks.
 5. Protect air-handling equipment.
 6. Weatherstrip openings.
- F. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
1. Provide fire extinguishers, installed on walls on mounting brackets, visible and accessible from space being served, with sign mounted above.
 - a. Field Offices: Class A stored-pressure water-type extinguishers.
 - b. Other Locations: Class ABC dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for exposures.
 - c. Locate fire extinguishers where convenient and effective for their intended purpose; provide not less than one extinguisher on each floor at or near each usable stairwell.
 2. Store combustible materials in containers in fire-safe locations.
 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for firefighting. Prohibit smoking in hazardous fire-exposure areas.
 4. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition.

5. Permanent Fire Protection: At earliest feasible date in each area of Project, complete installation of permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.
6. Develop and supervise an overall fire-prevention and first-aid fire-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.
7. Provide hoses for fire protection of sufficient length to reach construction areas. 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.
8. 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.

3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage caused by freezing temperatures and similar elements.
 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.
 2. Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- C. Operate Project-identification-sign lighting daily from dusk until 12:00 midnight.
- D. Temporary Facility Changeover: Except for using permanent fire protection as soon as available, do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- E. Termination and Removal: Unless the Engineer requests that it be maintained longer, 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 the property of Contractor. NOVA reserves right to take possession of Project identification signs.

2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements in Division 1 Section "Closeout Procedures."

END OF SECTION

SECTION 016000 – PRODUCT REQUIREMENTS

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes the following administrative and procedural requirements: selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.

1.2 DEFINITIONS

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

1.3 SUBMITTALS

- A. Product List: Submit a list, in tabular form, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.
 - 1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
 - 2. Form: Tabulate information for each product under the following column headings:

- a. Specification Section number and title.
 - b. Generic name used in the Contract Documents.
 - c. Proprietary name, model number, and similar designations.
 - d. Manufacturer's name and address.
 - e. Supplier's name and address.
 - f. Installer's name and address.
 - g. Projected delivery date or time span of delivery period.
 - h. Identification of items that require early submittal approval for scheduled delivery date.
3. Initial Submittal: Within 15 days after date of commencement of the Work, submit 3 copies of initial product list. Include a written explanation for omissions of data and for variations from Contract requirements.
 - a. At Contractor's option, initial submittal may be limited to product selections and designations that must be established early in Contract period.
 4. Completed List: Within 30 days after date of commencement of the Work, submit 3 copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
 5. Engineer's Action: Engineer will respond in writing to Contractor within 15 days of receipt of completed product list. Engineer's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Engineer's response, or lack of response, does not constitute a waiver of requirement that products comply with the Contract Documents.
- B. Substitution Requests: Requests for substitution will be considered if received within 30 days after commencement of the Work. Requests received more than 30 days after commencement of the Work may be considered or rejected at the discretion of the Director's Representative. Submit separate copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. VA Department of Health (VADOH) Approval: It is EXTREMELY important to note that any product substitution requests will require approval from the VADOH as all manufacturers and products listed within the project documents have been pre-reviewed and approved by VADOH. The submitting Contractor will be fully responsible to obtain any product substitutions' pre-approval from VADOH. A letter or e-mail documentation from VADOH will need to be submitted by the Contractor to the Director's Representative clearly stating approval has been granted prior to considering any product substitutions.
 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified material or product cannot be provided.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by NOVA and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.

- d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. List of similar installations for completed projects with project names and addresses and names and addresses of Engineers and NOVA.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
 - i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
 - j. Cost information, including a proposal of change, if any, in the Contract Sum.
 - k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
 - l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within one week of receipt of a request for substitution. Engineer will notify Contractor through Construction Manager of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
- a. Form of Acceptance: Change Order.
 - b. Use product specified if Engineer cannot decide on use of a proposed substitution within time allocated.
- C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section "Submittal Procedures." Show compliance with requirements.
- D. Warranty and Bond Submittals: Submit written warranties to the Engineer prior to the date certified for Substantial Completion. If the Engineer's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Engineer.
1. When a designated portion of the Work is completed and occupied or used by NOVA, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Engineer within fifteen days of completion of that designated portion of the Work.
 2. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to NOVA through the Engineer for approval prior to final execution.
 3. Forms for special warranties are included at the end of this Section. Prepare a written document utilizing the appropriate form, ready for execution by the Contractor, or the

Contractor and subcontractor, supplier or manufacturer. Submit a draft to NOVA through the Engineer for approval prior to final execution.

- a. Refer to individual Sections of Divisions-2 through -48 for specific content requirements, and particular requirements for submittal of special warranties.
4. Form of Submittal: At Final Completion compile two copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
5. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2" by 11" paper.
 - a. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address and telephone number of the installer.
 - b. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS," the Project title or name, and the name of the Contractor.
 - c. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

1.4 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.
 1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Engineer will determine which products shall be used.
- B. Source Limitations: To the fullest extent possible, provide products of the same kind, from a single source.
 1. When specified products are available only from sources that do not or cannot produce a quantity adequate to complete project requirements in a timely manner, consult with the Engineer for a determination of the most important product qualities before proceeding. Qualities may include attributes relating to visual appearance, strength, durability, or compatibility. When a determination has been made, select products from sources that produce products that possess these qualities, to the fullest extent possible.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.

2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
 5. Store products to allow for inspection and measurement of quantity or counting of units.
 6. Store materials in a manner that will not endanger Project structure.
 7. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 8. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 9. Protect stored products from damage.
- B. Storage: Provide a secure location and enclosure at Project site for storage of materials and equipment by NOVA' construction forces. Coordinate location with NOVA.

1.6 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.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: Forms are included with the Specifications. Prepare a written document using appropriate form properly executed.
 3. Refer to Divisions 02 through 49 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Warranty Requirements: Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.
1. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
 2. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or

- rebuilding defective Work regardless of whether NOVA has benefited from use of the Work through a portion of its anticipated useful service life.
3. NOVA's Recourse: Written warranties made to NOVA are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which NOVA can enforce such other duties, obligations, rights, or remedies.
 - a. Rejection of Warranties: NOVA reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
 4. NOVA reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

PART 2 – PRODUCTS

2.1 PRODUCT OPTIONS

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged, and unless otherwise indicated, that are new at time of installation.
 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. NOVA reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Engineer will make selection.
 5. Where products are accompanied by the term "match sample," sample to be matched is Engineer's.
 6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
 7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures: Procedures for product selection include the following:
 1. Product: Where Specification paragraphs or subparagraphs titled "Product" name a single product and manufacturer, provide the product named.
 - a. Substitutions may be considered.
 2. Manufacturer/Source: Where Specification paragraphs or subparagraphs titled "Manufacturer" or "Source" name single manufacturers or sources, provide a product by the manufacturer or from the source named that complies with requirements.
 - a. Substitutions may be considered.
 3. Products: Where Specification paragraphs or subparagraphs titled "Products" introduce a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.

- a. Substitutions may be considered.
4. Manufacturers: Where Specification paragraphs or subparagraphs titled "Manufacturers" introduce a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
 - a. Substitutions may be considered.
5. Available Products: Where Specification paragraphs or subparagraphs titled "Available Products" introduce a list of names of both products and manufacturers, provide one of the products listed or another product that complies with requirements. Comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.
6. Available Manufacturers: Where Specification paragraphs or subparagraphs titled "Available Manufacturers" introduce a list of manufacturers' names, provide a product by one of the manufacturers listed or another manufacturer that complies with requirements. Comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.
7. Product Options: Where Specification paragraphs titled "Product Options" indicate that size, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide either the specific product or system indicated or a comparable product or system by another manufacturer. Comply with provisions in "Product Substitutions" Article.
8. Basis-of-Design Products: Where Specification paragraphs or subparagraphs titled "Basis-of-Design Product[s]" are included and also introduce or refer to a list of manufacturers' names, provide either the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.
 - a. Substitutions may be considered.
9. Visual Matching Specification: Where Specifications require matching an established Sample, select a product (and manufacturer) that complies with requirements and matches Engineer's sample. Engineer's decision will be final on whether a proposed product matches satisfactorily.
 - a. If no product available within specified category matches satisfactorily and complies with other specified requirements, comply with provisions of the Contract Documents on "substitutions" for selection of a matching product.
10. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product (and manufacturer) that complies with other specified requirements.
 - a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Engineer will select color, pattern, or texture from manufacturer's product line that does not include premium items.
 - b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Engineer will select color, pattern, or texture from manufacturer's product line that includes both standard and premium items.
11. Allowances: Refer to individual Specification Sections and "Allowance" provisions in Division 1 for allowances that control product selection and for procedures required for processing such selections.

2.2 PRODUCT SUBSTITUTIONS

- A. Timing: Engineer will consider requests for substitution if received within 15 days after commencement of the Work. Requests received after that time may be considered or rejected at discretion of Engineer.
- B. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:
 - 1. Requested substitution offers NOVA a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities NOVA must assume. NOVA's additional responsibilities may include compensation to Engineer for redesign and evaluation services, increased cost of other construction by NOVA, and similar considerations.
 - 2. Requested substitution does not require extensive revisions to the Contract Documents.
 - 3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - 4. Substitution request is fully documented and properly submitted.
 - 5. Requested substitution will not adversely affect Contractor's Construction Schedule.
 - 6. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - 7. Requested substitution is compatible with other portions of the Work.
 - 8. Requested substitution has been coordinated with other portions of the Work.
 - 9. Requested substitution provides specified warranty.
 - 10. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
 - 11. The specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.
 - 12. The specified product or method of construction cannot be coordinated with other materials, and where the Contractor certifies that the proposed substitution can be coordinated.
 - 13. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provide the required warranty.

2.3 COMPARABLE PRODUCTS

- A. Where products or manufacturers are specified by name, submit the following, in addition to other required submittals, to obtain approval of an unnamed product:
 - 1. Evidence that the proposed product does not require extensive revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 - 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.

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

PART 3 – EXECUTION (Not Used)

END OF SECTION

SECTION 017300 – EXECUTION REQUIREMENTS

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. General installation of products.
 - 4. Coordination of NOVA-installed products.
 - 5. Progress cleaning.
 - 6. Starting and adjusting.
 - 7. Protection of installed construction.
 - 8. Correction of the Work.

1.2 SUBMITTALS

- A. Qualification Data: For professional engineer to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architect and NOVA, and other information specified.
- B. Certificates: Submit certificate signed by professional engineer certifying that location and elevation of improvements comply with requirements.
- C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

1.3 QUALITY ASSURANCE

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

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to NOVA 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. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by NOVA or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Engineer and NOVA not less than 48 hours in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Engineer's and/or NOVA' written permission.
- C. 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.
- D. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- E. 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 Engineer. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents. Submit requests on CSI Form 13.2A, "Request for Interpretation."

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Engineer promptly.
- B. General: Engage a land surveyor to lay out the Work using 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 dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 3. Inform installers of lines and levels to which they must comply.
 - 4. Check the location, level and plumb, of every major element as the Work progresses.
 - 5. Notify Engineer when deviations from required lines and levels exceed allowable tolerances.
 - 6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Construction Lines and Levels: Locate and lay out control lines and levels as necessary for all pool structures and floor levels, including those required for gutter installation work.

Contractor must ensure water depths are maintained. Transfer survey markings and elevations for use with control lines and levels.

- D. 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 Engineer.

3.4 FIELD ENGINEERING

- A. Identification: NOVA 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 Engineer. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Engineer 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 2 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.

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
 - 4. Maintain minimum headroom clearance of 8 feet in spaces without a suspended ceiling.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Engineer.
 - 2. Allow for building movement, including thermal expansion and contraction.
- G. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- H. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 NOVA-INSTALLED PRODUCTS

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

3.7 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.

3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Cutting and Patching: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.
 1. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.
- H. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- I. 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.
- J. 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.
- K. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

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

3.10 CORRECTION OF THE WORK

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

END OF SECTION

SECTION 017329 – CUTTING AND PATCHING

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.
- B. Refer to other sections for specific requirements and limitations applicable to cutting and patching individual parts of the work.

1.2 DEFINITIONS

- A. Cutting: Removal of existing construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.
- C. Areas Affected by Cutting & Patching shall include the following:
 - 1. Existing Pool walls and floor (at main drains, on damaged walls.)
 - 2. Existing Pool concrete deck area (to be removed and replaced).
 - 3. Existing Pool finish (to be completely demoed and removed).

1.3 SUBMITTALS

- A. Cutting and Patching Proposal: Where approval of procedures for cutting and patching is required before proceeding, submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
 - 1. Extent: Describe the extent of cutting and patching and show how they will be performed.
 - 2. Changes to Existing Construction: Describe anticipated results in terms of changes to existing construction; include changes to structural elements and operating components as well as changes in appearance and other significant visual elements.
 - 3. Products: List products to be used and firms or entities that will perform the Work.
 - 4. Dates: Indicate dates when cutting and patching will be performed.
 - 5. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted.

6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
7. Engineer's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right of the Engineer to later require removal and replacement of unsatisfactory work.
8. Describe means for the protection of adjacent areas to where cutting and patching shall take place.

1.4 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
 1. Insert list of elements that might otherwise be overlooked as structural elements and that require Engineer's or Construction Manager's approval of a cutting and patching proposal.
 - a. Pool foundation construction
 - b. Pool retaining walls
 - c. Structural concrete deck
 - d. Reinforcing steel
 - e. Shoring, bracing, and sheeting
- B. Operational Elements: Do not cut and patch the following operating elements or safety 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.
 1. Primary operational systems and equipment.
- C. Miscellaneous Elements: Do not cut and patch the following elements or related 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.
 1. Pool wall construction.
 2. Pool floor construction.
 3. Concrete deck.
 4. Equipment supports.
 5. Pool piping and equipment.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Engineer's opinion, reduce the aesthetic

qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

1. If possible, retain original Installer or fabricator to cut and patch exposed Work listed below. If it is impossible to engage original Installer or fabricator, engage another recognized, experienced, and specialized firm.

a. Swimming pool finishes.

E. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including all other trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.5 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 – PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections of these Specifications.

B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Prior to cutting existing services, examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed. Take corrective action before proceeding. If unsafe or unsatisfactory conditions are encountered, investigate both sides of the surface involved. Determine exact location of structural members.

1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Temporary Support: Provide temporary shoring and support of Work to be cut to prevent settlement or other damage to existing construction to remain.

- B. Protection: Protect existing 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.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to avoid interruption of services to occupied areas.
- E. Take all precautions necessary to avoid cutting existing recirculation pipe or conduit serving the pools but scheduled to be removed or relocated until provisions have been made to bypass them.

3.3 PERFORMANCE

- 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 existing 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. Cutting: Cut existing 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, where cutting is required, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Existing Finished Surfaces: To avoid marring existing 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 Division 2 Sections where required by cutting and patching operations.
 - 5. Proceed with patching after construction operations requiring cutting are complete.
- C. 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 possible. Comply with specified tolerances. Provide materials and comply with installation requirements specified in other Sections of these Specifications. Perform patching around

items penetrating existing construction in a manner that will maintain the water resistive capability of the existing construction.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate 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.
3. Pool Floor and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
4. Where reinstallation of removed items is indicated, reinstall them to a condition equal to or better than their condition before removal.

END OF SECTION

SECTION 017419 – CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 – GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Disposing of nonhazardous demolition and construction waste.

1.2 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from Pool construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from Pool demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Solid Waste: Any garbage, refuse or material planned for disposal.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials, including the following:
 - 1. Demolition Waste:
 - a. Concrete.
 - b. Concrete reinforcing steel.
 - c. Structural and miscellaneous steel.
 - d. Piping.
 - 2. Construction Waste:
 - a. Lumber (used for forms).
 - b. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
 - 1) Paper.
 - 2) Cardboard.
 - 3) Boxes.
 - 4) Plastic sheet and film.
 - 5) Polystyrene packaging.
 - 6) Wood crates.
 - 7) Plastic pails.

1.4 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Include the following information:
 - 1. Material category.
 - 2. Generation point of waste.
 - 3. Identify final destination for waste salvaged, recycled or recovered.
- B. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
 - 1. Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."
 - 2. Waste handling, containers, storage, signage, transportation and other applicable requirements shall be in accordance with applicable local, state and federal regulations.
- B. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 - 2. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 DISPOSAL OF WASTE

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

- B. Burning: Do not burn waste materials.
- C. Disposal: Remove waste materials from NOVA's property and legally dispose of them.

END OF SECTION

SECTION 017700 – CLOSEOUT PROCEDURES

PART 1 – GENERAL

1.1 SUMMARY

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

1. Inspection procedures.
2. Operation and maintenance manuals.
3. Warranties.
4. Instruction of NOVA's personnel.
5. Final cleaning.

1.2 SUBSTANTIAL COMPLETION

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

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise NOVA of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting NOVA unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
6. Deliver tools, spare parts, extra materials, and similar items to location designated by NOVA. Label with manufacturer's name and model number where applicable.
7. Make final changeover of permanent locks and deliver keys to NOVA. Advise NOVA's personnel of changeover in security provisions.
8. Complete startup testing of pool systems.
9. Submit test/adjust/balance records.
10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
11. Advise NOVA of changeover in heat and other utilities.
12. Submit changeover information related to NOVA's occupancy, use, operation, and maintenance.
13. Complete final cleaning requirements, including touchup painting.

14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer 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 Engineer, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

2. Results of completed inspection will form the basis of requirements for Final Completion.

1.3 FINAL COMPLETION

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

1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures."

2. Submit certified copy of Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Engineer. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.

3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

4. Instruct NOVA's personnel in operation, adjustment, and maintenance of all newly installed products, equipment, and systems. See specification section 131800 "MLPS POOL START-UP & OPERATIONS".

B. Final Inspection: Submit a written request for final inspection for acceptance. This shall include (if necessary) the Virginia Department of Health (VADOH) construction completion inspection. On receipt of request, Engineer will proceed with inspection and shall include VADOH site visit coordination. Inspection shall occur of which we will notify Contractor of unfulfilled requirements. Engineer 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. Reinspection: Request reinspection when the Work identified by VADOH in previous inspections as incomplete is completed or corrected.

1.4 OPERATION AND MAINTENANCE MANUALS

A. Assemble a complete set of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:

1. Operation Data:

- a. System, subsystem, and equipment descriptions, including operating standards.
- b. Operating procedures, including startup and shutdown operations.
- c. Pool winterization procedures.
- d. Description of controls and sequence of operations.

2. Maintenance Data:

- a. Manufacturer's information, including list of spare parts.
 - b. Name, address, and telephone number of Installer or supplier.
 - c. Maintenance procedures.
 - d. Maintenance and service schedules for preventive and routine maintenance.
 - e. Maintenance record forms.
 - f. Sources of spare parts and maintenance materials.
 - g. Copies of maintenance service agreements.
 - h. Copies of warranties and bonds.
- B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "VOLCANO ISLAND WATER PARK & EQUIPMENT OPERATION AND MAINTENANCE MANUAL" and name of Contractor.

1.5 WARRANTIES

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

3. Identify each binder on the front and spine with the typed or printed title "VOLCANO ISLAND WATER PARK & EQUIPMENT WARRANTIES," and name of Contractor.

D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 – PRODUCTS

2.1 MATERIALS

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

PART 3 – EXECUTION

3.1 DEMONSTRATION AND TRAINING

- A. Instruction: Instruct NOVA's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 1. Provide instructors experienced in operation and maintenance procedures.
 2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
 3. Schedule training with NOVA through Engineer with at least 7 days advance notice.
 4. Coordinate instructors, including providing notification of dates, times, length of instruction, and course content.
- B. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections. For each training module, develop a learning objective and teaching outline. Include instruction for the following:
 1. System design and operational philosophy.
 2. Review of documentation.
 3. Operations.
 4. Adjustments.
 5. Troubleshooting.
 6. Maintenance.
 7. Repair.

3.2 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

- B. Cleaning: Clean each area influenced by site construction. Comply with manufacturer's written instructions.
1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep pool and deck areas broom clean. Remove spills, stains, and other foreign deposits.
 - c. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - d. 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.
 - e. Remove labels that are not permanent.
 - f. Touch up and otherwise repair and restore marred, exposed finishes and surfaces.
 - g. Leave Project clean and ready for occupancy.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on NOVA's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION

SECTION 017823 – OPERATION AND MAINTENANCE DATA

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation manuals for the pool equipment including but not limited to the recirculation pumps and filtration system.
 - 2. Maintenance manuals for the care and maintenance of the swimming pool finish.
 - 3. MLPS equipment maintenance data.
 - 4. Water Feature equipment maintenance data.
 - 5. Main drain certification data and maintenance.

1.2 SUBMITTALS

- A. Initial Submittal: Submit 2 draft copies of each manual at least 15 days before requesting inspection for Substantial Completion. Include a complete operation and maintenance directory. Engineer will return one copy of draft and mark whether general scope and content of manual are acceptable.
- B. Final Submittal: Submit 1 copy of each manual in final form at least 15 days before final inspection. Engineer will return copy with comments within 15 days after final inspection.
 - 1. Correct or modify each manual to comply with Engineer's comments. Submit 3 copies of each corrected manual within 15 days of receipt of Engineer's comments.

PART 2 – PRODUCTS

2.1 OPERATION MANUAL

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
 - 1. System, subsystem, and equipment descriptions.
 - 2. Performance and design criteria if Contractor are delegated design responsibility.
 - 3. Operating standards.
 - 4. Operating procedures.
 - 5. Piped system diagrams.
 - 6. Precautions against improper use.
- B. Descriptions: Include the following:
 - 1. Product name and model number.
 - 2. Manufacturer's name.
 - 3. Equipment identification with serial number of each component.
 - 4. Equipment function.

5. Operating characteristics.
 6. Engineering data and tests.
 7. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
 2. Routine and normal operating instructions.
 3. Regulation and control procedures.
 4. Instructions on stopping.
 5. Normal shutdown instructions.

2.2 MAINTENANCE MANUALS

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Product Information: Include the following, as applicable:
1. Product name and model number.
 2. Manufacturer's name.
 3. Color, pattern, and texture.
- C. 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.
- D. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- E. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

PART 3 – EXECUTION

3.1 MANUAL PREPARATION

- A. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each product.
- B. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or

component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- C. Comply with Division 1 Section "Closeout Procedures" for the schedule for submitting operation and maintenance documentation.

END OF SECTION

SECTION 017839 – PROJECT RECORD DOCUMENTS

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:

1. Record Drawings.

1.2 SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit copies of Record Drawings as follows:

- a. Initial Submittal: Submit 1 set of plots from corrected Record CAD Drawings and 1 set of marked-up Record Prints. Engineer will initial and date each plot and mark whether general scope of changes, additional information recorded, and quality of drafting are acceptable. Engineer will return plots and prints for organizing into sets, printing, binding, and final submittal.
- b. Final Submittal: Submit 1 set of marked-up Record Prints, 1 set of Record CAD Drawing files, 1 set of Record CAD Drawing plots, and 3 copies printed from record plots. Plot and print each Drawing, whether changes and additional information were recorded.
- c. Electronic Media: Thumb Drive.

PART 2 – PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.

1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the 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 understandable drawing technique.
 - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.

- b. Revisions to details shown on Drawings.
 - c. Swimming pool depths.
 - d. Locations of depth markers.
 - e. Locations of gutter piping connections.
 - f. Changes made by Change Order or Work Change Directive.
 - g. Changes made following Engineer's written orders.
 - h. Details not on the original Contract Drawings.
 - i. Field records for variable and concealed conditions.
 - j. Record information on the Work that is shown only schematically.
3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 6. Note Work Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Record CAD Drawings: Immediately before inspection for Certificate of Substantial Completion, review marked-up Record Prints with Engineer. When authorized, prepare a full set of corrected CAD Drawings of the Contract Drawings, as follows:
1. Format: Same CAD program, version, and operating system as the original Contract Drawings.
 2. Incorporate changes and additional information previously marked on Record Prints. Delete, redraw, and add details and notations where applicable.
 3. Refer instances of uncertainty to Engineer for resolution.
 4. Engineer will furnish Contractor one set of CAD Drawings of the Contract Drawings for use in recording information.
 - a. Engineer makes no representations as to the accuracy or completeness of CAD Drawings as they relate to the Contract Drawings.
 - b. CAD Software Program: The Contract Drawings are available in AutoCAD 2024.
- C. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing Record Drawings where Engineer determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.

1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
 2. Consult with Engineer for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared Record Drawings into Record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
- D. Format: Identify and date each Record Drawing; include the designation "VOLCANO ISLAND WATER PARK POOL RECORD DRAWING" in a prominent location.
1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Record CAD Drawings: Organize CAD information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each CAD file.
 3. Identification: As follows:
 - a. Project name and Date.
 - b. Designation "VOLCANO ISLAND WATER PARK POOL RECORD DRAWINGS."
 - c. Name of Engineer.
 - d. Name of Contractor.

PART 3 – EXECUTION

3.1 RECORDING AND MAINTENANCE

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

END OF SECTION

SECTION 017900 – DEMONSTRATION AND TRAINING

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for instructing NOVA's personnel, including the following:
 - 1. Demonstration of operation of pool's new recirculation and filtration equipment.
 - 2. Training in operation and maintenance of all newly installed equipment.

1.2 QUALITY ASSURANCE

- A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 1 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

1.3 COORDINATION

- A. Coordinate instruction schedule with NOVA's operations. Adjust schedule as required to minimize disrupting NOVA's operations.

PART 2 – PRODUCTS

2.1 INSTRUCTION PROGRAM

- A. 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:
 - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System and equipment descriptions.
 - b. Operating standards.
 - c. Regulatory requirements.
 - d. Equipment function.
 - e. Operating characteristics.
 - f. Limiting conditions.
 - 2. Documentation: Review the following items in detail:
 - a. Emergency manuals.
 - b. Operations manuals.
 - c. Maintenance manuals.
 - d. Project Record Documents.
 - e. Identification systems.
 - f. Warranties and bonds.
 - 3. Emergencies: Include the following, as applicable:

- a. Instructions on stopping.
- b. Operating instructions for conditions outside of normal operating limits.
- c. Special operating instructions and procedures.
4. Operations: Include the following, as applicable:
 - a. Startup procedures.
 - b. Routine and normal operating instructions.
 - c. Regulation and control procedures.
 - d. Control sequences.
 - e. Safety procedures.
 - f. Instructions on stopping.
 - g. Normal shutdown instructions.
 - h. Special operating instructions and procedures.
5. Adjustments: Include the following:
 - a. Alignments.
 - b. Checking adjustments.
6. 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.
7. Repairs: Include the following:
 - a. Repair instructions.
 - b. Instructions for identifying parts and components.
 - c. Review of spare parts needed for operation and maintenance.

PART 3 – EXECUTION

3.1 INSTRUCTION

- A. Engage qualified instructors to instruct NOVA's personnel to adjust, operate, and maintain pool systems.
- B. Scheduling: Provide instruction at mutually agreed on times.
 1. Schedule training with NOVA with at least 7 days' advance notice.

END OF SECTION

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. This specification includes the prime general construction contract as referenced below.
- B. This Section includes the following:
 - 1. Demolition and removal of selected site elements at the Outdoor Pools area:
 - a. General Construction contract:
 - 1) Existing MLPS
 - 2) Existing Water Features
 - 3) Partial Concrete deck (see bid drawings for limits)
 - 4) Existing Main drains and associated piping
 - 5) Existing MLPS piping up to filter room
 - 6) Partial Pool Wall & Floor
 - 7) Existing (entire) Pool Finish
 - 8) Electrical related demolition
 - 9) Repair procedures for selective demolition operations
 - 10) Salvage of existing items to be reused or recycled

1.2 RELATED DOCUMENTS

- A. Division 01.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Detach items from existing construction and deliver them to NOVA.
- C. Remove and Reinstall: Detach items from existing construction, store them at an on-site location as directed by NOVA, prepare them for reuse, and reinstall them where indicated.
- D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled. (Note: These items may require protection and / or storage during construction.)
- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.4 MATERIAL OWNERSHIP

- A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain NOVA' property, demolished materials shall become Contractor's property and shall be removed from Project site.
- B. Unless otherwise indicated, demolition waste becomes property of Contractor.
- C. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to NOVA that may be uncovered during demolition remain the property of NOVA.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to NOVA.

1.5 PRE-DEMOLITION ACTION ITEMS

- A. Pre-demolition Conference: Conduct conference at Project site.
- B. Inspect and discuss condition of construction to be selectively demolished.
- C. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
- D. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
- E. Review areas where existing construction is to remain and requires protection.

1.6 INFORMATIVE SUBMITTALS

- A. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and NOVA, and other information specified.
- B. Schedule of Selective Demolition Activities: Indicate the following:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure NOVA's on-site operations are uninterrupted.
- C. Inventory: After selective demolition is complete, submit a list of items that have been removed and/or salvaged.
- D. Pre-demolition Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by selective demolition operations. Submit before Work begins.

1.7 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

1.8 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

1.9 PROJECT CONDITIONS

- A. NOVA may occupy portions of site adjacent to selective demolition area. Conduct selective demolition so NOVA's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by NOVA as far as practical.
- C. Before selective demolition, NOVA will remove the following items:
 - 1. Deck furniture and pool storage items.
 - 2. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Storage or sale of removed items or materials on-site is not permitted.
- E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
- F. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
 - 1. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from authorities having jurisdiction.
- G. NOVA assumes no responsibility for condition of areas to be selectively demolished.
 - 1. Conditions existing at time of inspection for bidding purpose will be maintained by NOVA as far as practical.

1.10 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.
 - 1. If possible, retain original Installer or fabricator to patch the exposed Work listed below that is damaged during selective demolition. If it is impossible to engage original Installer or fabricator, engage another recognized experienced and specialized firm.
 - a. Pool piping (partial to remain).
 - b. Pool equipment /systems to remain.

PART 2 - PRODUCTS

2.1 REPAIR MATERIALS

- A. Use repair materials identical to existing materials.
 - 1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 - 2. Use materials whose installed performance equals or surpasses that of existing materials.
- B. Comply with material and installation requirements specified in individual Specification Sections.

2.2 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- B. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.

3.2 PREPARATION

- A. Dangerous Materials: Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from NOVA and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

2. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
 3. Protect existing site improvements, appurtenances, and landscaping to remain.
- C. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure.
- D. Temporary Shoring: If necessary, provide and maintain exterior shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of construction to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

3.3 POLLUTION CONTROLS

- A. Dust Control: Use water mist, temporary enclosures, and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations.
- B. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- C. Cleaning: Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.4 SELECTIVE DEMOLITION

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Proceed with selective demolition systematically.
 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces.
 3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
 4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting pool walls or floors.
 5. Dispose of demolished items and materials promptly.
 6. Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.
- B. Removed and Salvaged Items: Comply with the following:

1. Clean salvaged items.
 2. Store items in a secure area until delivery to NOVA.
 3. Transport items to NOVA' storage area on-site.
 4. Protect items from damage during transport and storage.
- C. Reinstalled Items: Comply with the following:
1. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Engineer, items may be removed to a suitable, protected storage location during selective demolition and reinstalled in their original locations after selective demolition operations are complete.
- E. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals, using power-driven saw, then remove concrete between saw cuts.
- F. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

3.5 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
1. NOVA will arrange to shut off indicated services/systems when requested by Contractor.
 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of site.
 3. Disconnect, demolish, and remove plumbing, equipment, and components indicated on Drawings to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
 - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to NOVA.

3.6 PATCHING AND REPAIRS

- A. General: Promptly repair damage to adjacent construction caused by selective demolition operations.
- B. Patching: Comply with Division 01.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Promptly dispose of demolished materials.
- B. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
 - 4. Comply with requirements specified in Division 01.
- C. Burning: Do not burn demolished materials.
- D. Disposal: Transport demolished materials off NOVA's property and legally dispose of them.

3.8 CLEANING

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

END OF SECTION

SECTION 031110 - CONCRETE FORMWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Section includes general administrative and procedural requirements for all work. The administrative and procedural requirements included in this Section are to expand the requirements specified in Division 01.

1.2 SUMMARY

- A. Forming for cast-in-place concrete as indicated on the drawings and subsequent removal of all such forms except those earth forms described in this Section.
- B. Concrete formwork shall include scope at:
 - 1. MLPS Pool structure thickened pool slab (floor)
 - 2. MLPS Pool wall
 - 3. Pool deck

1.3 RELATED SECTIONS

- A. Division 02: Existing Conditions
- B. Division 13: Special Construction
- C. Division 26: Electrical
- D. Division 31: Earthwork

1.4 REFERENCES

- A. ACI 347 – Recommended Practice for Concrete Formwork
- B. ACI 117 – Specifications for Tolerances for Concrete Construction and Materials
- C. ACI 318 – Building Code Requirements for Reinforced Concrete
- D. CRSI – Manual of Standard Practice

1.5 QUALITY ASSURANCE

- A. All work of this section shall be performed by either the Prime Contractor or their sub-Contractor.
- B. Qualifications of Workers: Provide at least one person who shall be present at all times during execution of this portion of the work and who shall be thoroughly familiar with

the type of materials being installed, the referenced standards, and the requirements of this work, and who shall direct all work performed under this Section.

C. Standards:

1. In addition to complying with all applicable codes and regulations, comply with all pertinent recommendations contained in “Recommended Practice for Concrete Formwork”, Publication ACI 347-78 of the American Concrete Institute.
2. Where provisions of applicable codes and standards conflict with the requirements of this Section, the more stringent provisions shall govern.

1.6 SUBMITTALS

- A. Provide submittals for all forming systems and wall forming system, other than pool perimeter forms on grade, in accordance with the requirements of the General Requirements of Division 01.

1.7 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect concrete formwork materials before, during, and after installation and to protect the installed work of other trades.
- B. Replacement: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Director’s Representative.

1.8 COORDINATION

- A. Coordinate with other Contractors all work relating to this Section.
- B. The General Contractor must establish communication with other Sub-Contractors, having related work in this Section that all work necessary to complete the MLPS pool rehabilitation as shown on the drawings and in the specifications is included in the bid to NOVA.
- C. If in doubt regarding the responsibility for work covered in the Section and/or discovery of errors or omissions in the bidding documents, the Contractor shall notify the Director’s Representative through channels established by the specifications and request a clarification ten (10) days prior to the bid date.

1.9 WARRANTIES

- A. In accordance with the General Requirements of Division 01.

1.10 EXTRA MATERIALS

- A. No extra materials are required for this Section.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

- A. Form Lumber: All form lumber in contract with exposed concrete shall be new except as allowed for reuse of forms in Part 3 of this Section, and all form lumber shall be one of the following, a combination thereof, or an equal approved in advance by the Director's Representative:
 - 1. "Plyform", Class I, bearing the label of the Douglas Fir Plywood Association, "Inner-Seal" Form as manufactured by Louisiana-Pacific, or approved equal.
 - 2. Douglas Fir-Larch, number two grade, seasoned, surfaced four sides. Provisions of applicable codes and standards conflict with the requirements of this Section, the more stringent provisions shall govern.
- B. Form Release Agent: Colorless, non-staining, free from oils, chemically reactive agent that shall not impair bonding of paint or other coatings intended for use.

2.2 TIES AND SPREADERS

- A. Type: All form ties shall be non-corrosive and not leave an open hole through the concrete and which permits neat and solid patching at every hole.
- B. Design: When forms are removed, all metal reinforcement shall be not less than 2" from the finished concrete surface.
- C. Wire Ties and Wood Spreaders: Do not use wire ties and wood spreaders.

2.3 ALTERNATE FORMING SYSTEMS

- A. Alternate forming systems may be used subject to the advance approval of the Director's Representative.
- B. Checking Layout: Contractor or Sub-Contractor shall, before commencing the excavation work, check all lines, stakes, and levels for dimensions, angles, elevations, and grades with the survey.

2.4 OTHER MATERIALS

- A. All other materials, not specifically described but required for proper completion of the work of this Section, shall be as selected by the Contractor or Sub-Contractor subject to the advanced approval of the Director's Representative.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Inspection:

1. Prior to all work in this Section, carefully inspect the installed work of other trades and verify that all such work is complete to the point where this installation may properly commence.
 2. Verify that forms may be constructed in accordance with all applicable codes and regulations, the referenced standards, and the original design.
- B. Discrepancies:
1. In the event of a discrepancy, immediately notify the Director's Representative.
 2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
 3. Failure to notify the Director's Representative and give written notice of discrepancies shall constitute acceptance by the Contractor of existing conditions as fit and proper to receive this work.

3.2 CONSTRUCTION OF FORMS

- A. General: Construct all required forms to be substantial and sufficiently tight to prevent leakage of mortar, and able to withstand deflection when filled with wet concrete.
- B. Layout:
1. Form for all required cast-in-place concrete to the shapes, sizes, lines, and dimensions indicated on the drawings.
 2. Exercise particular care in the layout of forms to avoid necessity for cutting concrete after placement.
 3. Make proper provisions for all openings, offsets, recesses, anchorages, blocking, and other features of the work as shown or required.
 4. Perform all forming required for work of other trades and do all cutting and repairing of forms required to permit such installation.
 5. Carefully examine the drawings and specifications and consult with other trades as required relative to providing for openings, reglets, chases, and other items in the forms.
- C. Imbedded Items:
1. Set all required steel frames, angles, grilles, bolts, inserts, and other such items required to be anchored in the concrete prior to concrete being placed.
- D. Bracing:
1. Properly brace and tie the forms together so as to maintain position and shape and ensure safety to personnel.

2. Construct all bracing, supporting members, and centering of ample size and strength to safely carry, without deflection, all dead and live loads to which they may be subjected.
 3. Properly space the forms apart and securely tie them together using metal spreader ties that give positive tying and accurate spreading.
- E. Tolerances: Construct all forms straight, true, plumb, and square within a tolerance horizontally of one in 200 and a tolerance vertically of one in 500.
- F. Wetting: Keep forms sufficiently wetted to prevent joints from opening up before concrete is placed.

3.3 PLYWOOD FORMS

- A. Design: Nail the plywood panels directly to studs and apply in a manner to minimize the number of joints.
- B. Joints: Make all panel joints tight butt joints with all edges true and square.

3.4 FOOTING FORMS

- A. Wood Forms: All footing forms shall be wood unless otherwise specifically approved by the Director's Representative, or as specified in Paragraph 3.4(B).

3.5 REUSE OF FORMS

- A. General: Reuse of forms shall be subject to advance approval of the Director's Representative.
- B. Requirements:
1. Except as specifically approved in advance by the Director's Representative, reuse of forms shall in no way delay or change the schedule for placement of concrete from the schedule obtainable if all forms were new.
 2. Except as specifically approved in advance by the Director's Representative, reuse of forms shall in no way impart less structural stability to the forms or less acceptable appearance to the finished concrete.

3.6 REMOVAL OF FORMS

- A. General:
1. In general, side forms of footings may be removed seven (7) days after placement of concrete, but time may be extended if deemed necessary by the Director's Representative.
 2. Forms for slabs, pads, and other formed concrete may be removed fourteen (14) days after placement of concrete.
- B. Removal:

1. Use all means necessary to protect workers, bystanders, the installed work of other trades, and the complete safety of the structure.
2. Cut nails and tie wires or form ties off flush and leave all surfaces smooth and clean.
3. Remove metal spreader ties on exposed concrete by removing or snapping off inside the wall surface and pointing up and rubbing the resulting pockets to match the surrounding areas.
4. Flush all holes resulting from the use of spreader ties and sleeve nuts using water, and then solidly pack throughout the wall thickness with cement grout applied under pressure by means of a grouting gun. Grout shall be one-part Portland Cement to 2 ½ parts sand. Apply grout immediately after removing forms.

3.7 CLEAN-UP

- A. Upon completion of the work in this Section, immediately remove all forming materials, debris, and rubbish occasioned by this work to the approval of the Director's Representative.

END OF SECTION

SECTION 032000 - CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Section includes general administrative and procedural requirements for all work. The administrative and procedural requirements included in this Section are to expand the requirements specified in Division 01.

1.2 SUMMARY

- A. Furnish and install all reinforcement required and/or indicated on the drawings for all cast-in-place concrete associated with the MLPS pool improvements. This shall include:
 - 1. MLPS pool concrete shell (pool floor & pool wall)
 - 2. MLPS thickened pool slab sections
 - 3. Pool deck
 - 4. Any repairs necessary with the pool surge tank

1.3 RELATED SECTIONS

- A. Division 02: Existing Conditions
- B. Division 13: Special Construction
- C. Division 26: Electrical
- D. Division 31: Earthwork

1.4 REFERENCES

- A. ACI 301 – Specification for Structural Concrete
- B. ACI 302 – Recommended Practice for Concrete Floor and Slab Construction
- C. ACI 315 – Details and Detailing of Concrete Reinforcing
- D. ACI 315R – Manual of Engineering and Placing Drawings for Reinforced Concrete Structures
- E. ACI 117 – Specifications for Tolerances for Concrete Construction and Materials
- F. General Conditions Article 25.4- Domestic Steel
- G. ACI 318 – Building Code Requirements for Reinforced Concrete

H. CRSI – Manual of Standard Practice

1.5 QUALITY ASSURANCE

- A. All work in this section shall be performed by the Prime Contractor or Sub-Contractor.
- B. Qualifications of Workers: Provide at least one person who shall be present at all times during execution of this portion of the work and who shall be thoroughly familiar with the type of materials being installed, the referenced standards, and the requirements of this work, and who shall direct all work performed under this Section.
- C. Standards:
 - 1. In addition to complying with all applicable codes and regulations, comply with all pertinent recommendations contained in “Manual of Standard Practice for Detailing Reinforced Concrete Structures”, Publication ACI 315-74 of the American Concrete Institute.
 - 2. Where provisions of applicable codes and standards conflict with the requirements of this Section, the more stringent provisions shall govern.

1.6 SUBMITTALS

- A. Provide submittals in accordance with the requirements of the General Requirements of Division 01.
- B. Samples and Certificates:
 - 1. Provide all data and access required for testing as described in Division 01 of the Specifications.
 - 2. All material shall bear mill tags with heat number identification. Mill analysis and report shall be made available upon request.
 - 3. Material not so labeled and identifiable may be required by the Director’s Representative to be tested by the laboratory selected by NOVA and at no additional cost to the NOVA in which random samples will be taken for one series of tests from each 2 ½ tons or fraction thereof of each size and kind of reinforcement steel.
- C. Provide reinforcing shop drawings.

1.7 PRODUCT HANDLING

- A. Protection:
 - 1. Use all means necessary to protect concrete reinforcement before, during, and after installation and to protect the installed work of other trades.
 - 2. Store in a manner to prevent excessive rusting and fouling with dirt, grease, and other bond breaking coatings.

3. Use all necessary precautions to maintain identification after bundles are broken.
- B. Replacement: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Director's Representative.

1.8 COORDINATION

- A. Coordinate with other Contractors all work relating to this Section.
- B. The General Contractor must establish communication with other Sub-Contractors, having related work in this Section that all work necessary to complete the MLPS pool rehabilitation as shown on the drawings and in the specifications is included in the bid to NOVA.
- C. If in doubt regarding the responsibility for work covered in the Section and/or discovery of errors or omissions in the bidding documents, the Contractor shall notify the Director's Representative through channels established by the specifications and request a clarification ten (10) days prior to the bid date.

1.9 WARRANTIES

- A. In accordance with the General Requirements of Division 01.

1.10 EXTRA MATERIALS

- A. No extra materials are required for this Section.

PART 2 - PRODUCTS

2.1 BARS

- A. Bars for reinforcement shall conform to "Specifications for Deforming Billet-Steel Bars for Concrete Reinforcement", ASTM A-615, Grade 60.
- B. Bars shall be sized and spaced as per the construction drawings.

2.2 TIE WIRE

- A. Tie wire for reinforcement shall conform to "Specifications for Cold-Drawn Steel Wire for Concrete Reinforcement", ASTM A-82 black annealed 16-gauge tie wire.

2.3 SUPPORTS AND ACCESSORIES

- A. As required to complete work in accordance with CRSI (Concrete Reinforcing Steel Institute Manual of Standard Practice). Reinforcement supported from the ground shall rest on precise concrete blocks not more than 4" square and having a compressive strength equal to the specified compressive strength of the concrete being placed. Wood supports will not be allowed.

2.4 OTHER MATERIALS

- A. All other materials not specifically described but required for proper completion of the work of this Section shall be new, first quality of their respective kinds, and subject to the approval of the Director's Representative.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Inspection:
 - 1. Prior to all work in this Section, carefully inspect the installed work of other trades and verify that all such work is complete to the point where this installation may properly commence.
 - 2. Verify that reinforcement, when placed, will permit placement of concrete in the design indicated on the drawings.
- B. Discrepancies:
 - 1. In the event of a discrepancy, immediately notify the Director's Representative.
 - 2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
 - 3. Failure to notify the Director's Representative and give written notice of discrepancies shall constitute acceptance by the Contractor of existing conditions as fit and proper to receive this work.

3.2 BENDING

- A. General:
 - 1. Fabricate all reinforcement in strict accordance with the drawings.
 - 2. Do not use bars with kinks or bends not shown on the drawings.
 - 3. Do not bend or straighten steel in a manner that will injure the material.
- B. Design:
 - 1. Bend all bars cold.
 - 2. Make bends for stirrups and ties around a pin having a diameter of not less than two (2) times the minimum thickness of the bar.
 - 3. Make bends for other bars, including hooks, around a pin having a diameter of not less than six (6) times the minimum thickness of the bar.

3.3 PLACING

- A. General: Before the start of concrete placement, accurately place all concrete reinforcement, positively securing and supporting it by concrete blocks, metal chairs or spacers, or by metal hangers.
- B. Clearance:
 - 1. Preserve clear space between bars of not less than 1 ½ times the nominal diameter of the round bars.
 - 2. In no case let the clear space be less than 1 ½ inches nor less than 1 1/3 times the maximum size of the aggregate.
 - 3. Provide concrete covering of reinforcement as indicated on drawings or otherwise approved by the Director's Representative.
- C. Splicing:
 - 1. Horizontal Bars:
 - a. Place bars in horizontal members with minimum lap at splices sufficient to develop the strength of the bars.
 - b. Bars may be wired together at laps except at points of support of the member, at which points preserve clear space described above.
 - c. Whenever possible, stagger the splices of adjacent bars.
 - d. Splice forty (40) bar diameters minimum.
- D. Dowels: If doweling is used, place all required steel dowels and securely anchor them into position before concrete is placed.
- E. Obstructions: In the event conduits, piping, inserts, sleeves, and other items interfere with placing reinforcement as indicated on the drawings or otherwise required, immediately consult with the Director's Representative and obtain approval of a new procedure prior to placing concrete.

3.4 CLEANING REINFORCEMENT

- A. Steel Reinforcement, at the time concrete is placed around it shall be free from rust scale, loose mill scale, oil, paint, and all other coatings which will destroy or reduce the bond between steel and concrete.

3.5 CLEAN-UP

- A. Upon completion of the work in this Section, immediately remove all concrete reinforcement materials, debris, and rubbish occasioned by this work to the approval of the Director's Representative.

END OF SECTION

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Section includes general administrative and procedural requirements for all work. The administrative and procedural requirements included in this Section are to expand the requirements specified in Division 01.

1.2 SUMMARY

- A. This Section specifies all cast-in place concrete, including mix design, placement procedures, and finishes.
- B. Furnish and install all reinforcement required and/or indicated on the drawings for all cast-in-place concrete associated with the swimming pool improvements. This shall include:
 - 1. MLPS Pool shell (floor and walls)
 - 2. Pool Deck
 - 3. MLPS Thickened slab sections
 - 4. Any repairs necessary for the pool surge tank
- C. Concrete Formwork is specified in Division 03.
- D. Cast-in-Place Concrete Reinforcing is specified in Division 03.

1.3 RELATED SECTIONS

- A. Division 01: General Requirements
- B. Division 02: Existing Conditions
- C. Division 13: Special Construction
- D. Division 26: Electrical
- E. Division 31: Earthwork

1.4 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections.

- B. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, fly ash, and others as requested by Engineer.
- C. Shop drawings for reinforcement, fabrication, bending, and placement of concrete reinforcement. Comply with ACI SP-66 (latest edition), "ACI Detailing Manual," showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of concrete reinforcement. Include special reinforcement required for openings through concrete structures.
 - 1. The shop drawings are interpretations of and are supplemental to the Contract Drawings and Specification. Their intent is to demonstrate to the Engineer that the Contractor has understood the design concept, and to provide the detailed information necessary for the fabrication, assembly and installation of the products or materials specified. Neither the shop drawings nor comments placed on them by the Engineer shall be construed as being change orders. If any deviations, discrepancies or conflicts between the shop drawings and the Contract Drawings and Specification are discovered, either prior to or after the shop drawings have been reviewed, the Design Drawings and Specification shall govern and shall be followed.
 - 2. Shop drawings shall conform to the requirements of the Contract Documents and shall be in accordance with ACI 315. The Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the Engineer's approval of the shop drawings unless the Contractor has specifically informed the Engineer in writing of such deviation at the time of submission and the Engineer has given written approval to the specific deviation. The Contractor shall not be relieved from responsibility for errors or omissions in the shop drawings by the Engineer's approval thereof. The Contractor shall direct specific attention by a hand-drawn "Cloud," on re-submitted shop drawings, to revisions other than those requested by the Engineer on previous submittals.
 - 3. Drawings which require resubmittal shall have revisions clearly delineated by enclosing only the revised areas within a free-hand drawn "CLOUD."
 - 4. Processing Time: The Contractor shall allow up to 15 days between the time shop drawings are received by the Engineer of Record and the time they are sent back to the Contractor.
 - 5. Contract Documents shall not be incorporated into shop drawings.
- D. Submit laboratory test reports for concrete tests conducted and mix design tests.
- E. Materials certificates in lieu of materials laboratory test reports when permitted by Engineer. Materials certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.
- F. Minutes of pre-construction conference.
- G. Construction and Control Joints not shown on drawings.
- H. Environmental Product Declaration (EPD) Submittals

1. Environmental Product Declarations: Provide current Environmental Product Declarations (EPDs), that include the amount of embodied carbon in all concrete products including concrete mix and reinforcing steel.
2. Acceptable EPDs are non-expired, Product-specific, Facility or Plant-specific, or Supply Chain-specific Type III (Third-Party Reviewed), in adherence with ISO 14025 Environmental labels and declarations, ISO 14044 Environmental management – Life cycle assessment, and ISO 21930 Core rules for environmental product declarations of construction products and services.
3. Provide the EPD Material Tracking Form containing the total anticipated quantity/volume/weight (matching the units used in the EPDs) of each product being incorporated into the project.
4. With each application for payment, provide an updated EPD Material Tracking Form and copies of delivery tickets for each product incorporated into the project for the period covered by the payment application.

1.5 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following codes, specifications, and standards, except where more stringent requirements are shown or specified:
 1. ACI 318, “Building Code Requirements for Reinforced Concrete.”
 2. Concrete Reinforcing Steel Institute (CRSI), “Manual of Standard Practice.”
 3. ACI 301, “Specification for Structural Concrete for Buildings.”
- B. Mix Design: Concrete mix design shall be submitted to and reviewed / approved by Engineer.
- C. Concrete Testing Service: The Prime Contractor shall engage a third-party testing company (qualifications to be submitted to and approved by Engineer and NOVA) to perform concrete material evaluation tests and to design concrete mixes. Payment for services shall be by Prime Contractor which shall be included within their base bid.
- D. Testing Service Responsibilities: The Concrete Testing Service shall have an inspector on site whenever concrete is placed and shall be responsible for reviewing concrete test results (i.e.: slump, air content, placement time, truck / ticket #s, sample ID, load volume, concrete temperature, air temperature, admixtures, specimen size, etc.). Inspector shall submit daily report logs of test results and observations to Contractor. Contractor shall confirm the results are satisfactory and share with Engineer and Owner. See section 3.13 for additional requirements.
- E. Test Quantity: See section 3.13 for requirements.
- F. Materials and installed work may require testing and retesting at any time during progress of work. Retesting of rejected materials for installed work shall be done at Contractor’s expense.
- G. When proprietary items are used, follow manufacturer’s recommendations.

- H. Materials, fabrication and erection procedures and concrete operations are subject to inspection and test in mill, shop, and field, conducted by the Contractor's Testing and Inspection Agency. Such inspections and tests will not relieve Contractor of his responsibility for providing materials and fabrication procedures in compliance with specified requirements. The inspections and tests which the Testing and Inspection Agency performs, shall be at the expense of the General Contractor. Contractor shall provide free access to material stockpiles, facilities, and the Work. Contractor shall always coordinate with the Testing and Inspection Agency.
- I. The Contractor shall notify the Director's Representative 48 hours before placing concrete to give the Director's Representative an opportunity to inspect the formwork, reinforcing, and related items prior to placement of the concrete.

PART 2 – PRODUCTS

2.3 FORM MATERIALS

- A. See Section 031110 "Concrete Formwork" for form materials.

2.4 REINFORCING MATERIALS

- A. See Section 032000 "Concrete Reinforcement" for reinforcing materials.

2.5 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I.
 - 1. High-Early Strength Portland Cement: ASTM C 150, Type III.
 - 2. Use one brand of cement throughout project unless otherwise acceptable to Engineer.
- B. Fly Ash: ASTM C 618, Type F, Loss of Ignition (L.O.I.) 3 percent maximum.
- C. Normal Weight Aggregates: ASTM C 33 and as herein specified. Provide aggregates from a single source for exposed concrete.
 - 1. For exterior exposed surfaces, do not use fine or coarse aggregates containing spalling-causing deleterious substances.
 - 2. Local aggregates not complying with ASTM C 33 but that special tests or actual service have shown to produce concrete of adequate strength and durability may be used when acceptable to Engineer.
- D. Water: Drinkable.
- E. Admixtures, General: Provide admixtures for concrete that contain no more than 0.1 percent chloride ions.
- F. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
 - a. "Air-Mix" or "Perma-Air," Euclid Chemical Co.

- b. "MB-VR" or "Micro-Air," Master Builders, Inc.
 - c. "Sika AER," Sika Corp.
- G. Water-Reducing Admixture: ASTM C 494, Type A.
- 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
 - a. "Eucon WR-75," Euclid Chemical Co.
 - b. "Pozzolith Normal" or "Polyheed," Master Builders, Inc.
 - c. "Plastocrete 161," Sika Corp.
- H. High-Range Water-Reducing Admixture (Super Plasticizer): ASTM C 494, Type F or Type G.
- 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
 - a. "Eucon 37," Euclid Chemical Co.
 - b. "Rheobuild," Master Builders, Inc.
 - c. "Sikament 300," Sika Corp.
- I. Water-Reducing, Accelerating Admixture: ASTM C 494, Type E.
- 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
 - a. "Accelguard 80," Euclid Chemical Co.
 - b. "Pozzutec 20," Master Builders, Inc.
- J. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.
- 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
 - a. "Eucon Retarder 75," Euclid Chemical Co.
 - b. "Pozzolith R," Master Builders, Inc.
 - c. "Plastiment," Sika Corporation.

2.6 RELATED MATERIALS

- A. Reglets: Where resilient or elastomeric sheet flashing or bituminous membranes are terminated in reglets, provide reglets of not less than 0.0217 inch thick (26-gage) galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.
- B. Waterstops: Provide flat, dumbbell-type or centerbulb-type waterstops at construction joints and other joints as indicated. Size to suit joints.
- C. Polyvinyl Chloride Waterstops: Corps of Engineers CRD-C 572.
- 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the work include, but are not limited to, the following:
 - a. Greenstreak Plastic Products Co.
 - b. W.R. Meadows, Inc.
 - c. Schlegel Corp.

- D. Granular Base: Evenly graded mixture of fine and coarse aggregates to provide, when compacted, a smooth and even surface below slabs on grade.
- E. Nonslip Aggregate Finish: Provide fused aluminum oxide granules or crushed emery as abrasive aggregate for nonslip finish, with emery aggregate containing not less than 50 percent aluminum oxide and not less than 25 percent ferric oxide. Use material that is factory-graded, packaged, rustproof, and non-glazing and is unaffected by freezing, moisture, and cleaning materials.
- F. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
- G. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.
 - 1. Waterproof paper.
 - 2. Polyethylene film.
 - 3. Polyethylene-coated burlap.
- H. Liquid Membrane-Forming Curing Compound: Liquid-type membrane-forming curing compound complying with ASTM C 309, Type I, Class A. Moisture loss not more than 0.055 gr./sq. cm. when applied at 200 sq. ft./gal.
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
 - a. "Spartan-Cote," The Burke Co.
 - b. "Eucocure," Euclid Chemical Co.
 - c. "Masterkure," Master Builders, Inc.
- I. High Solids Curing Compound: Shall conform to ASTM C-309, Type 1 or ID when clear is specified and Type 2 Class B when white pigmented is specified. Moisture loss not more than 0.030 gr./sq. cm. when applied at 300 sq. ft./gal. at 72 hours and 30% solids content minimum.
 - 1. Available Products: Subject to compliance with requirements products that may be incorporated in the work include, but are not limited to, the following:
 - a. "Super Rey-Seal," Euclid Chemical Company
 - b. "Dress and Sela #30," L & M
 - c. "Masterkure 30," Master Builders, Inc.
- J. Water-Based Acrylic Membrane Curing Compound: ASTM C 309, Type I, Class B.
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
 - a. "Aqua-Cure," Euclid Chemical Co.
 - b. "Masterseal W," Master Builders, Inc.
 - c. "Sika Membrane," Sika Corp.
- K. Evaporation Control: Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
 - a. "Eucobar," Euclid Chemical Co.

- b. "E-Con," L&M Construction Chemicals, Inc.
 - c. "Confilm," Master Builders, Inc.
- L. Underlayment Compound: Free-flowing, self-leveling, pumpable, cement-based compound for applications from one inch thick to feathered edges.
- 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
 - a. "Conflow," Conspec Marketing and Mfg. Co.
 - b. "Flo-Top," Euclid Chemical Co.
 - c. "Pourcrete," Master Builders, Inc.
- M. Bonding Compound: Polyvinyl acetate or acrylic base.
- 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
 - a. Polyvinyl Acetate (Interior Only):
 - 1) "Euco Weld," Euclid Chemical Co.
 - 2) "Weld-Crete," Larsen Products Corp.
 - 3) "Everweld," L&M Construction Chemicals, Inc.
 - b. Acrylic or Styrene Butadiene:
 - 1) "Strongbond," Conspec Marketing and Mfg. Co.
 - 2) "SBR Latex," Euclid Chemical Co.
 - 3) "Acryl-Set," Master Builders Inc.
- N. Epoxy Adhesive: ASTM C 881, two-component material suitable for use on dry or damp surfaces. Provide material "Type," "Grade," and "Class" to suit project requirements.
- 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
 - a. "Euco Epoxy System #452 or #620," Euclid Chemical Co.
 - b. "Concresive 1001," Master Builders, Inc.
 - c. "Sikadur 32 Hi-Mod," Sika Corp.
- O. Epoxy Joint Filler:
- 1. Shall be a 100% solid semi-rigid epoxy compound with a minimum shore D hardness of fifty (50) acceptable are:
 - a. "Euco Epoxy #700," Euclid Chemical Co.
 - b. "Sikadur Lo-Mod Mortar," Sika Chemical Corp.
- P. Preformed Joint Filler:
- 1. Shall be performed joint filler conforming to ASTM D1751 and Federal Specification HH-F-341F, Type I.
- Q. Joint Sealer:
- 1. Shall conform to ASTM D1850 or Federal Specification SS-S-1401.
 - 2. Contractor shall confirm compatibility with joint filler material, hardeners and curing compounds.
 - 3. Provide written certification from synthetic floor manufacturer that the selected joint sealer is compatible with his floor materials.

- R. Stair Treads:
 - 1. Zinc Chromatic coated aluminum with abrasive filler. Stair nosing to be embedded into concrete step edge - Type 241 "Supergrit," Wooster Products, Inc. or equal.

2.7 PROPORTIONING AND DESIGN OF MIXES

- A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method used, use an independent testing facility acceptable to Engineer for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing.
 - 1. Limit use of fly ash to not exceed 15 percent of cement content by weight.
- B. Submit written reports to Engineer of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until proposed mix designs have been reviewed by Engineer.
- C. Design mixes to provide normal weight concrete with the following properties, as indicated on drawings (applies to both concrete pool shell and pool concrete deck):
 - 1. 4000-psi, 28-day compressive strength; W/C ratio, 0.45 maximum.
- D. Pumped Concrete:
 - 1. If concrete is intended to be pumped, comply with ACI 304.2 recommendations and the following requirements:
 - a. An alternate to using HRWR is to use Fly Ash.
 - b. Perform at Contractor's expense a field pumping test to confirm pumpability prior to approval of mix design and prior to placement.
 - c. 3" to 4" slump. Slumps greater than 4" will be rejected. The loss in slump during pumping shall not exceed two inches.
 - d. Tests shall be taken at truck discharge and point of final placement. However, concrete quality will be determined at point of placement.

2.8 ADMIXTURES

- A. Use water-reducing admixture or high-range water-reducing admixture (Superplasticizer) in concrete as required for placement and workability.
- B. Use non-chloride accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg F.
- C. Use high-range water-reducing admixture (HRWR) in pumped concrete, concrete for industrial slabs, architectural concrete, parking structure slabs, concrete required to be watertight, and concrete with water/cement ratios below 0.50.
- D. Use air-entraining admixture in exterior exposed concrete unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus or minus 1-1/2 percent within following limits:
 - 1. Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or hydraulic pressure:
 - a. 5.5 percent (severe exposure) 1-1/2-inch max aggregate.

2. Other concrete (not exposed to freezing, thawing, or hydraulic pressure) or to receive surface hardener: 2 percent to 4 percent air.
- E. Use admixtures for water reduction and set control in strict compliance with manufacturer's directions.
- F. Water-Cement Ratio: Provide concrete for following conditions with maximum water-cement (W/C ratios as follows:
 1. Subjected to freezing and thawing; W/C 0.45.
- G. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
 1. Ramps, slabs, and sloping surfaces: Not more than 3 inches.
 2. Reinforced foundation systems: Not less than 1 inch and not more than 3 inches.
 3. Concrete containing HRWR admixture (Superplasticizer): Not more than 8 inches after addition of HRWR to site-verified 2-inch to 3-inch slump concrete.
 4. Other concrete: Not more than 4 inches.

2.9 CONCRETE MIXING

- A. Provide batch ticket for each batch discharged and used in work, indicating project identification name and number, date, mix type, mix time, quantity, and amount of water introduced.
- B. Ready-Mix Concrete: Comply with requirements of ASTM C 94, and as specified.
 1. When air temperature is between 85 degrees F and 90 degrees F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 degrees F, reduce mixing and delivery time to 60 minutes.

PART 3 – EXECUTION

3.3 GENERAL

- A. Coordinate the installation of joint materials and vapor retarders with placement of forms and reinforcing steel.

3.4 FORMS

- A. See Section 031110 "Concrete Formwork" for installing forms.

3.5 PLACING REINFORCEMENT

- A. See Section 032000 "Concrete Reinforcement" for placing reinforcement.

3.6 JOINTS

- A. Construction Joints: Locate and install construction joints as indicated or, if not indicated, locate so as not to impair strength and appearance of the structure, as acceptable to Engineer.
- B. Provide keyways at least 1-1/2 inches deep and one-fourth the thickness of the joint in width in construction joints in walls and slabs and between walls and footings. Accepted bulkheads designed for this purpose may be used for slabs.

- C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as otherwise indicated. Do not continue reinforcement through sides of strip placements.
- D. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.
- E. Waterstops: Provide waterstops in construction joints as indicated. Install waterstops to form continuous diaphragm in each joint. Make provisions to support and protect exposed waterstops during progress of work. Field-fabricate joints in waterstops in accordance with manufacturer's printed instructions.
- F. Isolation Joints in Slabs-on-Ground: Construct isolation joints in slabs-on-ground at points of contact between slabs-on-ground and vertical surfaces, such as column pedestals, foundation walls, grade beams, and elsewhere as indicated.
- G. Contraction (Control) Joints in Slabs-on-Ground: Construct contraction joints in slabs-on-ground to form panels of patterns as shown. Use saw cuts 1/8 inch wide by 1/4 slab depth or inserts 1/4 inch wide by 1/4 of slab depth, unless otherwise indicated.
 - 1. Form contraction joints by inserting pre-molded plastic, hardboard, or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.
 - 2. Contraction joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.
 - 3. If joint pattern not shown, provide joints not exceeding 15 feet in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third bays).

3.7 INSTALLATION OF EMBEDDED ITEMS

- A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached thereto.
- B. Install reglets to receive top edge of foundation sheet waterproofing and to receive thru-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, relieving angles, and other conditions.
- C. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to obtain required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

3.8 PREPARATION OF FORM SURFACES

- A. General: Coat contact surfaces of forms with an approved, non-residual, low-VOC, form-coating compound before reinforcement is placed.
- B. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.
- C. Tape all joints in forms for exposed finish concrete.

3.9 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work.
- B. General: Comply with ACI 304, "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete," and as herein specified.
- C. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete that has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete to avoid segregation at its final location.
- D. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
 - 1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.
 - 2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators 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 set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.
- E. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed. Saturate base course prior to placement. Do not place concrete in standing water.
 - 1. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Bring slab surfaces to correct level with straightedge and strike off. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
 - 3. Maintain reinforcing and embedded items in proper position during concrete placement.
- F. Cold-Weather Placing: Comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
- G. When air temperature has fallen to or is expected to fall below 40 degrees F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees F and not more than 80 degrees F at point of placement.
 - 1. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 - 2. Do not use calcium chloride, salt, and other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.

3. Provisions shall be made for maintaining the concrete at a minimum temperature of not less than 50 degrees F and not more than 85 degrees F for a period of at least seven (7) days.
 4. Use of non-vented heaters shall not be permitted. At the end of the curing period, gradually reduce the temperature at a rate not to exceed 1 degree per hour until the temperature within the enclosure equals the temperature outside the enclosure, in accordance with ACI 306.
- H. Hot-Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.
1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 degrees F. Mixing water may be chilled or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing water. Use of liquid nitrogen to cool concrete is Contractor's option.
 2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
 3. Fog spray forms, reinforcing steel, and subgrade just before concrete is placed.
 4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, when acceptable to Engineer.

3.10 CONCRETE CURING AND PROTECTION

- A. General: Comply with ACI 301 and ACI 308 and as herein described; protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather, protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply in accordance with manufacturer's instructions after screeding and bull floating, but before power floating and troweling.
- B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days. If initial cure is not possible due to weather and curing is to be by application of curing compound use high solids curing compound as specified.
- C. Curing Methods: Perform curing of concrete by curing and sealing compound, by moist curing, by moisture-retaining cover curing, and by combinations thereof, as herein specified.
- D. Provide moisture curing by following methods.
 1. Keep concrete surface continuously wet by covering with water.
 2. Use continuous water-fog spray.
 3. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4-inch lap over adjacent absorptive covers.
- E. Provide moisture-cover curing as follows:
 1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

- F. Provide curing and sealing compound to exposed interior slabs and to exterior slabs, walks, and curbs as follows:
 - 1. Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - 2. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.
- G. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
- H. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces, by application of appropriate curing method.
- I. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.

3.11 REMOVAL OF FORMS

- A. General: Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 degrees F for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.
- B. Formwork supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, may not be removed in less than 14 days and until concrete has attained at least 75 percent of design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.
- C. Form-facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form-facing material without loosening or disturbing shores and supports.

3.12 REUSE OF FORMS

- A. Clean and repair surfaces of forms to be reused in work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork.
- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces except as acceptable to Engineer.

3.13 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and 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 to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.
- D. Reinforced Masonry: Provide concrete grout for reinforced masonry lintels and bond beams where indicated on drawings and as scheduled. Maintain accurate location of reinforcing steel during concrete placement.

3.14 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Engineer.
 - 1. Cut out honeycomb, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts, down to solid concrete but in no case to a depth of less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with specified bonding agent. Place patching mortar before bonding compound has dried.
 - 2. For exposed-to-view surfaces, blend white portland cement and standard portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- B. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Engineer. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes, fill with dry-pack mortar, or precast cement cone plugs secured in place with bonding agent.
 - 1. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.
- C. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having required slope.
 - 1. Repair finished unformed surfaces that contain defects that affect durability of concrete. Surface defects, as such, include crazing and cracks in excess of 0.01 inch

- wide or that penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, popouts, honeycomb, rock pockets, and other objectionable conditions.
2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
 3. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with patching compound. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Architect.
 4. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- D. Perform structural repairs with prior approval of Engineer for method and procedure, using specified epoxy adhesive and mortar.
- E. Repair methods not specified above may be used, subject to acceptance of Engineer.

3.15 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. General: The General Contractor will employ a testing laboratory to perform tests and to submit test reports.
- B. Sampling and testing for quality control during placement of concrete may include the following, as directed by Engineer.
- C. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
 1. Slump: ASTM C 143; one test at point of discharge for each day's pour and each set of compressive strength test specimens of each type of concrete; additional tests shall be performed when concrete consistency seems to have changed.
 2. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231 pressure method for normal weight concrete; one for each day's pour and each set of compressive strength test specimens of each type of air-entrained concrete.
 3. Concrete Temperature: Test hourly when air temperature is 40 degrees F and below, when 80 degrees F and above, and each time a set of compression test specimens is made.
 4. Compression Test Specimen: ASTM C 31; one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cure test specimens are required. Tests for verification of early strength gain are at the Contractor's option and expense.
 5. Compressive Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yds. plus additional sets for each 50 cu. yds. more than the first 25 cu. yds. of each concrete class placed in any one day, or for each 5,000 sq. ft. of surface area placed;

- one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
6. When frequency of testing will provide fewer than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
 7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor and ready-mix producer shall evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
 8. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.
 9. Unit weight: ASTM C138; One (1) test for each strength test for lightweight concrete only.
- D. Test results will be reported in writing to Contractor and Director's Representative within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.
- E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
- F. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Engineer. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests when unacceptable concrete is verified, including all inspection and Engineering fees when non-conforming work is verified.

END OF SECTION

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Section includes general administrative and procedural requirements for all work. The administrative and procedural requirements included in this Section are to expand the requirements specified in Division 01.

1.2 SUMMARY

- A. This section includes joint sealants for the following locations:
 - 1. Exterior joints in horizontal traffic surfaces as indicated below:
 - a. Expansion joints in pool deck.
 - b. Expansion joint behind pool coping.
 - c. Other horizontal joints as indicated in plans and specifications.
 - 2. Exterior joints in vertical concrete surfaces as indicated below:
 - a. Caulk joint below pool coping (if required).
 - b. Other vertical joints as indicated in plans and specifications.

1.3 RELATED SECTIONS

- A. The following Sections contain requirements that relate to this Section:
 - 1. Division 02: Existing Conditions
 - 2. Division 03: Concrete
 - 3. Division 13: Special Construction

1.4 SYSTEM PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that have been produced and installed to establish and to maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates.
- B. Joint sealant shall be approved for swimming pool use.

1.5 SUBMITTALS

- A. Provide submittals in accordance with the requirements of the General Requirements of the NOVA Contract.
- B. Product data from manufacturers for each joint sealant product required. Certification by joint sealant manufacturer that sealants plus the primers and cleaners required for sealant installation comply with local regulations controlling the use of volatile organic compounds.

- C. Samples for initial selection purposes in form of manufacturer's standard bead samples, consisting of strips of actual products showing full range of colors available, for each product exposed to view.
- D. Submit color selection for NOVA's selection.

1.6 QUALITY ASSURANCE

- A. **Installer Qualifications:** Engage an experienced Installer who has completed joint sealant applications similar in material, design, and extent to that indicated for project, which have resulted in construction with a record of successful in-service performance.
- B. **Single Source Responsibility for Joint Sealant Materials:** Obtain joint sealant materials from a single manufacturer for each different product required.
 - 1. Use test methods standard with manufacturer to determine if priming and other joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates. Perform tests under normal environmental conditions that will exist during actual installation.
 - 2. Submit not less than 9 pieces of each type of material including joint substrates, shims, joint sealant backings, secondary seals, and miscellaneous materials.
 - 3. Schedule sufficient time for testing and analysis of results to prevent delay in the progress of work.
 - 4. Investigate materials failing compatibility or adhesion tests and obtain joint sealant manufacturer's written recommendations for corrective measures, including use of specially formulated primers.
 - 5. Testing will not be required when joint sealant manufacturer is able to submit joint preparation data required above that is acceptable to the Owner's Representative and is based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.
- B. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.8 PROJECT CONDITIONS

- A. **Environmental Conditions:** Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer.
 2. When joint substrates are wet.
- B. Joint Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than allowed by joint sealant manufacturer for application indicated.
- C. Joint Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

1.9 SEQUENCING AND SCHEDULING

- A. Sequence installation of joint sealants to occur not less than 21 or more than 30 days before substantial completion.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
- B. Colors: Provide selections made by Director's Representative from manufacturer's full range of standard colors for products of type indicated.

2.2 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing elastomeric sealants that comply with ASTM C 920 and other requirements indicated on each Elastomeric Joint Sealant Data Sheet at end of this Section, including those requirements referencing ASTM C 920 classifications for Type, Grade, Class, and Uses. Where additional movement capability is specified in Elastomeric Joint Sealant Data Sheet, provide products with the capability, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, to withstand the specified percentage change in the joint width existing at time of installation and remain in compliance with other requirements of ASTM C 920 for Uses indicated.
- B. Available Products: Sikasil Pool High Performance one component, neutral curing silicone sealant for use in swimming pools and permanently wet areas, or equal.
- C. Joint sealant shall be manufactured for sealing joints around swimming pools, areas under permanent water immersion and wet areas between tiles, concrete, glass and metals. Sealant shall be equipped for interior and exterior use.

- D. Contractor to provide manufacturer's recommended joint backing material, primer, tools, and accessories for a proper installation. Contractor to verify that joint sealant is approved for each application, specifically, but not necessarily limited to exterior pool decks, coping stones, interior pool expansion joints and pool tile.

2.3 JOINT SEALANT BACKING

- A. General: Provide sealant backings of material and type that are non-staining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Plastic Foam Joint Fillers: Preformed, compressible, resilient, non-staining, non-waxing, non-extruding strips of flexible plastic foam of material indicated below and of size, shape, and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
 - 1. Open-cell polyurethane foam.
 - 2. Closed-cell polyethylene foam, non-absorbent to liquid water and gas, non-outgassing in unruptured state.
 - 3. Proprietary, reticulated, closed-cell polymeric foam, non-outgassing, with a density of 2.5 pcf and tensile strength of 35 psi per ASTM D 1623, and with water absorption less than 0.02 gms/cc per ASTM C 1083.
 - 4. Any material indicated above.
- C. Elastomeric Tubing Joint Fillers: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, non-absorbent to water and gas, capable of remaining resilient at temperatures down to -26 degrees Fahrenheit (-32 degrees Celsius). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and otherwise contribute to optimum sealant performance.
- D. Bond-Breaker Tape: Polyethylene tape or plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.4 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealant-substrate tests and filed tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming in any way joint substrates and adjacent nonporous surfaces and formulated to promote optimum adhesion of sealants with joint substrates.

- C. Masking Tape: Non-staining, non-absorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with the requirements for joint configuration, installation tolerances, and other conditions affecting joint sealant performance. Do not proceed with installation of joint sealants until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with recommendations of joint sealant manufacturer and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellants, water, surface dirt, and frost.
 - 2. Clean concrete, masonry, unglazed surfaces of ceramic tile, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
 - 3. Remove laitance and form release agents from concrete.
 - 4. Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile, and other nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Acoustical Sealant Application Standard: Comply with recommendations of ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.

- D. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:
1. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - a. Do not leave gaps between ends of joint fillers.
 - b. Do not stretch, twist, puncture, or tear joint fillers.
 - c. Remove absorbent joint fillers that have become wet prior to sealant application and replace with dry material.
 2. Install bond breaker tape between sealants where backer rods are not used between sealants and joint fillers or back of joints.
- E. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.
- F. Tooling of Non-sag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.
1. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
 2. Provide flush joint configuration, per Figure 5B in ASTM C 1193, where indicated. Use masking tape to protect adjacent surfaces of recessed tooled joints.
 3. Provide recessed joint configuration, per Figure 5C in ASTM C 1193, of recess depth and at locations indicated.
 4. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping, taking care not to pull or stretch material, and to comply with sealant manufacturer's directions for installation methods, materials, and tools that produce seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to sealant in conformance with sealant manufacturer's recommendations.

3.4 CLEANING

- A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of substantial completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so that the installation of repaired areas is indistinguishable from original work (at Contractor's expense).

END OF SECTION

SECTION 131100 – MLPS POOL GENERAL CONDITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Section includes general administrative and procedural requirements for all work. The administrative and procedural requirements included in this Section are to expand the requirements specified in Division 01.

1.2 SUMMARY

- A. The responsibility for the construction of the MLPS pool rehabilitation will be placed under a single Prime contract whereas the Contractor will complete the work noted below. Under this Section, the Contractor will provide but is not necessarily limited to the following:
1. Complete all remaining demolition work associated with the removal of the existing MLPS Pool Structure, water play equipment and surrounding deck area as designated within the bid documents.
 2. Complete all demolition work associated with the removal of the existing MLPS Pool's concrete shell.
 3. Provide all backfill, compacting, and grading materials necessary to begin new MLPS Pool shell construction.
 4. Construct all formwork required for pool shell and construct revised pool shell.
 5. Provide all equipment and services required for erection and delivery onto the premises of any equipment or apparatus furnished. Remove equipment from premises when no longer required.
 6. Provide all electrical grounding and bonding for all pool equipment/anchors and any metal components identified per latest NEC 680 code.
 7. Provide all required piping for the pool's main drain connections including but not necessarily limited to layout, trenching, backfill and compaction, pipe, fittings and all material and equipment necessary for the proper and complete installation per construction documents.
 8. Furnish and install a pool finish in the MLPS Pool (per Section 131148).
 9. Provide for the temporary storage and protection of all existing pool related equipment, materials, and systems. All items are the responsibility of the Contractor until final acceptance by NOVA.
 10. Obtain progress inspection approval and final inspection approval by jurisdictional health department. Document all inspections and submit to NOVA in Project Closeout Manual.
 11. Instruct all designated NOVA staff members in the systems operation and maintenance as described herein.
 12. Provide and install all VBG compliant stainless-steel main drains with hydrostatic relief valves.
 13. Provide layout and installation of all deck mounted anchors, sockets, and inserts for the pool and surrounding pool deck.
 14. Furnish and install all pool concrete decking (light tan colored concrete mix design) with non-slip finishes, but not necessarily limited to: grading, forming,

- reinforcing, concrete place and finish, curing, special coatings and/or finishes, and all inserts and imbeds per the contract documents.
15. Provide and install all new water play systems and structures including all connections and control systems. This shall include the features manifold as well as the features control panel(s).
 16. Provide and install all pool deck caulking, sealants, deck control joint systems, deck expansion joint systems, and pool gutter expansion joint systems.
 17. Provide, install, and maintain all necessary construction fencing, signs, lights, and flares for MLPS pool construction to protect workers and the public.
 18. Provide and install all inserts, sleeves, anchors and fittings. Assist and coordinate installation of Division 13 provided materials as listed above.
 19. Prior to concrete pours, verify electrical bonding of pool embedded items. Coordinate and arrange any required electrical, plumbing, and/or building inspections to be performed on embedded items.
 20. Provide and install caulking (sealant) to pool wall transition (continuous around perimeter of pool) and deck slabs on grade.
 21. Provide and install new water features within the MLPS pool.
 22. Provide/replace any landscaping that was destroyed during excavation & installation of pool related items.

1.3 RELATED SECTIONS

- A. Work related to the swimming pools to be completed by the Contractor.
 1. The Contractor shall provide any landscape around the pool that is damaged or destroyed.
 2. The Contractor shall obtain permits, inspections, and approvals of all wiring including grounding and bonding of all metal components associated with the swimming pool in complete compliance with all Federal, State, National, and Local electrical codes.

1.4 REFERENCES

- A. The MLPS pool shall comply with the Virginia regulatory agencies governing the design and construction of public swimming pools.
- B. The MLPS pool and associated equipment shall be provided and installed to meet all National and Local codes and follow applicable sections of the Model Aquatic Health Code (MAHC 1st Edition, 2014).
- C. All aspects of the MLPS pool and recirculation system shall comply with Virginia State Code.
- D. The Contractor shall include in the work, without extra cost to NOVA, any labor, materials, services, apparatus or drawings in order to comply with all applicable laws, ordinances, rules and regulations, whether shown on drawings and/or specified.

1.5 QUALITY ASSURANCE

- A. The specifications and drawings illustrate and detail swimming pool systems that shall be utilized for public use. Certain technical aspects of the design are common only to pool systems planned for public use. Understanding these aspects, their functions, and interaction through experience is vital to completing a successful operating system. It is a mandatory requirement that all bidders will have achieved such experience as a prerequisite for bidding this project.
1. The Contractor shall show evidence of having adequate experience in construction of commercial & public swimming pools. To be considered for this project, the Contractor must have completed at least five (5) public use pools of similar nature within the last three years. The pools must be substantially completed and/or currently in operation. Submit a list of such projects with the name, address, and current telephone number of the Owner's Operator and Architect of Record to NOVA.
 2. The NOVA reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy that such bidder is properly qualified to carry out the obligation of the contract and to complete the work described or if the bidder does not have the qualifications stated herein.

1.6 SUBMITTALS AND OPERATION & MAINTENANCE MANUALS

- A. All submittals shall be made in accordance with the General Requirements in Division 01 and in strict compliance with the following procedures and guidelines. If there are discrepancies between this specification and these requirements, the more stringent requirements will apply.
- B. All shop drawings and engineering data shall be tabbed, indexed, referenced to the specifications, and issued by way of a pdf document and submitted when available / appropriate. Provide cover sheet for each item submitted identifying item and product number. The first stage shall be all embedded items and all time sensitive and/or critical items for the swimming pools. The following stages will include the balance of submittals for a complete submittal package. Only complete submittals will be reviewed.
- C. All submittals shall be submitted to the Engineer no later than 20 days after Notice to Proceed date.
- D. All submittals shall be submitted in a timely fashion so as not to delay any phase of the schedule or delay the project.
1. Engineering data covering all systems, equipment, structures, and fabricated materials, which will become a permanent part of the work under this Contract, shall be submitted for review. This data shall include drawings and descriptive information in sufficient detail and scale to show the kind, size, arrangement, and operation of component materials and devices; the external connections, anchorages and supports required; performance characteristics; fabrication and dimensions needed for installation and correlation with other materials and equipment. A certification, in writing, shall be provided indicating that all equipment will fit in the space allotted and as shown in the drawings.
 2. All submittals regardless of origin shall be stamped with approval of the awarded Contractor(s) and identified with the name and number of this Contract, Contractor's name, and references to applicable specification paragraphs and contract drawings. Each submittal shall indicate the intended use of the item in the work. When catalog pages are submitted, applicable items shall be clearly

- identified. The current revision, issue number, and date shall be indicated on all drawings and other descriptive data.
3. Submittals will not be accepted from anyone but the awarded Contractor. Submittals shall be consecutively numbered in direct sequence of submittal without division by subcontracts or trades.
 4. Contractor's stamp of approval is a representation that the awarded Contractor(s) accepts full responsibility for determining and verifying all quantities, dimensions, field construction criteria, materials, catalog numbers and similar data, and that they have reviewed and coordinated each submittal with the requirements of the work and the Contract Documents.
 5. Each submittal shall include a statement prepared by the originator of the drawings and data, certifying compliance with Contract Documents except for deviations, which are required to be specifically identified.
 6. All deviations from the Contract Documents shall be identified on each submittal and shall be tabulated in the Contractor's letter of transmittal. Such submittals shall, as pertinent to the deviation, indicate essential details of all changes proposed by the Contractor (including modifications to other facilities that may be a result of the deviation).
 7. Awarded Contractor shall accept full responsibility for the completion of each submission, and, in the case of resubmission, shall verify that all exceptions previously noted have been taken into account.
 8. Any need for more than one resubmission, or any other delay in obtaining review of submittals, will not entitle the Contractor to an extension of the contract times unless delay of the work is directly caused by a change in the work authorized by a change order.
 9. Review of drawings and data submitted by Contractor(s) will cover only general conformity to the drawings and specifications, external connections and dimensions that affect the layout. Review does not indicate a thorough review of all dimensions, quantities, and details of the material, equipment, device, or item shown. Review of submittals shall not relieve Contractor(s) from the responsibility for errors, omissions, or deviations, or responsibility for compliance with the Contract Documents.
 10. When the drawings and data are returned marked REJECTED, REVISE AND RESUBMIT, or SUBMIT SPECIFIED ITEM, the corrections shall be made as noted therein and as instructed and resubmitted.
 11. Resubmittals shall bear the number of the first submittal followed by a letter (A, B, etc.) to indicate the sequence of the resubmittal. All resubmittals shall be indexed, tabbed, referenced to the specifications and submitted at one time via a pdf document.
 12. Time sensitive submittals can be submitted in one (1) package and submitted in advance of this initial submittal.
 13. When corrected copies are resubmitted, the submitting Contractor shall in writing direct specific attention to all revisions and shall list separately and revisions made other than those called for on previous submissions.
 14. When the drawings and data are returned marked NO EXCEPTIONS TAKEN or MAKE CORRECTIONS NOTED, no additional submissions need to be furnished unless specifically requested for record purposes.

E. Test Reports:

1. Submit a sample format for each test report intended for use. Submit test reports required herein only on approved forms.

- F. Complete Product Data Indexed, Tabbed, and Referenced to Specifications with 8 ½” x 11” Cover Sheet covering:
 - 1. Reference Section 131148 – MLPS Pool Finish
 - 2. Reference Section 131151 – MLPS Main Drains & Recirculation Fittings
 - 3. Reference Section 131451 - MLPS Pool Piping, Valves, & Fittings

- G. Engineering/ Shop Drawings and Product Data:
 - 1. Reference Division 07 – Joint Sealants
 - 2. Reference Division 26 – Electrical Grounding and Bonding

- H. Detailed operation and maintenance information shall be supplied for all equipment requiring maintenance or other attention. The Contractor shall prepare an operation and maintenance manual for all equipment installed. Parts lists and operating and maintenance instructions shall be included.

- I. Operation and maintenance manuals shall include the following:
 - 1. Operating instructions for start-up, routing, and normal operation and regulation and control.
 - 2. Include manufacturer recommended maintenance schedule.
 - 3. Pool finish maintenance instruction.
 - 4. Pool finish “Do’s” and “Don’t”.
 - a. Acid washing instructions and recommendations.
 - b. Pool fill recommendations.
 - c. Temperature affects.
 - 5. Guide to “troubleshooting”.
 - 6. Parts lists.
 - 7. Outline, cross section, and assembly drawings.
 - 8. Stainless steel care and maintenance.

- J. The operation and maintenance manuals shall be in addition to any instructions or parts lists packed with or attached to the equipment when delivered, or which may be required by the Contractor.

- K. Manuals and other data shall be printed on 8 ½” x 11” paper with standard 3-hole punch. Drawings and diagrams shall be reduced to 8 ½” x 11” or 11” x 17”. Where reduction is not practical, larger drawings shall be folded separately and placed in envelopes that are bound into the manuals and labeled on the outside.

- L. Three (3) bound volumes of each manual shall be submitted. All parts lists and information shall be assembled in three ring binders. Material shall be assembled and bound in the same order as specified, and each volume shall have a table of contents and suitable index tabs.

- M. All material shall be marked with project identification. Non-applicable information shall be deleted.

- N. Shipment of equipment shall not be considered complete until all required manuals and data have been received.

1.7 PRODUCT HANDLING

- A. Deliver material in manufacturer's original, unopened containers and crates with all labels intact and legible.
- B. Deliver materials in sufficient time and quantity to allow continuity of work and compliance with approved construction schedule.
- C. Handle materials in a manner to prevent damage.
- D. Store all materials on clean raised platforms with weather protective covering. Provide continuous protection of materials against damage or deterioration.
- E. Remove damaged materials from site.

1.8 COORDINATION

- A. Coordinate all work relating to Division 13.
- B. The Contractor must establish with other Sub-Contractors, having related work in this Section that all work necessary to complete the pool as shown on the drawings and in the specifications is included in the base bid and alternates to the NOVA.
- C. If in doubt regarding the responsibility for work covered in the Section and/or discovery of errors or omissions in the bidding documents, the Contractor shall notify the NOVA through channels established by the specifications and request clarification of a minimum of ten (10) days prior to the bid date.

1.9 WARRANTIES

- A. The Contractor warrants to the NOVA that materials and equipment furnished under the contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the work will be free from defects not inherent in the quality required or permitted, and that the work will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized may be considered defective. The Contractor's warranty may exclude remedies for damage or defect caused by abuse, improper or insufficient maintenance, and improper operations, modifications not executed by the Contractor or wear and tear under normal use. If required by the Engineer, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. All warranties shall be for the time periods indicated below (see section C).
- B. The Contractor shall agree to repair or replace any defective or non-complying work at no cost to the NOVA upon written notification from the NOVA within the warranty period. Pro-rated warranties are not acceptable unless otherwise stipulated herein.
- C. Submit all warranties covering, but not limited to, the following:
 - 1. MLPS Structure.
 - 2. Main drains
 - 3. Pool Finish

1.10 SYSTEM TRAINING

- A. A qualified representative of the Swimming Pool Contractor performing work under this Section shall put the equipment into operation and instruct NOVA in the operation of this equipment to their satisfaction immediately after project substantial completion.
- B. No additional cost for this training will be provided (should be included in the bid proposal). All travel and expenses to conduct the training listed must be included (no additional fees will be required).
- C. Training period shall be 8 hours on-site training scheduled as follows:
 - 1. 4 hours Contractor training at end of Construction.
 - 2. 4 hours Contractor training after NOVA staff has experience operating the systems. This time may be requested any time after the pool has been placed in operation within a period of one (1) year from the time the pool was accepted by NOVA.
 - 3. Prior to leaving the job, the Contractor shall obtain written certification from the designated NOVA Representative acknowledging that the instruction period has been completed, and all necessary operating information has been provided.

1.11 POOL FILL WATER QUALITY

- A. The Contractor shall bear the cost of the water required for one (1) complete filling of the pools. Additional fillings, or partial fillings (more than 25%) of the pools, shall be by the awarded Contractor at their expense. The NOVA shall provide the cost for the water to the Contractor.
- B. The Contractor shall provide the necessary chemicals to adjust and balance the water chemistry in the swimming pools to the following levels:
 - 1. Free Chlorine: 1.0 – 3.0 ppm
 - 2. pH: 7.4 – 7.6
 - 3. Calcium Hardness: 250-350 ppm
 - 4. Total Alkalinity: 100-120 ppm
 - 5. Langelier Saturation Index: -0.3 - +0.3

PART 2 - PRODUCTS

2.1 START-UP CHEMICALS

- A. The Contractor shall provide chemicals required for the initial balance of the water for the pools. This shall consist of:
 - 1. Disinfection: Sodium Hypochlorite
 - 2. pH control: Muriatic Acid
- B. The Contractor shall maintain the chemical balance of the pool water until the pools are fully operational and accepted by the NOVA.

2.2 RECORD DRAWINGS

- A. Contractor shall provide a complete set of record drawings of the pool improvements including all sub-systems. All record drawings shall be prepared in accordance with the General Swimming Pool Requirements, and shall be a complete, stand-alone set. The Contractor shall be permitted to copy original documents for this purpose only. Furnish the record set (1 copy) on 24" x 36" bound hard copy and via digital pdf and ACAD.dwg format.

PART 3 - EXECUTION

3.1 EXISTING CONDITIONS, INSPECTION AND PREPARATION

- A. Carefully examine all of the Contract Documents for requirements that affect the work of this Section. Prior to starting work, notify the NOVA of defects requiring correction. Do not begin work until conditions are satisfactory.
- B. Verify that all work by others, related to this Section, has been completed. This includes all earthwork/ concrete work and preparation
- C. Protect all materials and work completed by others from damage while completing the work in this Section.

3.2 FIELD MEASUREMENTS

- A. Verify benchmark and locations prior to beginning layout for formwork.
- B. If field measurements differ from the construction drawing dimensions, notification shall be given to NOVA prior to proceeding with work.

3.3 EXCAVATION, REINFORCING STEEL AND CAST-IN-PLACE CONCRETE

- A. Reference Division 02- Existing Conditions

3.4 TOLERANCES FOR CONSTRUCTION

- A. The completed structures shall be constructed level and to the dimensions, elevations, depths, and thickness as shown on approved plans.
- B. The elevation (level) tolerance of the pool finish shall be 1/8 inch.
- C. The elevation (level) tolerance of the gutter lip shall be plus or minus 1/16 inch.
- D. The pool wall to wall dimension shall be exact as per plans. Differences must be corrected by Contractor.
- E. The vertical wall surface tolerance of the pool finish, for the first 48 inches from the water surface shall be plus or minus ¼ inch measured with a 10-foot straight edge.
- F. Ground wires or grade pins, if used, shall be installed in such a manner that they accurately outline the section of the pool shell as indicated on the plans. They shall be

located at intervals sufficient to insure proper thickness throughout and shall be maintained tight. Grade pins shall not be permanently embedded in the pool shell.

3.5 PIPING INSTALLATION

A. General:

1. Provide and install, according to the best practices of the trade, all piping connections shown on the drawings and required for the complete installation of these systems. The piping shown on the Drawings shall be considered as diagrammatic in indicating the general run and connections and may or may not be shown in its true position. The piping may have to be offset, lowered or raised as required or as directed at the site. This does not relieve the Contractor from responsibility for the proper installation of the systems or piping in every respect suitable for the work intended as described in the specifications. In the installation of all piping, it shall be properly supported, and proper provisions shall be made for expansion, contraction and anchoring of piping. All piping shall be cut accurately for fabrication to measurements established at the construction site. Pipe shall be worked into place without springing and/or forcing, properly clearing all surroundings. All pipes shall have burrs and/or cutting slag removed by reaming or other cleaning methods in strict accordance with the manufacturer's instructions. All changes in direction shall be made with fittings. All open ends of pipe and equipment shall be properly capped or plugged to keep dirt and other foreign materials out of the systems. Plugs of rags, wool, cotton waste, or similar materials may not be used in plugging. Flanges or unions as applicable for the type of piping specified shall be provided in the piping at connections to all items of equipment. All piping shall be installed to ensure noiseless circulation.

3.6 ANCHOR & IMBED INSTALLATION

- A. The Contractors shall assemble and install all anchors and imbeds as shown on pool drawings, specifications, and shop drawings of the equipment of the equipment suppliers.
- B. The Contractor shall furnish all anchors and inserts to be embedded in the deck including all fittings, inserts, and structure sleeves and required anchorages as shown in the plans and as indicated in this Section of specifications. Anchorage shall be set true and plumb using factory supplied jigs and/or templates where available. Contractors shall ensure anchor bolts are of the correct size and spacing as required by the equipment manufacturer. All anchor bolts shall be Type 304 stainless steel and of a length capable of adequate anchorage into rough slab-on-grade allowing for finish deck tile and setting bed. Anchors shall be set and cast into place during deck concrete work. Contractors shall inspect all anchor settings for horizontal and vertical alignment prior to pouring concrete. Removable equipment items shall be easily removable from anchors and shall fit without noticeable wobble.
- C. The Contractors shall re-install all deck equipment and systems in accordance with manufacturer's directions in their original locations.

3.7 CONCLUSION

- A. It is the intention of these specifications to provide a complete installation for proposed pool improvements. All required construction and apparatus necessary in the operation or testing of the performance of the work shall be included. The omission of specific reference to any part of the work necessary for such complete installation shall not be interpreted as relieving the awarded Contractors from furnishing and installing such parts. Any such omission or clarification shall be brought to the attention of NOVA prior to bidding as provided in this Section.

END OF SECTION

SECTION 131148 – MLPS POOL FINISH

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Section includes general administrative and procedural requirements for all work. The administrative and procedural requirements included in this Section are to expand the requirements specified in Division 01.

1.2 SUMMARY

- A. All preparation of the swimming pool structure and labor and materials required to install the swimming pool finish as indicated on the drawings and herein specified shall be provided.
- B. MLPS pool to receive a Quartz Aggregate finish.

1.3 RELATED SECTIONS

- A. Division 2- Existing Conditions
- B. Division 3- Concrete
- C. Division 13- Special Construction

1.4 SUBMITTALS

- A. Provide submittals in accordance with the requirements of the General Requirements of Division 01.
 - 1. Product data for each finish component (ie: bond coat and finish).
 - 2. Color and texture samples.
 - 3. Watercolor expected outcome.
 - 4. Installer's qualifications and manufacturer's written endorsement.

1.5 PRODUCT HANDLING

- A. Properly label and identify all containers as Specialized Coating materials. Deliver and store all materials to prevent damage to product and containers.
- B. Store materials in a clean, dry location.
- C. Comply with manufacturer's Material Safety Data Sheet (MSDS) for delivery, storage, and handling of products.

1.6 COORDINATION

- A. Coordinate this work with other applicable phases of construction to avoid any delays (especially concrete cure time).
- B. Coordinate pool finish with any ceramic tile work (within the pool).
- C. Coordinate pool finish with main drain and gutter installations.

1.7 WARRANTY

- A. Contractor / Installer shall provide a two (2) year warranty specifically for the installation of the pool finish. Any degradation of the pool finish that is deemed not typical 'wear and tear' will be replaced at no additional cost to NOVA. This shall include all necessary labor to repair or refinish the degraded material.
- B. Finish manufacturer shall warrant its product against material failure from the date of installation for a standard period of (10) years. In the event of failure, finish manufacturer shall, upon verification, provide interior pool materials necessary to repair the area of failure. Material replacement is limited to repair only. It is understood that some cosmetic variation may result in connection with installation of the material upon repair.

1.8 EXTRA MATERIALS

- A. No extra materials required for this Section.

1.9 PROJECT CONDITIONS

- A. Environmental conditions during time of scheduled application must be given highest priority as this can adversely affect the resulting finish. Contractor shall record the following information and submit to the Director's Representative after pool finish is applied:
 - 1. Day bond coat and finish were applied.
 - 2. Time period of application(s) (ie: Bond coat applied on MLPS Pool from 8:00 AM to 1:15 PM).
 - 3. Outside Temperature (°F) at each hour of application.
 - 4. Weather condition at each hour of application (ie: Sunny, rain, wind, etc.).
- B. These conditions include, but are not limited to, ambient temperature, humidity, wind, rain, substrate moisture, and surface contaminants.
- C. Work area must remain dry during application.
- D. Consult finish manufacturer with any questions or concerns before any work commences.

PART 2 - PRODUCTS

2.1 POOL FINISH: EXPOSED QUARTZ AGGREGATE FINISH

A. APPROVED MANUFACTURERS

1. DiamondBrite - Southern Grouts and Mortars, 1502 SW 2nd Place, Pompano Beach, FL 33069.
2. KrystalKrete – C.L. Industries Inc., 8188 South Orange Avenue, Orlando, FL 32859.
3. Or approved equal.

B. BASIS OF DESIGN

1. DiamondBrite is used in the basis of design.

C. MATERIALS

1. Pool Coating: SGM Diamond-Brite exposed aggregate finish, made with 100 percent quartz aggregate and polymer modified cement. Contractor shall provide the Premium White Commercial Quartz finish (which comes standard with a ten-year warranty).
2. VADOH code: Must be white or light in color. Specified finish is white. Four (4) samples to be provided during submittal review by NOVA staff.
3. Quantity: Provide enough material to cover the entire pool and have enough for replacement of unsatisfactory work.
4. Bond Coat: SGM Bond Kote.
5. Hydraulic Cement (Pool Patch): SGM Instant Hydraulic Cement.
6. Patching Cement: SGM Vinyl Patching Compound or SGM Sand Topping Mix and Concrete Bonding Agent.
7. Water: Potable water without detrimental minerals, metals, hardness, or alkalinity; if in doubt, verify quality with coating manufacturer.

D. FINISH THICKNESS

1. The new MLPS pool finish shall be 1/2” thick.

E. PRE-INSTALLATION

1. Contractor shall coordinate the installation of the pool finish with all other work to not interfere or conflict with any other construction. Application for pool finish should not be started without the pre-approval of the Director's Representative.
2. Installer **MUST** be a manufacturer's approved representative of the specific concrete coating being applied and shall have all pre-required installation

experience as dictated by the manufacturer. Contractor must consult the coating manufacturer for satisfying this requirement. Inexperienced installers will NOT be accepted.

3. Install finish as per manufacturer's written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION & PREPARATION OF CONCRETE

- A. Concrete must be structurally sound with required reinforcement and footings and shall be compatible with all aspects of the pool coating being applied. Contractor must allow newly poured concrete to fully cure before applying pool finish.
- B. Examine concrete surfaces to identify conditions that might interfere with proper bonding of coating.
 1. Look for algae, mold, or mildew.
 2. Look for dirt, paint, mortar droppings, patching compounds, loose tile, remaining paint, etc.
 3. Identify hollow spots in surface by sounding. Place and finish concrete in a skilled and workman-like manner.
- C. Remove dirt, loose deck, paint, grease, oil, curing compounds, or other foreign substances.
- D. Clean concrete surface with high pressure power washer, if required.
- E. Treat cracks and repair surface damage and make corrective measures on concrete if necessary.
- F. Install any control joints or other pool finishes (ie: ceramic tile) throughout concrete pool surface prior to beginning coating installation.

3.2 APPLICATION / INSTALLATION

- A. Provide protective masking at all adjacent areas.
- B. Mix base coating per manufacturer's written procedures using mechanical agitation when necessary. Mix coating to produce best quality and consistent color throughout. If material from more than one batch number is used, mix all batches together for color consistency.
- C. Apply base coat, when necessary, using pattern gun, squeegee, or trowel uniformly over area to be coated and allow to dry.
- D. Apply final finish as per manufacturer's instructions.
- E. Repair/Replace areas of non-uniform appearance.

3.3 START-UP / MAINTENANCE

- A. Contractor shall perform the following start-up and maintenance procedures which shall be included in Contractor's scope of work:
1. After the finish is applied, begin filling the pool with water to hydrate the newly applied surface. Consult with finish manufacturer for specific requirements and recommendations. Delaying the fill water a few hours or until the next morning may cause damage to the newly applied finish. As such, care must be taken not to over-dry the plaster and cause shrinkage cracking. There are no substitutes for experience and knowledge of local conditions in determining how long to let plaster air dry.
 2. Use pre-filtered water during this application to eliminate stain-causing contaminants.
 3. Start the circulation system as soon as possible using the main drain line. Do NOT start the system until the water level is above the return inlets. Circulate the pool continuously for the first 3 days.
 4. On the first day test and record chlorine, pH, total alkalinity, calcium hardness and temperature levels. Adjust pH to 7.2 to 7.4 and the Total Alkalinity to 100 ppm. Dissolve all chemicals in water first and allow sufficient time for each chemical to be fully dispersed before adding others. Do NOT add chlorine or calcium chloride.
 5. Brush the entire surface twice each day as necessary for the first 3 days or as directed by finish manufacturer. Clean the filter as needed.
 6. On the second day, repeat steps 4 and 5 above.
 7. On the third day adjust all the chemistry to the following levels:
 - a. Free Chlorine: 1.0 to 3.0 ppm
 - b. pH: 7.4 to 7.6
 - c. Total Alkalinity 80 - 120 ppm
 - d. Calcium Hardness: 200 - 400 ppm
 - e. Stabilizer: 30 to 60 ppm
 8. Do not install automatic pool cleaners until given approval to do so by the finish manufacturer.
 9. Do not vacuum the pool with a wheeled vacuum for 14 days or approval from the finish manufacturer to avoid leaving "Wheel Marks". Brush type vacuums may be used immediately.
 10. Brush pool walls and floor daily for the first 2 weeks or as required by finish manufacturer.
- B. Contractor shall test and record water chemistry values once a day and adjust as indicated per water-balance table recommendations above. Brush entire pool, walls and floor

weekly. Remove any debris and foreign materials immediately to prevent staining. Check and maintain filter and recirculation pump to maintain proper flow and filtering action. This shall be performed until construction is handed over to NOVA.

END OF SECTION

SECTION 131151- MLPS POOL MAIN DRAINS & RECIRCULATION FITTINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Section includes general administrative and procedural requirements for all work. The administrative and procedural requirements included in this Section are to expand the requirements specified in Division 01.

1.2 SUMMARY

- A. Work Included: Supply and install all swimming main drain assemblies and recirculation fittings as required for this work as indicated in the Contract Documents and Drawings.

1.3 RELATED SECTIONS

- A. Division 02: Existing Conditions
- B. Division 03: Concrete
- C. Division 13: Special Construction

1.4 REFERENCES

- A. 2021 Virginia Uniform Statewide Building Code (USBC)
- B. Virginia Swimming Pool & Spa Code
- C. Virginia Graeme Baker Pool and Spa Safety Act.
- D. NSF 50
- E. American National Standard for Suction Outlet Fitting Assemblies (SOFA) For Use In Pools, Spas, And Hot Tubs - ANSI/APSP/ICC-16 2017 (PA 2021)

1.5 SUBMITTALS

- A. Provide submittals in accordance with the requirements of the General Requirements of Division 01.
- B. Provide all shop drawings and catalog data for a complete submittal.
- C. Substitutions: Include with request specified item, design, catalog number(s), and finish for each item on which approval is being requested ten (10) days prior to bid opening. Blanket approval by manufacturer's name only will not be given. Substitutions may not be granted after the ten-day period or after the project bid.

1.6 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the swimming pool items before, during, and after installation and to protect the installed work of other trades.
- B. Replacement: In the event of damage, immediately make all repairs and replacements necessary for the approval of the Director's Representative and at no additional cost to NOVA.

1.7 COORDINATION

- A. Coordinate with any sub-contractors all work relating to this Section.
- B. The Contractor must establish with other Sub-Contractors, having related work in this Section that all work necessary to complete improvements as shown on the drawings and in the specifications is included in the bid to NOVA.
- C. If in doubt regarding the responsibility for work covered in the Section and/or discovery of errors or omissions in the bidding documents, the Contractor shall notify the Director's Representative through channels established by the specifications and request a clarification ten (10) days prior to the bid date.

1.8 WARRANTIES

- A. In accordance with the General Requirements of Division 01.

1.9 EXTRA MATERIALS

- A. No extra materials required for this Section.

PART 2 - PRODUCTS

2.1 MAIN DRAINS

- A. Main Drains: (Qty. 4) shall be DALMAX-SG-242430 as manufactured by Daldorado, LLC or approved equal. Main drain grate opening shall be 24" x 24" and shall be an anti-entrapment main drain certified to ASME A112.19.8a-2008 and NSF/ANSI Standard 50 requirements. Sump and Grate shall be unblockable large area main drains. The main drains shall be certified to APSP-16-2011 Standards by IAPMO, and NSF certified for material composition. Main drain assembly shall have APSP-16-2011 Main Drain grates having a 25 year service life. DalMax™ main drain sumps for commercial pools are constructed of fiberglass with grates made from the highest quality PVC that meet or exceed IBC standards. Grate shall have a large open area of 62% and the highest flow rate in the industry. Main drains shall be rated for a 1,734 GPM maximum flow rate (per drain). Main drain sumps shall be equipped with a 12" diameter maximum port (see plans for detail of drain). Main drain shall be provided with integrated hydrostatic relief valve (Contractor shall include this option for all four drains). Drains shall be equipped to handle 100% of the recirculation flow rate. All hardware shall be stainless steel. Main drains shall be installed in accordance with the manufacturer's instructions and at the locations indicated within the contract documents.

- B. Hydrostatic Relief Valve: (Qty. 4, one per drain) shall be provided and installed. Hydrostatic relief valve shall be furnished by main drain manufacturer and shall be integrated with main drain sump assembly.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Inspection: Prior to all work in this Section, carefully inspect the installed work of other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Verify that the swimming pool equipment items may be installed in strict accordance with the original design, pertinent codes and regulations, and the manufacturer's recommendations.

3.2 INSTALLATION

- A. Supply and install items of swimming pool equipment in strict accordance with pertinent codes and regulations, the original design, and the manufacturer's published recommendations, anchoring firmly and securely for long life under frequent use. Coordinate with other trades to ensure all imbedded items are set plumb and flush.

3.3 INSTRUCTION

- A. Once final inspection and approval is met by NOVA, the Contractor shall instruct the maintenance personnel in the proper operations and maintenance of installed equipment.

END OF SECTION

SECTION 131451- MLPS POOL PIPING, VALVES & FITTINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Section includes general administrative and procedural requirements for all work. The administrative and procedural requirements included in this Section are to expand the requirements specified in Division 01.

1.2 SUMMARY

- A. Work Included: Provide and install all MLPS pool recirculation and feature piping, valves and miscellaneous fittings necessary to complete the renovations and improvements detailed within the plans.

1.3 RELATED SECTIONS

- A. Division 02: Existing Conditions
- B. Division 13: Special Construction
- C. Division 31: Earthwork

1.4 REFERENCES

- A. 2021 Virginia Uniform Statewide Building Code (USBC)
- B. Virginia Swimming Pool & Spa Code
- C. NSF 50- National Sanitation Foundation
- D. ASTM D1784
- E. ASTM D2467

1.5 QUALITY ASSURANCE

- A. All work in this section shall be performed by the Prime Contractor or qualified Sub-Contractor.

1.6 SUBMITTALS

- A. Provide submittals in accordance with the requirements of the General Requirements of Division 01.
- B. Provide all shop drawings, product data and certificates of compliance for all pipe and fittings for a complete submittal.

- C. Substitutions: Include with request specified item, design, catalog number(s), and finish for each item on which approval is being requested ten (10) days prior to bid opening. Blanket approval by manufacturer's name only will not be given. Substitutions may not be granted after the ten-day period or after the project bid.

1.7 PRODUCT HANDLING

- A. Delivery: Deliver all materials to the project site in the manufacturer's original unopened containers with all labels intact and legible.
- B. Storage: Store all materials under cover in a manner to prevent damage and contamination and store only the specified materials at the project site.
- C. Protection: Use all means necessary to protect piping materials before, during, and after installation and to protect the installed work of other trades.
- D. Replacement: In the event of damage, immediately make all repairs and replacements necessary for the approval of the Director's Representative and at no additional cost to NOVA.

1.8 COORDINATION

- A. Each Prime Contractor must establish with other Sub-Contractors, having related work in this Section, that all work necessary to complete all pipe work as shown in the drawings and in the specifications is included in the bid to NOVA.
- B. If in doubt regarding the responsibility for work covered in the Section and/or discovery of errors or omissions in the bidding documents, the Contractor(s) shall notify the Director's Representative through channels established by the specifications and request a clarification ten (10) days prior to the bid date.

1.9 WARRANTIES

- A. In accordance with the General Requirements of Division 01.

1.10 EXTRA MATERIALS

- A. No extra materials required for this Section.

PART 2 - PRODUCTS

2.1 PIPING, FITTINGS & FLANGES

- A. Swimming Pool Piping: NSF approved Schedule 80 PVC.
- B. Bedding: Per Section 31 Earthwork.
- C. All PVC Schedule 80 pipe and fittings shall be produced by Spears Manufacturing Company or approved equal from PVC Type I, cell classification 12454, conforming to ASTM Standard D1784. All injection molded PVC Schedule 80 fittings shall be certified

for potable water service by NSF International and manufactured in strict compliance to ASTM D2467. All fabricated fittings shall be produced in accordance with Spears General Specifications for Fabricated Fittings. All PVC flanges shall be designed and manufactured to meet CL150 bolt pattern per ANSI Standard B16.5 and rated for maximum internal pressure of 150 psi, non-shock at 73-degrees F. Fabricated fittings are only allowed on fitting sizes greater than 12”.

- D. All pipe/fittings shall bear the company’s name or trademark, material designation, size, applicable IPS or class rating, and the NSF stamp.
- E. All flanges shall be PVC molded class 150 flange fitting coupling devices designed for joining IPS (Iron Pipe Size) plastic piping systems. Flanges shall be designed such that frequent disassembly may be required. Flanges shall also exhibit the use as a transitional fitting for joining plastic to metal piping systems. Injection molded flanges shall be produced from either PVC materials approved for potable water use by the National Sanitation Foundation (NSF®). Flange pressure ratings shall be 150 psi for water at 73°F. Flange type shall be Van Stone Style which is a two-piece design with rotating flange ring. Flanges shall be provided in socket configurations, sizes 1/2" through 24". Flanges shall be produced by Spears Manufacturing Company or approved equal.

2.2 CONNECTION COUPLERS (TO EXISTING PIPE)

- A. Couplings shall be slip-fit PVC Schedule 80 as produced by Spears Manufacturing Company or equal. Connections shall be glued (no exceptions) and shall be leak tested (see below for testing protocol).

2.3 BUTTERFLY VALVES: 2” – 12”

- A. Lever Operated Butterfly valves shall be provided per plans on pipes up to and including 6” in size. Valves shall be the ASAHI Pool-Pro Type SP or approved equal. All “Pool-Pro” Type SP Butterfly Valves sizes shall be of a PVC Body, PVC Disc and EPDM construction suitable for chlorinated water applications. Stem shall be of 316 stainless steel and non-wetted. Valves shall be a self-gasketing design with a convex sealing arrangement. All Pool-Pro Type SP (1 1/2”-10”) valves shall be rated to 150 psi as manufactured by Asahi/America, Inc. Material of construction allows complete submersion of valve body as all components are compatible with chlorinated water. Allows for field mounting of accessories including stem extensions, gear operators & automation. Eighteen (18) position throttle plate for lever handle style is provided.
- B. Gear Operated Butterfly valves shall be provided per plans on pipes 8” up to and including 12” in size. Valves shall be the ASAHI Pool-Pro Type SP or approved equal. All Pool-Pro Type SP Butterfly Valves sizes shall be of a PVC Body, PVC Disc and EPDM construction suitable for chlorinated water applications. Stem shall be of 316 stainless steel and non-wetted. Valves shall be a self-gasketing design with a convex sealing arrangement. All Pool-Pro Type SP (1 1/2”-10”) valves shall be rated to 150 psi and size (12”) 100 psi at 70 degrees F as manufactured by Asahi/America, Inc. Material of construction allows complete submersion of valve body as all components are compatible with chlorinated water. Allows for field mounting of accessories including stem extensions, gear operators & automation.

2.4 BALL CHECK VALVES: 1/4” – 3”

- A. Ball check valves shall be True Union 2000 Industrial Ball Check valves as manufactured by Spears Manufacturing Company or approved equal. All thermoplastic check valves shall be manufactured to ASTM F1970 and constructed from PVC Type I, ASTM D1784 Cell Classification 12454 or CPVC Type IV, ASTM D1784 Cell Classification 23447. All O-rings shall be EPDM or genuine Viton®. All valve union nuts shall have Buttress threads. All valve seats shall be standard O-ring type. All seal carriers shall be Safe-T-Blocked®. All valve components shall be replaceable. All valves shall be listed by NSF for use in potable water service. All PVC and CPVC ½” thru 2” valves shall be pressure rated to 235 psi. All 2 ½” thru 3” and all flanged valves shall be pressure rated to 150 psi for water at 73 degrees F.

2.5 BALL VALVES: 1 ½” – 4”

- A. Ball valves shall be True Union 2000 Industrial Ball valves as manufactured by Spears Manufacturing Company or approved equal. All thermoplastic ball valves shall be manufactured to ASTM F1970 and constructed from PVC Type I, ASTM D1784 Cell Classification 12454 or CPVC Type IV, ASTM D1784 Cell Classification 23447. All O-rings shall be EPDM or genuine Viton®. All valves shall have Safe-T-Shear® stem with double O-ring stem seals. All valve handles shall be polypropylene with built-in lock out mechanism. All valve union nuts shall have Buttress threads. All seal carriers shall be Safe-T-Blocked®. All valve components shall be replaceable. All valves shall be listed by NSF for use in potable water service. All ½” thru 2” valves shall be pressure rated to 235 psi. All 2 ½” thru 4” and all flanged valves shall be pressure rated to 150 psi for water at 73 degrees F.

2.6 MODULATING FLOAT VALVE: 10”

- A. Modulation valves (quantity = 2) shall be 10” vertical type with dual/double float arms with extra weighted float balls. Valve shall be manufactured by mermade or approved equal. All metallic components shall be stainless steel. Pool contractor shall provide all necessary flanged connections for complete installation.
- B. Modulation valves shall be Mermade or equal.

2.7 ANTI-VORTEX PLATES

- A. Anti-vortex plates shall be provided on all suction piping within pump reservoir and shall be PVC style by Neptune Benson or approved equal. Sizes shall be per the detail shown in the bid documents. Contractor shall supply all stainless steel all thread and hardware to secure plate to pump reservoir concrete floor.

2.8 BALANCE TANK (VAULT) PIPE WALL SEALS

- A. All vault pipe penetrations shall be furnished and installed by the Prime Contractor / Sub-Contractor which shall be a complete Link-Seal® modular seal assembly, manufactured by PSI-Thunderline/Link-Seal® or approved equal.
- B. All pipe seals shall be modular, mechanical type, consisting of inter-locking synthetic rubber links shaped to continuously fill the annular space between the pipe and the wall opening. The elastomeric element shall be sized and selected per manufacturer’s sizing procedure and have the following properties as designated by ASTM. Coloration shall be

throughout elastomer for positive field inspection. Each link shall have a permanent identification of the size and manufacturer's name molded into it.

- C. All fasteners shall be sized according to latest Link-Seal® modular seal technical data. Bolts, flange hex nuts shall be Type 316 Stainless Steel per ASTM F593-95, with an 85,000-psi average tensile strength.
- D. A quantity of (6) pipe seals shall be provided and installed through the pool's balance tank. See plans for sizes and locations through vault.

PART 3 - EXECUTION

3.1 EXISTING CONDITIONS, INSPECTION AND PREPARATION

- A. Verify that all work by others related to this Section is installed. This includes but is not limited to all earthwork, concrete foundations, and mechanical/electrical connections.
- B. Prior to starting work, notify the Director's Representative of defects requiring correction. Do not begin work until conditions are satisfactory.
- C. Protect other materials and installed work against damage caused by completing work in this section.

3.2 PIPING AND FITTINGS

- A. Workmanship: Workmanship shall be in accordance with good commercial practice. Fittings shall be homogeneous throughout and free from visible cracks, holes, foreign inclusions, or other injurious defects in color, opacity, density, and other physical properties.
- B. Installation: All pipe and fittings shall be installed according to the best recommendations of the manufacturer.
- C. No lengths of PVC piping shall be unsupported for lengths in excess of fifteen feet. All pump discharge piping shall be properly supported, braced, and secured as necessary to minimize vibration.
- D. Pitch of Pipes: Horizontal drainage lines shall be supported to a uniform slope and all piping shall be so installed as to avoid unnecessary turns in order that friction loss may be kept at a minimum. Suction piping shall be installed in order to prevent air traps. Gutter piping shall slope as shown on drawings.
- E. All chemical tubing (if specified) shall be encased in Schedule 80 PVC piping with sweep fittings. All such piping systems shall be hand fitted without cement and shall be secured, strapped, and supported to avoid sagging.

3.3 WATER PIPE TESTING

- A. All pool circulation piping installed on the project, unless specifically shown otherwise, shall be hydraulically tested as specified herein. Air and/or gas pressure testing is

prohibited. Prior to backfill, all pool pipe pressure testing shall be inspected by Engineer for compliance.

- B. Piping may be tested a section at a time to facilitate the construction.
- C. Tests to be Performed: The Contractor shall fill the section of pipe to be tested with water. The tests shall be conducted by the Contractor. These tests shall be conducted before any pipe joint is covered.
- D. Duration of Tests: All tests shall apply full test pressure to the piping until piping of the pool equipment has begun.
- E. Pressure of Tests: All tests shall be conducted at 40 psi for a minimum 4-hour time period. Air pressure tests are not acceptable.

3.4 EXCAVATION AND BACKFILL

- A. Excavation:
 - 1. Excavate and backfill as required for the Work of this Section.
 - 2. The Contractor shall perform all excavation of every description and of whatever materials encountered, to depths indicated on the drawings or as necessary. The Contractor shall dispose of the excavated materials not required or suitable for backfill, as directed, and shall perform such grading as may be necessary to prevent surface water from flowing into the trenches. The Contractor shall provide adequate equipment for the removal of storm or subsurface waters, which may accumulate in the excavated areas.
- B. Backfilling:
 - 1. Material for backfilling of swimming pool pipes shall be approved material (per Division 31). No excavation materials shall be used as backfill.
 - 2. Backfilling pipe trenches shall commence immediately after installation and testing to preclude damage to the installed pipe. Backfill around pipe shall be carefully placed so as not to displace or damage the pipe and shall be carried up symmetrically on each side of the pipe to 1'-0" above the top of the pipe. The material shall be carefully compacted or consolidated before additional backfill is placed.
 - 3. Unless otherwise indicated on the drawings, all pipes shall have a minimum of 18" of cover.

3.5 PIPE IDENTIFICATION

- A. All exposed pool piping within the MLPS pool equipment room shall be installed as per Model Aquatic Health Code Section 4.7.1.7.4 – Piping and Component Identification. See Below for Requirements:
 - 1. 4.7.1.7.4.1A Clearly Marked: All exposed piping shall be clearly marked to indicate function.

2. 4.7.1.7.4.2 Flow Direction and Source: All piping shall be clearly marked to indicate type or source of water and direction of flow with clear labeling and / or color coding.
3. 4.7.1.7.4.3 Valves: All valves shall be clearly marked to indicate function with clear labeling and / or color coding.
4. 4.7.1.7.4.4 Schematic Displayed: A complete, easily readable schematic of the entire aquatic venue recirculation system shall be openly displayed in the mechanical room or available to maintenance and inspection personnel.

B. Pipe identification shall be provided by the Prime Contractor.

END OF SECTION

SECTION 131451- MLPS POOL WATER FEATURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Section includes general administrative and procedural requirements for all work. The administrative and procedural requirements included in this Section are to expand the requirements specified in Division 01.

1.2 SUMMARY

- A. Water Features shall consist of all labor, materials, and equipment necessary for the furnishing and installation of spray features mounted within the MLPS pool floor and all ancillary spray equipment components. This includes but is not limited to all necessary excavation, installation of concrete footings, and installation of components all in accordance with manufacturer specifications, and as shown on the plans.
- B. All preparation and installation of the new spray features and labor and materials required to achieve a fully functioning system as indicated on the drawings and herein specified.

1.3 RELATED SECTIONS

- A. Division 03: Concrete
- B. Division 13: Special Construction
- C. Division 31: Earthwork

1.4 SUBMITTALS

- A. Provide submittals in accordance with the requirements of the General Requirements of Division 01.
- B. Product Data:
 - 1. Submit manufacturers' technical data for each product indicated including recommendations for their applications and use. Include test reports and/or certifications substantiating that products comply with requirements.
- C. Shop Drawings:
 - 1. Contractor shall submit shop drawings in accordance with the requirements of General Requirements of these specifications. They must include the following documents/samples as a minimum:
 - a. General Layout
 - b. Dimensions
 - c. Materials
 - d. Finishes/Available Color Choices

- e. Anchoring Method/Support (including any special footing or foundation requirements for same as required by manufacturer)
- f. Escutcheon/Hardware
- g. Fittings, Connections and accessories
- h. Flow and head pressure information

D. Certificates:

- 1. Submit certificates attesting that the materials furnished meet the requirements specified herein.

E. Qualification and Warranty information.

- F. Substitutions: Include with request specified item, design, catalog number(s), and finish for each item on which approval is being requested ten (10) days prior to bid opening. Blanket approval by manufacturer's name only will not be given. Substitutions may not be granted after the ten-day period or after the project bid.

1.5 PRODUCT HANDLING

- A. Delivery: Deliver materials to the Project Site in the manufacturer's original unopened containers with all labels intact and legible.
- B. Protection: Use all means necessary to protect listed items before, during and after installation and to protect the installed work and materials of all other trades. Contractor is responsible for equipment until acceptance by NOVA.
- C. Storage: Materials shall be stored in a manner to prevent damage and/or contamination. Only specified materials are to be stored at the Project Site.
- D. Replacements: Examine delivery of materials to determine if any damage has been sustained and make necessary repairs and/or replacements necessary for the approval of the Director's Representative and at no additional cost to NOVA.

1.6 COORDINATION

- A. Coordinate installation of spray features with all other disciplines' work relating to the spray feature region.
- B. Coordinate with any sub-contractors all work relating to this Section.

1.7 WARRANTIES

- A. In accordance with the General Requirements of Division 01.
- B. Contractor shall furnish a written guarantee covering the installation of the spray features and any ancillary spray feature equipment (ie: manifold). It shall be a certificate of product liability insurance, guaranteeing replacements (parts and labor) of any items or components found to be defective up to two years.

- C. Spray Feature Manufacturer shall warrant all properly installed and maintained spray equipment (excluding consumables) for a period of one year from date of start-up. Manufacturer shall replace or repair any materials, components, or workmanship found to be defective, within the warranty period when returned to the factory. Defective equipment or parts shall be returned for repair or replacement with a factory issued RMA (Return Material Authorization).
 - 1. Special Provisions: The following spray feature equipment shall be warranted for the terms noted when properly installed and maintained (excluding consumables):
 - a. Structural Pipe: Stainless steel pipe and anchor bases used in the fabrication of spray equipment shall be warranted against structural failure for a period of 5 years.
 - b. Finish Coating: Shall be warranted for a period of 2 years against peeling or fading under normal environmental conditions.
 - c. Nozzles: Brass or stainless steel, 5 Years. PVC nozzles, 2 years.
 - d. Polyurethane Components: Shall be warranted for a period of 2 Years.
 - e. Valve manifold: Shall be warranted against structural defects for a period of 3 years.

1.8 EXTRA MATERIALS

- A. No extra materials required for this Section.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Basis of Design: The basis of design for all spray features and equipment is Wizard Works Design Group, LLC.
- B. Spray Features and Feature Equipment components shall be as designed and fabricated as specified. All structures are to be designed in such a way that they comply with the current ASTM and ADA standards for playground equipment. All materials used in the manufacture of spray features shall be inherently resistant to corrosion. Approved materials include Type 304/316 stainless steel, fiberglass, HDPE, and polyurethane. Galvanized carbon steel is strictly prohibited, as the base metal lacks natural corrosion resistance, posing a long-term durability risk in aquatic environments. The following spray equipment system features and components shall be installed as shown on the contract drawings.

2.2 WATER FEATURES

- A. Interactive Fountains™ - as manufactured by Wizard Works or approved equal: Quantity = (8)
 - 1. Manufacturer's ID No: IF-100
 - 2. Anchoring and Plumbing: The in-concrete embedment shall be constructed of Type 304 stainless steel or brass and include a bonding/grounding connection. The fixture shall feature an eyeball nozzle, allowing the water stream trajectory to be

fine-tuned after the concrete has cured. This adjustability eliminates the need for high-precision leveling during the concrete pour. Plumbing connections shall include a 3/4" NPT fitting, and all bonding/grounding must comply with local jurisdictional codes.

3. Fasteners: All fasteners shall be tamper-resistant 18/8 stainless steel or brass.
 4. Nozzle: The nozzles shall be brass precision jets.
 5. Interactive water effect: Each nozzle is delivered water from an individual solenoid valve which is caused to open by signaling from the SmartWorks Controller which will be programmed for visually appealing choreography. A variety of patterns will be programmed that will automatically cycle through providing for whimsical changes that enhance the engagement of the children. The web-like streams of water discharging from the nozzles shall be field adjusted to the owner's visual preference at startup.
 6. Hydraulic Requirements: The designed operational water supply shall be a maximum 20 GPM @ 30PSI each and produce a pleasing visual array.
 7. No communication with the SmartWorks Controller is required.
- B. Powered Water Blasters™ – as manufactured by Wizard Works or approved equal:
Quantity = (4)
1. Manufacturer's ID No: PWB-100
 2. Anchoring and Plumbing: Anchor of the base shall be supplied with 18/8 stainless steel 1/2" button head bolts and washers, and 1/2" threaded female sockets for anchoring into concrete or nyloc nuts for mounting to elevated decks. Washers shall be used as shims beneath base plate for leveling. The play feature shall have a bonding/grounding connection and 3/4" FPT inlet connection. Bonding/grounding shall be compliant with codes of the jurisdiction having authority.
 3. Stand Column: The above grade frame shall be constructed of 4" type 304 stainless steel pipe with 4" machined type 304 flanged base plates.
 4. Fasteners: All accessible fasteners shall be tamper-resistant 18/8 stainless steel.
 5. Interactive Water Effect: When a patron activates the device, compressed air pressurizes a specific volume of water, forcing it through uniquely designed internal chambers and out through the final nozzle. The patron is presented with two sturdy handles allowing them to manipulate the head of the blaster to accurately aim at a safe target. The device is engineered to meet rigorous safety standards, ensuring the protection of both patrons and maintenance personnel. The water effect shall be adjustable by the installer and permanently set to contain the water spray within the designated play area.

6. Hydraulic and Pneumatic Requirements: The designed operational water supply shall be 30 GPM @ 30 PSI at the water entry to the play feature and 4 CFM @ 90 PSI compressed air.
 7. Color: To be selected by Owner.
 8. Finish: This feature shall be coated with a UV stabilized, textured structural elastomeric polymer with a UV and chlorine resistant sealer coat.
 9. Communication with the SmartWorks Controller shall be via low voltage wiring and shall be protected inside liquid-tight, non-corrosive components which shall include a 1/2" connection. Control wiring shall not be greater than 24v.
- C. Loose Hose™ – as manufactured by Wizard Works or approved equal: Quantity = (2)
1. Manufacturer's ID No: LH-100
 2. Anchoring and Plumbing: Anchor of the base shall be supplied with 18/8 stainless steel 1/2" button head bolts and washers, and 1/2" threaded female sockets for anchoring into concrete or nyloc nuts for mounting to elevated decks. Washers shall be used as shims beneath base plate for leveling. The play feature shall have a bonding/grounding connection and 3/4" FPT inlet connection. Bonding/grounding shall be compliant with codes of the jurisdiction having authority.
 3. Stand Column: The above grade frame shall be constructed of 6" type 304 stainless steel pipe with 6" machined type 304 flanged base plates.
 4. Fasteners: All accessible fasteners shall be tamper-resistant 18/8 stainless steel.
 5. Interactive Water Effect: Water flows out of a flexible hose which allows a patron to manipulate to aim the water stream in any direction. The hose assembly is tethered to the base assembly which limits the range of motion of the hose to minimize hose failure due to fatigue and to limit the range of the water stream so as not to spray beyond the designated water play area. The water effect shall be adjustable by the installer and permanently set to contain the water spray within the designated play area.
 6. Hydraulic Requirements: The designed operational water supply shall be 30 GPM @ 30 PSI at the water exit of the play feature.
 7. Color: To be selected by Owner.
 8. Finish: This feature shall be coated with a UV stabilized, textured structural elastomeric polymer with a UV and chlorine resistant sealer coat.
 9. Communication with the SmartWorks Controller shall be via low voltage wiring and shall be protected inside liquid-tight, non-corrosive components which shall include a 1/2" connection. Control wiring shall not be greater than 24v.
- D. Spider Sprayer™ – as manufactured by Wizard Works or approved equal: Quantity = (1)

1. Manufacturer's ID No: SS-100
 2. Anchoring and Plumbing: Anchor of the base shall be supplied with 18/8 stainless steel 1/2" button head bolts and washers, and 1/2" threaded female sockets for anchoring into concrete or nyloc nuts for mounting to elevated decks. Washers shall be used as shims beneath base plate for leveling. The play feature shall have a bonding/grounding connection and 3/4" FPT inlet connection. Bonding/grounding shall be compliant with codes of the jurisdiction having authority.
 3. Stand Column: The above grade frame shall be constructed of 6" type 304 stainless steel pipe with 6" machined type 304 flanged base plates.
 4. Fasteners: All accessible fasteners shall be tamper-resistant 18/8 stainless steel.
 5. Interactive Water Effect: Water flows out of a stainless steel head with a plurality of small holes drilled causing multiple streams of water to spray upward, turn over, then downward. The water effect shall be adjustable by the installer and permanently set to contain the water spray within the designated play area.
 6. Hydraulic Requirements: The designed operational water supply shall be 20 GPM @ 30 PSI at the water exit of the play feature.
 7. Color: To be selected by Owner.
 8. Finish: This feature shall be coated with a UV stabilized, textured structural elastomeric polymer with a UV and chlorine resistant sealer coat.
 9. Communication with the SmartWorks Controller shall be via low voltage wiring and shall be protected inside liquid-tight, non-corrosive components which shall include a 1/2" connection. Control wiring shall not be greater than 24v.
- E. Umbrella Sprayer™ – as manufactured by Wizard Works or approved equal: Quantity = (1)
1. Manufacturer's ID No: US-100
 2. Anchoring and Plumbing: Anchor of the base shall be supplied with 18/8 stainless steel 1/2" button head bolts and washers, and 1/2" threaded female sockets for anchoring into concrete or nyloc nuts for mounting to elevated decks. Washers shall be used as shims beneath base plate for leveling. The play feature shall have a bonding/grounding connection and 3/4" FPT inlet connection. Bonding/grounding shall be compliant with codes of the jurisdiction having authority.
 3. Stand Column: The above grade frame shall be constructed of 6" type 304 stainless steel pipe with 6" machined type 304 flanged base plates.
 4. Fasteners: All accessible fasteners shall be tamper-resistant 18/8 stainless steel.
 5. Interactive Water Effect: Water flows out of a brass nozzle which is designed to cause the exiting water to fan outward in a 360-degree array, roll over and fall

downward, similar to the shape of an umbrella. The water effect shall be adjustable by the installer and permanently set to contain the water spray within the designated play area.

6. Hydraulic Requirements: The designed operational water supply shall be 20 GPM @ 30 PSI at the water exit of the play feature.
 7. Color: To be selected by Owner.
 8. Finish: This feature shall be coated with a UV stabilized, textured structural elastomeric polymer with a UV and chlorine resistant sealer coat.
 9. Communication with the SmartWorks Controller shall be via low voltage wiring and sleeved inside a 1/2" liquid-tight, non-corrosive conduit. Control wiring shall not be greater than 24v.
- F. DetonatorTM – as manufactured by Wizard Works or approved equal: Quantity = (2)
1. Manufacturer's ID No: DET-100
 2. Anchor Base: The anchor base shall have a bonding/grounding connection. It shall be supplied with 18/8 stainless steel 1/2" button head bolts and washers, and 1/2" threaded female sockets for anchoring into concrete or nyloc nuts for mounting to elevated decks. Washers shall be used as shims beneath base plate for leveling. Bonding/grounding shall be compliant with codes of the jurisdiction having authority.
 3. Stand Column: The above grade frame shall be constructed of 4" type 304 stainless steel pipe with 4" machined type 304 flanged base plates.
 4. Fasteners: All accessible fasteners shall be tamper-resistant 18/8 stainless steel.
 5. Interactive Water Effect: A patron depresses a "T" handle which triggers a remote device, typically a Depth Charge, causing a water spray effect.
 6. Hydraulic Requirements: None.
 7. Color: To be selected by Owner.
 8. Finish: This feature shall be coated with a UV stabilized, textured structural elastomeric polymer with a UV and chlorine resistant sealer coat.
 9. Communication with the SmartWorks Controller shall be via low voltage wiring and shall be protected inside liquid-tight, non-corrosive components which shall include a 1/2" connection. Control wiring shall not be greater than 24v.
- G. Depth ChargeTM – as manufactured by Wizard Works or approved equal: Quantity = (2)
1. Manufacturer's ID No: DC-100
 2. Embedment: The embedment shall be manufactured from ABS plastic and shall have a removable lid for maintenance and therefore does not require bonding. The

embedment does not require direct plumbing nor electrical connection but does require a 3/4" PEX or ABS plastic pipe for operation. See installation detail for proper procedure.

3. Fasteners: All accessible fasteners shall be tamper-resistant 18/8 stainless steel.
 4. Interactive Effect: As a remote device is activated by a patron, typically a Detonator, a solenoid valve is caused to open which releases a specific pressure and volume of compressed air which causes a spray effect to percolate up from beneath the water. The water effect shall be adjustable by the installer and permanently set to contain the water spray within the designated play area.
 5. Hydraulic Requirements: None.
 6. Pneumatic Requirements: 7 CFM @ 90 PSI.
 7. Color: NA
 8. Finish: NA
 9. No communication with the SmartWorks Controller is required.
- H. Deck Bubbler™ – as manufactured by Wizard Works or approved equal: Quantity = (1)
1. Manufacturer's ID No: DB-100
 2. Anchoring and Plumbing: The anchor base shall have a bonding/grounding connection and 3/4" FPT inlet. It shall be supplied with 18/8 stainless steel 1/4" button head bolts, washers, and 1/4" nyloc nuts for mounting. Bonding/grounding shall be compliant with codes of the jurisdiction having authority.
 3. Assembly: The assembly shall consist of a plurality of thick circular plates with a hole drilled through the center of each plate and shall be manufactured from type 304 stainless steel material. The plates shall be designed to anchor to an elevated deck and plumbed from beneath the deck.
 4. Fasteners: All accessible fasteners shall be tamper-resistant 18/8 stainless steel.
 5. Interactive Water Effect: Patrons activate a remote device, typically an Activation Station or similar, causing water to flow to the plurality of nozzles which is designed to cause the exiting water to rise upward in fluttering streams which eventually reach zero velocity and turn over and fall back down to the deck. The water effect shall be adjustable by the installer and permanently set to contain the water spray within the designated play area.
 6. Hydraulic Requirements: The designed operational water supply shall be 40 GPM @ 30 PSI at the water exit of the play feature.
 7. Color: silver.
 8. Finish: unfinished.

9. Communication with the SmartWorks Controller shall be via low voltage wiring and shall be protected inside liquid-tight, non-corrosive components which shall include a 1/2" connection. Control wiring shall not be greater than 24v.
- I. Down JetsTM – as manufactured by Wizard Works or approved equal: Quantity = (1)
1. Manufacturer's ID No: DJ-100
 2. Anchoring and Plumbing: Anchor of the base shall be supplied with 18/8 stainless steel 1/2" button head bolts and washers, and 1/2" threaded female sockets for anchoring into concrete or nyloc nuts for mounting to elevated decks. Washers shall be used as shims beneath base plate for leveling. The play feature shall have a bonding/grounding connection and 1" FPT inlet connection. Bonding/grounding shall be compliant with codes of the jurisdiction having authority.
 3. Stand Column: The above grade frame shall be constructed of 8" type 304 stainless steel pipe with 8" machined type 304 flanged base plates.
 4. Fasteners: All accessible fasteners shall be tamper-resistant 18/8 stainless steel.
 5. Interactive Water Effect: Water is expelled out of a plurality of downward vertical nozzles that are affixed inside of a horizontal pipe which is suspended above the heads of patrons, causing the water to flow downward in thick but harmless streams. The water effect shall be adjustable by the installer and permanently set to contain the water spray within the designated play area.
 6. Hydraulic Requirements: The designed operational water supply shall be 40 GPM @ 30 PSI at the water exit of the play feature.
 7. Color: To be selected by Owner.
 8. Finish: This feature shall be coated with a UV stabilized, textured structural elastomeric polymer with a UV and chlorine resistant sealer coat.
 9. Communication with the SmartWorks Controller shall be via low voltage wiring and shall be protected inside liquid-tight, non-corrosive components which shall include a 1/2" connection. Control wiring shall not be greater than 24v.
- J. Arch JetsTM – as manufactured by Wizard Works or approved equal: Quantity = (1)
1. Manufacturer's ID No: AJ-100
 2. Anchoring and Plumbing: Anchor of the base shall be supplied with 18/8 stainless steel 1/2" button head bolts and washers, and 1/2" threaded female sockets for anchoring into concrete or nyloc nuts for mounting to elevated decks. Washers shall be used as shims beneath base plate for leveling. The play feature shall have a bonding/grounding connection and 1" FPT inlet connection. Bonding/grounding shall be compliant with codes of the jurisdiction having authority.
 3. Stand Column: The above grade frame shall be constructed of 8" type 304 stainless steel pipe with 8" machined type 304 flanged base plates.

4. Fasteners: All accessible fasteners shall be tamper-resistant 18/8 stainless steel.
 5. Interactive Water Effect: Water is expelled out of a plurality of angular nozzles that are affixed inside of a horizontal pipe which is suspended above the heads of patrons, causing the water to flow angularly upward and outward, then turn over and fall downward in thick but harmless streams. The water effect shall be adjustable by the installer and permanently set to contain the water spray within the designated play area.
 6. Hydraulic Requirements: The designed operational water supply shall be 40 GPM @ 30 PSI at the water exit of the play feature.
 7. Color: To be selected by Owner.
 8. Finish: This feature shall be coated with a UV stabilized, textured structural elastomeric polymer with a UV and chlorine resistant sealer coat.
 9. Communication with the SmartWorks Controller shall be via low voltage wiring and shall be protected inside liquid-tight, non-corrosive components which shall include a 1/2" connection. Control wiring shall not be greater than 24v.
- K. Activation StationTM – as manufactured by Wizard Works or approved equal: Quantity = (1)
1. Manufacturer's ID No: AS-100
 2. Anchor Base: The anchor base shall have a bonding/grounding connection. It shall be supplied with 18/8 stainless steel 1/2" button head bolts and washers, and 1/2" threaded female sockets for anchoring into concrete or nyloc nuts for mounting to elevated decks. Washers shall be used as shims beneath base plate for leveling. Bonding/grounding shall be compliant with codes of the jurisdiction having authority.
 3. Stand Column: The above grade frame shall be constructed of 6" type 304 stainless steel pipe with 6" machined type 304 flanged base plates.
 4. Fasteners: All accessible fasteners shall be tamper-resistant 18/8 stainless steel.
 5. Interactive Water Effect: As the device is activated by a patron it triggers a remote device causing a water effect.
 6. Hydraulic Requirements: None.
 7. Color: To be selected by Owner.
 8. Finish: This feature shall be coated with a UV stabilized, textured structural elastomeric polymer with a UV and chlorine resistant sealer coat.
 9. Communication with the SmartWorks Controller shall be via low voltage wiring and shall be protected inside liquid-tight, non-corrosive components which shall include a 1/2" connection. Control wiring shall not be greater than 24v.

- L. Mile High Geyser™ – as manufactured by Wizard Works or approved equal: Quantity = (1)
1. Manufacturer's ID No: MHG-100
 2. Anchoring and Plumbing: The anchor base shall have a bonding/grounding connection, a 3/4" FPT compressed air inlet and a 1" FTP water inlet. It shall be supplied with 18/8 stainless steel 1/2" button head bolts and washers, and 1/2" threaded female sockets for anchoring into concrete. Washers shall be used as shims beneath base plate for leveling. Bonding/grounding shall be compliant with codes of the jurisdiction having authority.
 3. Base and Assembly Design: The entire body, frame and pump assembly shall be constructed of type 304 welded stainless steel components. The play feature shall incorporate a sturdy pump assembly to be manipulated by two or more patrons and shall be balanced for optimal safety and performance.
 4. Fasteners: All accessible fasteners shall be tamper-resistant 18/8 stainless steel.
 5. Interactive Water Effect: Two or more patrons place their hands onto opposing handles of the same pump assembly which are positioned for comfort and safety and allow the patrons to rock up and down in synchronization. As they pump the teeter-totter handle, the design provides feedback to the participants to notify them that they are pressurizing the feature which encourages them to continue. After enough pumps are induced, the precise mixture of water and compressed air is forced through a carefully designed internal chamber system, then up through a vertical 2" barrel and propelled at high velocity into the sky. The water exits as a tall column at first then expands as it travels higher into the air until eventually breaking down into smaller particles as it gracefully returns back to the ground in a drenching shower. The device is engineered to meet rigorous safety standards, ensuring the protection of both patrons and maintenance personnel. The water effect shall be adjustable by the installer and permanently set to contain the water spray within the designated play area.
 6. Hydraulic and Pneumatic Requirements: The designed operational water supply shall be 50 GPM @ 30 PSI at the water entry to the play feature and 10 CFM @ 90 PSI compressed air.
 7. Color: To be selected by Owner.
 8. Finish: This feature shall be coated with a UV stabilized, textured structural elastomeric polymer with a UV and chlorine resistant sealer coat.
 9. Communication with the SmartWorks Controller shall be via low voltage wiring and shall be protected inside liquid-tight, non-corrosive components which shall include a 1/2" connection. Control wiring shall not be greater than 24v.
- M. 500-Gallon Hydro Storm™ – as manufactured by Wizard Works or approved equal: Quantity = (1)
1. Manufacturer's ID No: HS-500

2. Anchoring and Plumbing: The anchor bases shall consist of four legs and have a bonding/grounding connection and 3" FPT inlet. It shall be supplied with 18/8 stainless steel 5/8" button head bolts and washers, and 5/8" threaded female sockets for anchoring into concrete. Washers shall be used as shims beneath base plate for leveling. Bonding/grounding shall be compliant with codes of the jurisdiction having authority.
 3. Stand Columns: The four stand columns shall be constructed of 6" type 304 stainless steel pipe with 6" machined type 304 flanged base plate.
 4. Fasteners: All accessible fasteners shall be tamper-resistant 18/8 stainless steel.
 5. Interactive Water Effect: Continuous water flows up the 3" feed pipe and empties into the suspended tank. As the water continues to rise at a rate that is adjustable by the owner by dialing a ball valve placed in a discrete location, the water level eventually triggers a sensor inside the tank which initiates a certain sequence which begins by triggering an audible alert to the patrons below followed by movement of the tank to allow the water to be quickly unleashed then raining down onto the patrons below in an umbrella-shaped plume. When all the water is expelled, the sequence resets allowing the event to start over.
 6. Hydraulic Requirements: The designed operational water supply shall be 300 GPM @ 30 PSI at the water exit of the play feature.
 7. Color: To be selected by Owner.
 8. Finish: This feature shall be coated with a UV stabilized, textured structural elastomeric polymer with a UV and chlorine resistant sealer coat.
 9. Communication with the SmartWorks Controller shall be via low voltage wiring and shall be protected inside liquid-tight, non-corrosive components which shall include a 1" connection. Control wiring shall not be greater than 24v.
- N. Kiddie Racer Slide™ – as manufactured by Wizard Works or approved equal: Quantity = (1)
1. Manufacturer's ID No: KRS-100
 2. Design and Anchoring: The play feature shall be manufactured from fiberglass which is sprayed into a series of mold patterns that form a smooth sliding channel that is tilted on a slight incline and employs shallow side walls which contain patrons within the trough as gravity and water carry them from top to bottom. The feature does not turn left or right but only straight ahead, which allows the ability to tilt the slide at a greater angle to cause patrons to travel slightly faster than curved slides. The slides do not get mounted on tall platforms and therefore will not allow patrons to accelerate to excessive speeds, but rather a short, quick burst. The water flow shall be adjustable by the installer and permanently set for optimal rider safety and play experience. Since the play feature does not involve steel, no bonding is required.

3. Fastening and connections: The slide shall have two 1-1/2" FPT inlets which should be teed beneath the slide. It shall be supplied with 18/8 stainless steel 3/8" button head bolts and washers and nyloc nuts. Bonding/grounding unnecessary as it is manufactured from fiberglass.
 4. Hydraulic and Pneumatic Requirements: The designed operational water supply shall be 40 GPM @ 30 PSI at the water entry to the play feature.
 5. Color: To be selected by Owner.
 6. No communication with the SmartWorks Controller is required.
- O. Body Slide™ – as manufactured by Wizard Works or approved equal: Quantity = (2)
1. Manufacturer's ID No: BS-100
 2. Design and Anchoring: The play feature shall be manufactured from fiberglass which is sprayed into a variety of mold patterns that form a U-shaped trough sliding channel containing the patrons. It is tilted on a slight incline to cause gravity and water to carry them from top to bottom. The slope of this type of body slide is gentler than racer slides and enclosed kiddie tubes thereby controlling the speed and acceleration. The thrill of the body slide is the switchbacks, which change in direction from left to right and vice versa encouraging the rider to adjust their body to enhance the banking of the turns. These body slides can be very tall, which can enhance the ride experience. The water flow shall be adjustable by the installer and permanently set for optimal rider safety and play experience. Since the play feature does not involve steel, no bonding is required.
 3. Fastening and connections: The slide shall have two 1-1/2" FPT inlets which should be teed beneath the slide. It shall be supplied with 18/8 stainless steel 3/8" button head bolts and washers and nyloc nuts. Bonding/grounding unnecessary as it is manufactured from fiberglass.
 4. Hydraulic and Pneumatic Requirements: The designed operational water supply shall be 60 GPM @ 30 PSI at the water entry to the play feature.
 5. Color: To be selected by Owner.
 6. No communication with the SmartWorks Controller is required.

2.3 ADDITIONAL EQUIPMENT & CONTROLS

- A. MLP Structure as manufactured by Wizard Works or approved equal: Quantity = (1) set
1. See Appendix 'A' at the end of the Project Manual for reference.
 2. The entire structure including the columns (I-beams), deck structure (C-Channel and Angle), Handrails (Box tube and round tube), Structural Stairs (C-channel and Angle), Base Plates (1/2" Flat Plate), shall be manufactured from FRP (Fiberglass Reinforced Pultrusion). The deck panels shall be 4' x 8' x 1-1/2" thick Pro-Grate (FRP), with 1/8" FRP flat sheet glued on top.

3. Materials shall be as manufactured by Bedford Reinforced Pultrusions or approved equal.
 4. Dimensions, fire retardant rating, chemical resistance and performance data shall be provided from manufacturer in submittal format.
- B. Spray Feature Distribution Manifold™— as manufactured by Wizard Works or approved equal: Quantity = (1)
1. Custom Floor Mount Distribution Manifold with Stainless Steel Headers.
 2. Headers sizing shall be designed to handle the volume of water necessary to deliver a safe spray effect at the outlet of each spray feature at the play site.
 3. Drain Valve: The distribution manifold header shall have a ¾” drain fixture for winterizing.
 4. Pressure Balancing Design: The distribution manifold header shall be designed in a manner such that it is self-balancing as the associated interactive solenoid valves open and close variably, or in the event main power should be disconnected and fail-closing of the interactive valves should follow. The self-balancing design may or may not include auto balancing valves. Brass ball valves for balancing and throttling the discharges of the play features shall be included.
 5. Mounting Brackets: Shall be supplied with (3) type 304 stainless steel with (6) 3/8” stainless steel anchors.
- C. PLC-Based Computer Controller™— as manufactured by Wizard Works or approved equal: Quantity = (1)
1. The system shall utilize a central processing unit (CPU) called the SmartWorks Controller™ to interpret sensor-detected patron inputs and responsive solenoid valves actuation. This programmable architecture allows for regulated water distribution, demand-based conservation, and orchestration of complex effects, including air-water sequences—not achievable with traditional mechanical systems. The system shall be designed to utilize voltages in the patron play area not exceeding 24 volts. To maximize efficiency, the CPU features an automated 'sleep' mode during periods of inactivity, resuming programmed operation immediately upon patron engagement. For safety and performance integrity, system programming is accessible exclusively to the manufacturer or certified personnel.

2.4 ADDITIONAL APPROVAL

- A. Contractor shall provide shop drawings for all spray equipment system components that depict basic sizing, connections and material selections for review and approval prior to purchase and installation. The manufacturer may avoid disclosing any information that it deems proprietary in nature. It is important to note that the new spray features should be purchased from a single source (manufacturer) to avoid unlike features.

- B. Colors for the spray equipment system features shall be as specified. Colors will be submitted by the vendor for Owner selection.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to Work of this Section, carefully inspect the installed Work of other trades and verify that all such Work is complete to the point where this installation can properly commence.
2. Examine the anchoring, subgrade, finish surfaces and installation conditions. Do not commence work until all unsatisfactory conditions are corrected.

B. Discrepancies:

1. In the event of discrepancies, immediately notify Director's Representative.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
3. Failure to notify the Director's Representative and give written notice of discrepancies shall constitute acceptance by the Contractor of existing conditions as fit and proper to receive the Work.

3.2 LAYING OUT THE WORK

A. Completion of Other Work:

1. Do not commence installation of new spray features until all other work is completed and all construction equipment used for those portions of the work has been moved from the immediate area.
2. The Contractor performing the work of this section assumes full and sole responsibility for the accuracy and correctness of all layouts, lines, levels, grades and other aspects of the work under this Section. Lay out all work in accordance with the requirements, therefore, as indicated in the drawings.

3.3 INSTALLATION

- A. The Spray Feature Equipment Components shall be installed in accordance with the manufacturer's specifications, plans and installation instructions, as directed by the Director's Representative. All construction shall be in accordance with standard industry practices, using new materials to produce a quality-finished product.
- B. The Adventure Series Multi-Level Play Structure has been manufactured by Wizard Works Design Group, LLC out of New York. The Contractor will be hired directly by the NOVA, and they will be responsible for anything not specifically listed in this section. Any questions about Wizard Works' scope of supply can be directed toward Wizard Works at the letterhead

contact information. Wizard Works will provide specific materials and equipment as described below:

1. Contractor's Responsibilities: In preparation for the Multi-Level Play Structure (MLPS), the Installation/Site Contractor shall furnish all labor, materials, and workmanship as specified in the construction documents. That contractor's scope includes, but is not limited to:
 - a. Structural: All concrete, reinforcement steel (rebar), and sub-base materials.
 - b. Mechanical/Plumbing: Provision and installation of all plumbing stub-ups as indicated in the construction plans.
 - c. Electrical: Bonding and Grounding wire and connections material and workmanship.
2. Quality Control & Protection: To ensure the integrity of the aquatic systems, the Contractor must adhere to the following standards prior to the concrete pour:
 - a. System Integrity: All stub-ups must be pressure tested to verify leak-free performance.
 - b. Debris Prevention: All piping must be securely capped to prevent the ingress of construction debris.
 - c. Interface Alignment: All stub-ups must be precisely positioned to allow for seamless final connection to the Wizard Works play equipment.
3. Connections to The Manifold (which is located beneath the MLPS): All PVC plumbing materials, glue, primer, supports and workmanship to connect from the primary water stub up to the manifold inlet flange shall be the responsibility of the contractor. All PVC conduit materials, glue, primer and supports from the primary electrical stub up into the Manifold Junction Box to make a completely watertight connection shall be the responsibility of the Contractor.
4. Connections to The Hydro Storm: All PVC plumbing materials, glue, primer, supports and workmanship to connect from the primary water stub up to the Hydro Storm leg and from the leg to the tank shall be the responsibility of the Contractor.
5. Connections to The Water Slides: All PVC plumbing materials, glue, primer, supports and workmanship to connect from the primary water stub up to the water slides shall be the responsibility of the Contractor.
6. Electrical Hookups: All electrical materials and workmanship to connect from the panel box to the SmartWorks Control Cabinet with a single dedicated 120v AC, 20 amp, GFI protected circuit shall be the responsibility of the Contractor. Contractor shall also be responsible for equipotential bonding of all metal components within the pool. Each of the Wizard Works play features will come equipped with a ¼" bonding lug for such connection to the rebar grid.
7. Equipment Furnished by Wizard Works prior to pouring concrete: The following components are the only Wizard Works-provided materials required to be embedded within or installed prior to the completion of the concrete pool shell:
 - a. Two (2) Depth Charge Basins
 - b. Eight (8) Brass Fountain Jet Fixtures

8. Equipment Furnished by Wizard Works inside the pool area for erection after the pool concrete is cured. The following components are the Wizard Works-provided materials pursuant to the proper erection of the MLPS within the pool:
 - a. All anchors and epoxy (all anchors are drilled and epoxied after concrete is cured).
 - b. All base plates.
 - c. All materials for installation and assembly of the Multi-Level Play Structure above the finished concrete.
 - 1) All FRP structural members
 - 2) All stainless steel fasteners
 - 3) All handrails
 - 4) All steps & stairs
 - 5) All enclosure panels
 - 6) All interactive play features
 - 7) All water slides and steel support elements
 - 8) All theming elements in Wizard Works scope
 - d. Custom Stainless Steel interactives manifold, including solenoid valves and junction box.
 - e. All low voltage wire materials and flexible conduit for communication with the interactive play features and manifold and SmartWorks Controller.
 - f. All hose, hose fittings and clamps to connect all interactive play features to manifold.
 - g. Touch up paint.
9. Equipment Furnished by Wizard Works outside the pool: The only other equipment provided by Wizard Works outside of the pool area is the SmartWorks Computer Controller which is to be installed inside the mechanical room.
10. Other notes and responsibilities:
 - a. All tools and equipment necessary for the proper installation of the MLPS shall be "By Others".
 - b. All other materials or workmanship that is not specifically listed above in Wizard Works scope of supply shall be "By Others".
 - c. Barrier netting to prevent patrons from accessing any areas deemed inaccessible shall be "By Others".
 - d. Any materials, product, equipment or goods outside of the pool area and/or inside the Mechanical Room other than the SmartWorks Computer Controller, shall not be the responsibility of Wizard Works.

3.4 CLEAN-UP

- A. Perform cleaning during installation of the work and upon completion of the work. Remove all excess materials, equipment and debris occasioned by this Work and leave the job site in a clean and presentable condition. Perform all such clean-up to the approval of NOVA.
- B. Repair any damage resulting from spray equipment work.

3.5 WATER FEATURE STARTUP

- A. Verify that all spray features are functioning. Calibrate all necessary controls (manual butterfly valves and feature pump / VFD as required).

- B. Adjust spray to the liking of the Director's Representative.
- C. Commissioning:
 - 1. Once the construction of the Spray Equipment System is complete and operable, the Contractor shall be responsible to coordinate the following with the manufacturer of the spray equipment system:
 - a. Schedule a meeting to perform a test of all operating systems to ensure that spray equipment features, valves, and all water pressure is regulated and functions in accordance with the manufacturer's specifications.
 - b. Schedule a separate meeting with NOVA to instruct NOVA staff on how to operate and maintain the system and all its components.
 - 2. Contractor shall provide the necessary training to NOVA for all water feature equipment specified. Contractor should also provide a detailed operation and maintenance manual prior to commissioning.

END OF SECTION

SECTION 133800- MLPS POOL START-UP & OPERATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Section includes general administrative and procedural requirements for all work. The administrative and procedural requirements included in this Section are to expand the requirements specified in Division 01.

1.2 SUMMARY

- A. Work Included:
 - 1. Provide all start-up, operation and maintenance / winterization instructions for the MLPS Pool and all its equipment and controls to NOVA's personnel.
 - 2. Provide all training for NOVA's personnel as noted.

1.3 RELATED SECTIONS

- A. Division 13: Special Construction

1.4 REFERENCES

- A. Virginia Swimming Pool & Spa Code

1.5 QUALITY ASSURANCE

- A. Demonstrate to NOVA and appropriate officials that all systems are fully operational, and that calcium hardness, chlorine residual, and pH levels are within specified limits.
- B. Standards: General Contractor shall furnish labor and chemicals as required to condition the water properly to the following specifications:
 - 1. Calcium Hardness: 250 to 400 ppm
 - 2. Total Alkalinity: 100 ppm
 - 3. Chlorine Residual: 1.00 – 3.00 ppm
 - 4. pH Factor: 7.2 – 7.6
 - 5. Langelier Saturation Index: -0.3 - +0.3
- C. All work in this section shall be performed by the Prime Contractor or a qualified Sub-Contractor.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 POOL EQUIPMENT ACTIVATION

- A. All recirculation, water chemistry and filtration equipment shall be fully operational upon filling of pool. Chemicals and other related support items as supplied by NOVA shall be in ample supply at start-up. Coordinate as necessary.
- B. Complete all pool systems checks to ensure proper operation. This shall include but is not limited to main drains, skimmers, floor returns, pipe vault valves and water features.
- C. Verify all electrical systems / connections to ensure proper working order.

3.2 DOCUMENTATION

- A. Prove all equipment Operation and Maintenance manuals as per Division 1.

3.3 SYSTEM TRAINING

- A. A qualified representative of the Contractor performing work under this Section shall put the equipment into operation and provide detailed instruction to the NOVA Department in the operation of this equipment to their satisfaction immediately after project substantial completion.
- B. Training periods shall be coordinated with the Director's Representative to provide the necessary system training to NOVA personnel. A mutually agreed upon time and date shall be established at construction substantial completion. A total of 16 hours of on-site training shall be provided by the Contractor which shall be scheduled as follows:
 - 1. 8 hours initial training at completion of project's construction.
 - 2. 8 hours after NOVA staff has experience with operating the systems. This time may be requested any time after the pool has been placed in operation within a period of one (1) year from the time the pool was accepted by NOVA (performed in one trip).
 - 3. Prior to leaving the job, the Contractor shall obtain written certification from the Director's Representative acknowledging that the instruction period has been completed and all necessary operating information has been provided.

3.4 POOL WINTERIZATION

- A. The Contractor or a qualified Sub-Contractor shall properly train NOVA Personnel in the winterization procedures for the newly installed swimming pools and pool equipment. This shall be provided and included within the system training mentioned above at the end of the project.
- B. The Contractor or qualified Sub-Contractor shall provide a written winterization procedure to be posted inside the Equipment Room, as well as be included in the O&M documents.

END OF SECTION

SECTION 260001 – ELECTRICAL

PART 1 - GENERAL

1.1 SUMMARY

- A. All electrical related work necessary to complete the project outlined in the bid documents. This shall include but is not necessarily limited to:
 1. Power requirements
 2. Grounding and equipotential bonding.
 3. Conduits and control wiring.
 4. Feature manifold electrical and control panel(s).
 5. Electrical connections to any existing equipment to remain.

1.2 SCOPE OF WORK

- A. Provide all labor, material, tools, equipment, transportation, and services necessary for and incidental to completion of all electrical work as indicated on the Drawings and/or as specified herein.

1.3 DRAWING USE AND INTERPRETATION

- A. The Drawings are diagrammatic and indicate the general arrangement of systems and equipment unless indicated otherwise by dimensions or details. Exact equipment locations and raceway routing, etc. shall be governed by actual field conditions and/or instructions of the Engineer and/or Owner's Representative.

1.4 COMPLETE SYSTEMS

- A. General: Furnish and install all materials as required for complete systems, including all parts obviously or reasonably incidental to a complete installation, whether specifically indicated or not. All systems shall be completely assembled, tested, adjusted and demonstrated to be ready for operation prior to Owner's acceptance.
- B. Wiring: The wiring specified and/or shown on the Drawings is for complete and workable systems. Any deviations from the wiring shown due to a manufacturers or subcontractor's requirements shall be made at no cost to either the Contract or the Owner.

1.5 CODES AND REGULATIONS

- A. General: Comply with the latest recognized edition of the National Electrical Code (NEC) and all governing federal, state, and local laws, ordinances, codes, rules, and regulations. Where the Contract Documents exceed these requirements, the Contract Documents shall govern. In no case shall work be installed contrary to or below minimum legal standards.
- B. Utilities: Comply with all applicable rules, restrictions, and requirements of the utility companies serving the project site/facilities.

- C. Non-Compliance: Should any work be performed which is found not to comply with any of the above codes and regulations, provide all work and pay all the necessary costs to correct the deficiencies.

1.6 REFERENCE STANDARDS

- A. All latest published standards of the following associations/organizations shall be followed and applied where applicable as minimum requirements:
 1. (ADA), Americans with Disabilities Act.
 2. (ANSI), American National Standards Institute.
 3. (ASTM), American Society for Testing and Materials.
 4. (BCNYS), Building Code of Virginia.
 5. (CBM), Certified Ballast Manufacturer.
 6. (EPACT), National Energy Policy Act.
 7. (ETL), Electrical Testing Laboratory.
 8. (ICEA), Insulated Cable Engineers Association.
 9. (IEEE), Institute of Electrical and Electronic Engineers.
 10. (IESNA), Illuminating Engineering Society of North America.
 11. (NBFU), National Board of Fire Underwriters.
 12. (NEMA), National Electrical Manufacturers Association.
 13. (NESC), National Electrical Safety Code.
 14. (NFPA), National Fire Protection Association.
 15. (UL), Underwriter's Laboratories.

1.7 PERMITS

- A. General: Obtain and pay for any and all permits required by all applicable agencies, prior to commencing work.

1.8 SUBMITTALS

- A. General: Prepare and submit for approval, per the procedures set forth in Division 1, all submittals required by Division 1, this section, and by all other Contract Documents.
- B. Types: Required submittals may include: Schedule of Values; List of Subcontractors; Product Data; Shop Drawings; Samples; Test Reports; Certifications; Warranties; Maintenance Manuals; Record Drawings; and various administrative submittals.
- C. Number of Copies: As indicated in Division 1, Division 26, or elsewhere in the Contract Documents. For quantities indicated in the Contract Documents or specification sections other than Division 26 sections, increase number of copies by one to allow for the Engineer's record copy. Minimum number of copies per submittal: three.
- D. Product Data: Submit for all basic electrical equipment, devices, and materials to be used on the project. Product data to consist of manufacturer's standard catalog cuts, descriptive literature and/or diagrams, in 8-1/2-inch-by-11-inch format, and in enough detail to clearly indicate compliance with all specified requirements and standards. Mark each copy to clearly indicate proposed product, options, finishes, etc.
- E. Shop Drawings: Submit for all custom equipment and systems (e.g., panelboards) to be used on the project. Shop Drawings to be newly prepared, specifically for this project, and shall

include all information listed in the Shop Drawings submittal requirements in the respective specification section. Include all pertinent information such as equipment/system identification, manufacturer, dimensions, nameplate data, sizes, capacities, types, materials, performance data, features, accessories, wiring diagrams, etc., in enough detail to clearly indicate compliance with all specified requirements and standards. For control systems, provide computer generated control ladder diagrams specifically developed for this project (standard diagrams not acceptable).

- F. Shop Drawings: Signed and sealed by a Commonwealth of Virginia licensed professional engineer. Show fabrication and installation details and include calculations for the following:
 - 1. Steel slotted channel systems. Include Product Data for components.
 - 2. Nonmetallic slotted channel systems. Include Product Data for components.
 - 3. Equipment supports.
- G. Maintenance Manuals: Include operating and maintenance data in accordance with Division 1. Include all Product Data/Shop Drawing submittals as well as descriptions of function, normal operating characteristics and limitations, and manufacturer's printed operating maintenance, trouble shooting, repair, adjustment, and emergency instructions, and complete replacement parts listing.
- H. Record Documents: Prepare and submit in accordance with Division 1. In addition to Division 1 requirements, indicate actual installed locations for all equipment and devices, routing of major interior raceways, locations of all concealed and underground equipment and raceways, and all approved modifications to the Contract Documents, and deviations necessitated by field conditions and change orders.

1.9 QUALITY ASSURANCE

- A. Manufacturers' Qualifications: Not less than three years' experience in the actual production of the specified products.
- B. Installers' Qualifications: Firm with not less than five years' experience in the installation of electrical systems and equipment similar in scope and complexity to those required for this Project and having successfully completed at least ten comparable scale projects.
- C. Incidental Work: Excavation, backfill, painting, patching, welding, carpentry, mechanical work, concrete pads and the like related to or required for Division 26 work shall be performed by craftsman skilled in the appropriate trade, but shall be provided for under Division 26.

1.10 INSPECTIONS

- A. General: During and upon completion of the work, arrange and pay all associated costs for inspections of all electrical work installed under this contract, in accordance with the Conditions of the Contract.
- B. Inspections Required: As per the laws and regulations of the local and/or state agencies having jurisdiction at the project site.
- C. Inspection Agency: Approved by the local and/or state agencies having jurisdiction at the project site.

- D. Certificates: Submit all required inspection certificates.
- E. Coordination: Coordinate inspections with the local utility.

1.11 DELIVERY STORAGE AND HANDLING

- A. Comply with Division 01 requirements.
- B. Packing and Shipping: Deliver products in original, unopened packaging, properly identified with manufacturer's identification, and compliance labels.
- C. Storage and Protection: Comply with all manufacturer's written recommendations. Store all products in a manner, which shall protect them from damage, weather, and entry of debris.
- D. Damaged Products: Do not install damaged products. Arrange for prompt replacement.

1.12 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design supports for raceways, circuit components and concrete bases and foundations incidental supporting electrical equipment or as indicated on plans; including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated and as necessary.
- B. Design supports for multiple raceways and circuit components capable of supporting combined weight of supported systems and its contents.
- C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Where Specified: Materials and equipment shall be as specified herein and/or as indicated on the Drawings.
- B. General Requirements: All materials and equipment shall be in accordance with the Contract Documents, and to the extent possible, standard products of the various manufacturers, except where special construction or performance features are called for. All materials and equipment to be new, clean, undamaged, and free of defects and corrosion.
- C. Acceptable Products: The product of a specified or approved manufacturer will be acceptable only when that product complies with or is modified as necessary to comply with all requirements of the Contract Documents.
- D. Common Items: Where more than one of any specific items is required, all shall be of the same type and manufacturer.
- E. UL Listing: All electrical materials and equipment shall be Underwriters' Laboratories (UL) listed and labeled where UL standards and listings exist for such materials or equipment.

2.2 PRODUCT OPTIONS AND SUBSTITUTIONS

- A. Refer to the Conditions of the Contract and Division 1.

2.3 SOIL MATERIALS

- A. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, crushed slag, or natural or crushed sand.
- B. Drainage Fill: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, with 100 percent passing a 1-1/2-inch sieve and not more than 5 percent passing a No. 4 sieve.
- C. Backfill and Fill Materials: Materials complying with ASTM D2487 soil classification groups GW, GP, GM, SM, SW, and SP, free of clay, rock, or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetable, and other deleterious matter.

2.4 600 VOLT CLASS WIRE

- A. General: All wire and cable shall be constructed in accordance with all applicable ICEA, NEMA and IEEE published standards, and shall be UL-listed and labeled. Single-conductor, 98 percent conductivity, annealed, uncoated copper conductors with 600-volt rated type "THHN/THWN" insulation.
- B. Wire shall be annealed bare copper per ANSI/ASTM B3, UL 83, and Federal Specification JC-30A with 600-volt insulation, be stranded (except for #10 AWG and smaller may be solid) and be minimum size #12 AWG (except for control wiring and signal circuits).
- C. Insulation: Provide THHN/THWN insulation for all conductors except XHHW insulation may be used for conductors #4 and larger.
- D. Ampacity of conductors shall be rated for 75 °C regardless of temperature of conductor insulation when combining circuits in one conduit. De-rate conductors and increase size per NEC when installing multiple circuits in a raceway, utilizing 75 °C ampacity table.
- E. Connectors: Nylon shell insulated metallic screw-on connectors for #14-10 AWG and bolted pressure or compression type lugs and connectors with insulating covers for #8 AWG and larger.

2.5 EQUIPMENT CONNECTIONS

- A. Materials as specified in this section, and as required.

2.6 GROUNDING / BONDING

- A. General: Ground rods, conductors, clamps and connectors, etc., as required.
- B. Connectors - Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

- C. Bolted Connectors for Conductors and Pipes: Copper or copper alloy listed for the application
- D. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- E. Ground Rods: Minimum 5/8-inch diameter by 10-foot long copper clad steel.
- F. Welded Connectors: Exothermic process.

2.7 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Allied Tube & Conduit.
 - b. Cooper B-Line, Inc.; a division of Cooper Industries.
 - c. ERICO International Corporation.
 - d. GS Metals Corp.
 - e. Thomas & Betts Corporation.
 - f. Unistrut; Tyco International, Ltd.
 - g. Wesanco, Inc.
 - 2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 - 3. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 - 4. Channel Dimensions: Selected for applicable load criteria.
- B. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- C. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
 - 1. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel, for use in hardened Portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
 - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Cooper B-Line, Inc.; a division of Cooper Industries.
 - 2) Empire Tool and Manufacturing Co., Inc.
 - 3) Hilti Inc.
 - 4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - 5) MKT Fastening, LLC.
 - 2. Concrete Inserts: Steel or malleable-iron, slotted support system units like MSS Type 18; complying with MFMA-4 or MSS SP-58.
 - 3. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A325.
 - 4. Toggle Bolts: All-steel springhead type.

5. Hanger Rods: Threaded steel

D. Concrete bases and foundations designed to properly support all electrical components attached to them.

2.8 METAL CONDUITS, TUBING, AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AFC Cable Systems, Inc.
2. Allied Tube & Conduit.
3. Anamet Electrical, Inc.
4. Electri-Flex Company.
5. O-Z/Gedney.
6. Picoma Industries.
7. Republic Conduit.
8. Robroy Industries.
9. Southwire Company.
10. Thomas & Betts Corporation.
11. Western Tube and Conduit Corporation.
12. Wheatland Tube Company.

B. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. GRC: Comply with ANSI C80.1 and UL 6.

D. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.

E. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.

1. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions were installed, and including flexible external bonding jumper.
2. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.

F. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.9 BOXES, ENCLOSURES, AND CABINETS

A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Adalet.
2. Cooper Technologies Company; Cooper Crouse-Hinds.
3. EGS/Appleton Electric.
4. Erickson Electrical Equipment Company.
5. FSR Inc.

6. Hoffman.
 7. Hubbell Incorporated.
 8. Kraloy.
 9. Milbank Manufacturing Co.
 10. Mono-Systems, Inc.
 11. O-Z/Gedney.
 12. RACO; Hubbell.
 13. Robroy Industries.
 14. Spring City Electrical Manufacturing Company.
 15. Stahlin Non-Metallic Enclosures.
 16. Thomas & Betts Corporation.
 17. Wiremold / Legrand.
- B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- C. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
1. NEMA 1 for interior dry locations
 2. NEMA 4X for exterior and interior wet locations

2.10 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

- A. General Requirements for Handholes and Boxes:
1. Boxes and handholes for use in underground systems shall be designed and identified as defined in NFPA 70 for intended location and application.
 2. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70 by a qualified testing agency and marked for intended location and application.
- B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel, fiberglass, or a combination of the two.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Armorcast Products Company.
 - b. Carson Industries LLC.
 - c. NewBasis.
 - d. Oldcastle Precast, Inc.
 - e. Quazite: Hubbell Power System, Inc.
 - f. Synertech Moulded Products.
 2. Standard: Comply with SCTE 77.
 3. Configuration: Designed for flush burial with open bottom unless otherwise indicated.
 4. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.
 5. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
 6. Cover Legend: Molded lettering, "ELECTRIC."
 7. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
 8. Handholes 12 inches wide by 24 inches long and larger: Have inserts for cable racks and pulling-in irons installed before concrete is poured.

2.11 MOLDED CASE CIRCUIT BREAKERS

- A. Breakers to be added to Existing Panelboards or Equipment: Same manufacturer, type, and interrupting rating as for the existing breakers in same panelboard or equipment, unless indicated otherwise.

2.12 MAGNETIC MOTOR CONTROLLERS

- A. Manufacturers' subject to compliance with these specifications, provide products from the following manufacturers:
 - 1. General Electric.
 - 2. Allen Bradley.
 - 3. Siemens.
- B. General: Coordinate the features of each motor controller with the ratings and characteristics of the supply circuit, the motor, the required control sequence, the duty cycle of the motor, drive, and load, and the pilot device, and control circuit affecting controller functions. Provide controllers that are horsepower rated to suit the motor controlled.
- C. Size: NEMA rated based on horsepower or larger as indicated. IEC rated unacceptable.
- D. Contacts shall open each ungrounded connection to the motor.
- E. Overload Relays: Provide electronic overload devices.
- F. Enclosures: For individually mounted motor controllers and control devices, comply with NEMA Standard 250, "Enclosures for Electrical Equipment (1000 Volts Maximum)." Provide enclosures suitable for the environmental conditions at the controller location. Provide NEMA Type 1 enclosures for indoor and NEMA 4 for outdoor except as otherwise indicated.
- G. Description: Provide full-voltage, non-reversing, across-the-line, magnetic controller.
- H. Control Circuit:
 - 1. Control Power: Provide 120V control power transformer integral with controller where no separate 120V control power to controller is indicated. Provide control power transformer with adequate capacity to operate connected pilot, indicating and control devices plus 100 percent spare capacity. Transformer shall be connected to the load side of the motor's disconnect switch.
 - 2. Overcurrent Protection:
 - a. With Transformer: Provide fuses on both primary legs and one secondary leg. Sizes to be sized based on manufacturer's requirements. In no case may the fuse size exceed the maximum size allowed by the NEC.
 - b. Without Transformer: Provide fuses on each ungrounded leg sized based on manufacturer's requirements. In no case may the fuse size exceed the maximum size allowed by the NEC.
- I. Combination Controllers: Switch type, fused or non-fused as indicated; quick-make, quick-break switch, factory assembled with controller and arranged to disconnect it. Unit shall be designed for full voltage, across the line starting non-reversing; and lockable in the off

position. For faced switches, provide rejection-type fuse clips and fuses as indicated. Provide defeat able interlock for switch and controller door.

- J. Enhanced-Protection Overload Relay: Provide overload relays with NEMA Class 10 tripping characteristics where indicated. Select to protect motor against voltage unbalance and single phasing.

PART 3 - EXECUTION

3.1 GENERAL

- A. The installation of all electrical work shall be in accordance with the intent of the Contract Documents as determined by the Engineer.
- B. Installation Requirements: All materials and equipment shall be installed as recommended by the respective manufacturers, by mechanics experienced and skilled in their trade, in a neat and workmanlike manner, in accordance with the standards of the trade, and so as not to void any warranty or UL listing.
- C. Administration and Supervision: All electrical work shall be performed under the Contractor's direct supervision using enough and qualified personnel as necessary to complete the work in accordance with the progress schedule. The Contractor shall assign one or more competent supervisors who shall have authority to accept and execute orders and instructions, and who shall cooperate with the other Contractors and subcontractors, the Engineer, and Owner in all matters to resolve conflicts and avoid delays.

3.2 EXAMINATION

- A. Conditions Verification: Examine the areas and conditions under which the work is to be performed and identify any conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.

3.3 COORDINATION

- A. General: Sequence, coordinate and integrate the installation of all electrical materials and equipment for efficient flow of work, in conjunction with the other trades. Review to the Drawings for work of the other trades, and report and resolve any discovered discrepancies, prior to commencing work.
- B. Cooperation: Cooperate with the other Contractors and individual disciplines for placement, anchorage, and accomplishment of the work. Resolve interferences between work of other disciplines or Contractors, prior to commencing installation.
- C. Chases, Slots, and Openings: Arrange for chases, slots, and openings during the progress of construction as required to allow for installation of the electrical work.
- D. Supports and Sleeves: Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components as they are constructed.

- E. Obstacles and Interferences: When installing equipment and raceways, provide offsets, fittings, accessories, and changes in elevation or location as necessary to avoid obstacles and interferences, per actual field conditions.
- F. Space Requirements: Electrical equipment sizes indicated on the Drawings are generally based on specified manufacturer. Verify that the proposed equipment will fit in the space indicated on the drawings. Maintain clearances required by NEC.

3.4 DIMENSIONS

- A. Building Dimensions: For exact locations of building elements, refer to dimensioned drawings. However, field measurements take precedence over dimensioned drawings.
- B. Site Dimensions: Field measurements take precedence over scaled electrical site plans.
- C. Limiting Dimensions: Equipment outlines shown on detail drawings of 1/4" = 1'-0" scale or larger and dimensions indicated on the Drawings are limiting dimensions. Do not install equipment exceeding dimensions indicated by outlines on Drawings or equipment or arrangements that reduce indicated clearances.
- D. Establish the exact location of electrical equipment based on the actual field verified dimensions of equipment furnished.

3.5 EQUIPMENT PROTECTION

- A. Protect all electrical equipment, and materials and work from the weather elements, paint, mortar, construction debris and damage until project is substantially complete. Repair, replace, and clean all electrical work so affected.

3.6 ELECTRICAL INSTALLATION - GENERAL

- A. Unfinished and Finished Areas: For the purposes of these electrical specifications, "unfinished" areas shall include mechanical, electrical and telephone equipment rooms. All other areas shall be considered "finished" spaces unless indicated or approved otherwise.
- B. In Unfinished Areas: Raceways, equipment, and devices may be installed concealed or exposed unless indicated otherwise.
- C. In Finished Areas: Conceal all raceway and flush mount all electrical boxes, equipment, and devices unless indicated or approved otherwise. The space above suspended ceilings or behind furred spaces is considered outside finished areas and electrical materials installed within these areas are considered concealed.
- D. Dimensions and Clearances: Field measure all dimensions and clearances affecting the installation of electrical work in relation to established datum, building openings and clearances, and work of other trades as construction progresses.
- E. Rough-In Locations: Verify final locations for rough-ins with field measurements and requirements of actual equipment being installed.
- F. Install equipment according to manufacturer's written instructions.

- G. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- H. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- I. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Wood: Fasten with lag screws or through bolts.
 - 2. To New Concrete: Bolt to concrete inserts.
 - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 4. To Existing Concrete: Expansion anchor fasteners.
- J. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- K. Concrete bases and foundations solely used to support electrical equipment shall be provided.

3.7 LAYOUT

- A. General: Install electrical systems, materials and equipment level and plumb, and parallel and perpendicular to other building systems and components, where installed exposed.
- B. Serviceability: Install electrical equipment and raceways, etc., to readily facilitate servicing, maintenance, and repair or replacement of components and to minimize interference with other equipment and installations.
- C. Clearances: Prior to commencing work, verify that all electrical equipment will adequately fit and conform to the indicated and code required clearances in the spaces indicated on the Drawings. If rearrangement is required, submit plan and elevation drawings or sketches indicating proposed rearrangement for the Engineer's approval. Do not rearrange without express written permission of the Engineer.
- D. Right-Of-Way: When laying out electrical work, give priority in available space to steam and condensate lines, sanitary lines, drain lines, fire protection piping, and sheet metal duct work. Provide offsets as required to avoid conflicts. Resolve all conflicts before commencing installation.

3.8 HOLES, SLEEVES, AND OPENINGS

- A. General: Provide all holes, sleeves, and openings required for the completion of Division 26 work and restore all surfaces damaged to match surrounding surfaces. Maintain integrity of all fire and smoke rated barriers using approved firestopping systems. When cutting holes or openings, or installing sleeves, do not cut, damage, or disturb structural elements or reinforcing steel unless approved in writing by the Project Structural Engineer.
- B. Conduit Penetrations: Size core drilled holes so that an annular space of not less than 1/4 inch and not more than 1 inch is left around the conduit. When openings are cut in lieu of

core drilled, provide sleeve in rough opening. Size sleeves to provide an annular space of not less than 1/4 inch and not more than 1 inch around the conduit. Patch around sleeve to match surrounding surfaces.

3.9 CUTTING AND PATCHING

- A. General: Provide all cutting, drilling, chasing, fitting, and patching necessary for accomplishing the work of Division 26, which includes any and all work necessary to: uncover work to provide for the installation of ill-timed work; remove and replace defective work and work not conforming to the requirements of the Contract Documents; and install equipment and materials in existing structures, in addition to that required during the normal course of construction.
- B. Comply with the cutting and patching requirements of Division 1.
- C. Building Structure: Do not endanger the integrity of the building structure by cutting, drilling, or otherwise modifying any structural member without specific approval. Do not proceed with any structural modifications without written permission of the Project Structural Engineer.
- D. Repairs: Repair any and all damage to work of other trades caused by cutting and patching operations using skilled mechanics of the trades involved.

3.10 CONDUCTORS - 600 VOLT AND BELOW

- A. Minimum Conductor Size: All branch circuit wiring shall be minimum #12 AWG. All control circuit wiring shall be minimum #14 AWG unless indicated otherwise. Provide larger sizes as indicated or required.
- B. Branch Circuit Conductor Sizes: Provide branch circuit conductor sizes as indicated on the panelboard schedules, plans, or elsewhere. Neutral conductor size to match phase conductors unless indicated otherwise. Provide branch circuit switch legs and travelers as required for the switching indicated.
- C. Equipment Grounding Conductor Required: For each branch circuit and feeder run, provide an equipment grounding conductor for continuous length of run, sized per NEC 250-122 (minimum), larger if so indicated.
- D. Terminations: Furnish and install terminations including lugs (if necessary) to make all electrical connections indicated or required. Make connections and terminations for all stranded AWG conductors using crimp, clamp, or box-type connectors and terminators. Enclose all strands of stranded conductors in connectors, and lugs.
- E. Color: Conductors #10 and smaller shall be factory color-coded by integral pigmentation with a separate color for each phase and neutral. #8 and larger shall have stripes, bands, hash marks, or color pressure-sensitive plastic tape. Color code all branch circuit and feeder conductors as follows:
 - 1. Equipment Grounding Conductors: Green

3.11 EQUIPMENT CONNECTIONS

- A. Connect complete, all equipment requiring electrical connections, furnished as part of this Contract or by others unless indicated otherwise.
- B. Equipment Variations: Note that equipment sizes and capacities as shown on the Contract Documents are for bidding purposes and as such may not be the exact unit furnished. Contractor shall anticipate minor variations in equipment and shall include in his Bid all costs required to properly connect the equipment furnished.
- C. Verification: Obtain and review shop drawings, product data, and manufacturer's instructions for equipment furnished by others. Examine actual equipment to verify proper connection locations and requirements.
- D. Coordination: Sequence electrical rough-in and final connections to coordinate with installation and start-up schedule and work by other trades.
- E. Rough-In: Provide all required conduit, boxes, fittings, wire, connectors, miscellaneous accessories, etc., as necessary to rough in and make final connections to all equipment requiring electrical connections. In general, motors and equipment shall be wired in conduit to a junction box (or safety switch) near the unit, and from there to the unit in flexible metal or liquid-tight flexible steel conduit.
- F. Connections: Provide properly sized overload and short circuit protection for all equipment connected, whether furnished under this Contract or by others. Verify proper connections with manufacturer's published diagrams and comply with same. Verify that equipment is ready for electrical connections, wiring, and energization prior to performing same.

3.12 HANGERS AND SUPPORTS

- A. General: Rigidly support and secure all electrical materials, raceway, and equipment to structure using hangers, supports, and fasteners, suitable for the use, materials and loads encountered. Provide all necessary hardware.
- B. Temporary Conditions: Do not attach to or support electrical work from removable or knockout panels or temporary walls or partitions.
- C. Miscellaneous Supports: Provide any additional structural support steel brackets, angles, fasteners, and hardware as required to adequately support all electrical materials and equipment.

3.13 GROUNDING / BONDING

- A. General: Provide all system and equipment grounding as indicated and required by the NEC.
- B. Equipment Grounding: Provide a green equipment grounding conductor, sized per NEC 250-122 (larger if so indicated), with each feeder and branch circuit run.
- C. Provide exothermic welded connections where indicated.
- D. Equipotential Bonding - provide bonding of all metal pool devices as required by the NEC article 680.

3.14 RACEWAY APPLICATION

- A. GRC for interior, exterior, and underground conduit.
- B. LFMC for connection to motors and vibrating equipment.
 - 1. LFMNC shall be limited to last five feet of conduit run and shall be connected to raceway system with UL listed connectors.
- C. Minimum Raceway Size:
 - 1. 3/4-inch trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
 - 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 - 2. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

3.15 INSTALLATION

- A. Complete raceway installation before starting conductor installation.
- B. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- C. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.
- D. Support conduit within 12 inches of enclosures to which attached.
- E. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- F. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- G. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch.
- H. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- I. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- J. Cut conduit perpendicular to the length.
- K. Expansion-Joint Fittings:

1. install where underground conduit emerges from grade and underground conduit is subject to movement due to frost and is attached to a structure or conduit support not subject to movement due to frost.
 2. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- L. Flexible Conduit Connections: Comply with NEMA RV 3.
- M. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

3.16 INSTALLATION OF UNDERGROUND CONDUIT

- A. Direct-Buried Conduit:
1. Excavate trench bottom to provide firm and uniform support for conduit.
 2. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling.
 3. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.
 4. Underground Warning Tape: Install tape in continuous run. Tape shall be detectable (by metal detector, etc.).

3.17 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.
- B. Unless otherwise indicated, support units on a 6" level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.
- C. Elevation: Set covers of other enclosures 1 inch (25 mm) above finished grade.
- D. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables but short enough to preserve adequate working clearances in enclosure.
- E. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.18 INSTALLATIONS OF MOTOR CONTROL EQUIPMENT

- A. APPLICATION

1. Pushbutton Stations: Except as otherwise indicated, momentary-contact, start-stop units. Provide in covers of magnetic controllers for manually started motors where indicated, and connect start contact in parallel with sealing auxiliary contact for low-voltage protection.

B. INSTALLATION

1. General: Install motor control devices in accordance with manufacturer's written instructions.
2. Location: Locate controllers as indicated and within sight of motors controlled.
3. Mounting: For controllers not at walls, provide freestanding racks fabricated of lightweight slotted structural steel channels. Use feet consisting of 3/8-inch thick steel plates, 6 inches square, bolted to the foundation. Use feet for welded attachment of 1-1/2-inch by 1-1/2-inch by 1/4-inch vertical angle posts not over three feet on centers. Connect the posts with horizontal lightweight slotted steel channels and bolt the control equipment to the channels.
4. Motor-Controller Fuses: As indicated or as recommended by manufacturer for motor nameplate information
Install wiring in enclosures neatly bundled, trained, and supported.

C. CONNECTIONS

1. Tighten connectors, terminals, bus joints, and mountings. Tighten field connected connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values. Where manufacturer's torqueing requirements are not indicated, comply with tightening torques specified in UL 486A and UL 486B.

D. FIELD QUALITY CONTROL

1. Visual and mechanical inspection: Include the following inspections and related work.
 - a. Motor-Control Device Ratings and Settings: Verify that ratings and settings as installed are appropriate for final loads and final system arrangement and parameters. Recommend final protective-device ratings and settings where differences are found. Use accepted revised ratings or settings to make the final system adjustments. Prepare and submit the load current and overload relay heater list.
 - b. Inspect for defects and physical damage, NRTL labeling, and nameplate compliance with current project drawings.
 - c. Exercise and perform operational tests of mechanical components and other operable devices in accordance with manufacturer's instructions.
 - d. Check tightness of electrical connections of devices with calibrated torque wrench. Use manufacturer's recommended torque values.
 - e. Clean devices using manufacturer's approved methods and materials.
 - f. Verify proper fuse types and ratings in fusible devices.
2. Electrical Tests: Perform the following in accordance with manufacturer's instructions:
 - a. Insulation resistance test of motor control devices conducting parts to the extent permitted by the manufacturer's instructions. Insulation resistance less than 100 megohms is not acceptable.
 - b. Adjust for final settings of adjustable-trip devices.
 - c. Test auxiliary protective features such as loss of phase, phase unbalance, and undervoltage to verify operation.

- d. Check for improper voltages at terminals in controllers that have external control wiring when controller disconnect is opened. Any voltage over 30V is unacceptable.
3. Correct deficiencies and retest motor control devices. Verify by the system tests that specified requirements are met.

E. CLEANING

1. Remove paint splatters and other spots, dirt, and debris. Touch up scratches and mars of finish to match original finish. Clean devices internally using methods and materials as recommended by manufacturer.

3.19 CHECKOUT, TESTING, AND ADJUSTING

- A. General: Provide testing equipment, materials, instruments, and personnel to perform all test procedures and adjustments required by the Contract Documents and/or deemed necessary by the Engineer to establish proper performance and installation of electrical systems and equipment. All test instruments to be accurately calibrated and in good working order.
- B. Scheduling: Schedule tests at least three days in advance, and to allow Engineer and Owner representative(s) to witness the test, unless directed otherwise. Do not schedule tests until the system installation is complete and fully operational unless indicated or directed otherwise.
- C. Manufacturer's Authorized Representatives: For all new and modified systems and equipment, arrange and pay for the services of the manufacturer's authorized representative(s) to be present at time of equipment or system start-up, to supervise the start-up, and to conduct and/or certify all required testing and adjusting.
- D. Test Reports: Submit test reports neatly typewritten on 8-1/2-inch-by-11inch sheets indicating system or equipment being tested, methodology of testing, date, and time of test, witnesses of test, and test results. Submit test reports in three (3) copies to the Engineer for review within five (5) days after test is performed and include a copy with the appropriate operation and maintenance data.
- E. Correction/Replacement: After testing, correct any deficiencies, and replace materials and equipment shown to be defective or unable to perform at design or rated capacity. Retest without additional cost to the Owner or Contract. Submit finalization report indicating corrective measures taken and satisfactory results of retest.

3.20 CLEANING AND TOUCH-UP PAINTING

- A. Perform cleaning required by Division 1.
- B. General: Periodically remove from the project site, all waste, rubbish, and construction debris accumulated from construction operations, and maintain order. The premises shall be left clean and free of any debris and unused construction materials prior to final acceptance.
- C. Electrical Equipment: Remove all dust, dirt, debris, mortar, wire scraps, rust, and other foreign materials from the interior and exterior of all electrical equipment and enclosures and wipe down. Clean accessible current carrying elements and insulators prior to energizing.

- D. Touch-Up Painting: Restore and refinish to original condition, all surfaces of electrical equipment scratched, marred, and/or dented during shipping, handling, or installation. Remove all rust, and prime and paint as recommended by the manufacturer.

END OF SECTION

SECTION 310519.13 – GEOTEXTILES

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes the installation of separation/stabilization fabric as shown on the Drawings and as specified herein.

1.2 QUALITY ASSURANCE

- A. The latest edition of the following standards, as referenced herein, shall be applicable.
 - 1. American Society for Testing and Materials (ASTM).

1.3 SUBMITTALS

- A. Product Data:
 - 1. Submit Manufacturer's material specifications, product literature and installation instructions.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery:
 - 1. Deliver sufficient materials to the site to prevent interruption of the work.
 - 2. All materials shall be inspected by Contractor upon delivery. Contractor shall notify Engineer of any damage. Products received at the site torn, with holes, deteriorated, or otherwise damaged will not be approved and shall be returned and replaced at no expense to the Owner.
- B. Storage:
 - 1. All material shall be stored in strict accordance with the manufacturer's recommendations and as approved by the Engineer.
 - 2. Do not store products directly on ground. Ship and store geotextile with suitable wrapping for protection against moisture and ultraviolet exposure. Store geotextile in way that protects it from elements, if stored outdoors, elevate, and protect geotextile with waterproof cover.
- C. Handling:
 - 1. All material shall be handled in strict accordance with the manufacturer's recommendations and as approved by the Engineer.

PART 2 – PRODUCTS

2.1 WOVEN GEOTEXTILE

- A. Stabilization Fabric: To be used beneath pool and concrete deck.

- B. Composed of polymeric yarn interlaced to form a planar structure with uniform weave pattern.
- C. Calendared or finished so yarns will retain their relative position with respect to each other.
- D. Polymeric Yarn: Long-chain synthetic polymers (polyester or polypropylene) with stabilizer or inhibitors added to make filament resistant to deterioration due to heat and ultraviolet light exposure.
- E. Sheet Edges: Selvaged or finished to prevent outer material from separating from sheet.
- F. Unseamed Sheet Width: Minimum 12 feet.
- G. Physical Properties: Conform to requirements noted below:

PROPERTY	DESIGN VALUE	TEST METHOD
Tensile Strength	315 pounds	ASTM D4632
Elongation	12 percent	ASTM D4632
Trapezoidal Tear	113 pounds	ASTM D4533
CBR Puncture Strength	900 pounds	ASTM D6241
A.O.S.	40 (US Sieve)	ASTM D4751
Permittivity	.05 sec ⁻¹	ASTM D4491

2.2 NONWOVEN GEOTEXTILE

- A. Separation/Filtration Fabric: To be used in drainage ditches, haybale installation, culvert outfall installations, rip-rap outfall installations, and cover material separation
- B. Pervious sheet of polyester, polypropylene, or polyethylene fabricated into stable network of fibers that retain their relative position with respect to each other. Nonwoven geotextile shall be composed of continuous or discontinuous (staple) fibers held together through needle-punching, spun-bonding, thermal-bonding, or resin-bonding.
- C. Geotextile Edges; selvaged or otherwise finished to prevent outer material from pulling away from geotextile.
- D. Unseamed Sheet Width: Minimum 12 feet.
- E. Physical Properties: Conform to the requirements noted below:

PROPERTY	DESIGN VALUE	TEST METHOD
Tensile Strength	160 pounds	ASTM D4632
Elongation	50 percent	ASTM D4632
Trapezoidal Tear	60 pounds	ASTM D4533
CBR Puncture Strength	400 pounds	ASTM D6241
A.O.S.	70 (US Sieve)	ASTM D4751
Permittivity	1.4 sec ⁻¹	ASTM D4491

PART 3 – EXECUTION

3.1 GENERAL

- A. The Contractor shall be responsible for the installation and seaming of geotextile fabric in accordance with the specifications and the manufacturer's recommendations, as approved by the Engineer.

3.2 SUBGRADE PREPARATION

- A. Surfaces to be covered with geotextile fabric shall be smooth and free of rocks, sticks, roots, sharp objects, and all debris that may damage the fabric. The surface to be covered shall be firm and unyielding, with no sudden changes or breaks in grade. There shall be no standing water or excessive moisture on the surface when the fabric is placed.
- B. The compacted subgrade shall be maintained in a smooth, uniform, and compacted condition during installation of the fabric.

3.3 GEOTEXTILE INSTALLATION

- A. The fabric shall be cleaned of all debris or other materials that may negatively affect the fabric's performance.
- B. Mechanical equipment shall not be permitted to operate directly on the fabric unless authorized to do so by the manufacturer and approved by the Engineer.
- C. Geotextile Placement:
 1. Fabric shall be placed as recommended by the manufacturer and approved by the Engineer on surfaces which have been prepared to conform with these Specifications and found acceptable for fabric installation.
 2. The fabric shall be placed as smooth and wrinkle-free as possible.
 3. When installing geotextile in trenches, swales, ditches, etc., overlap geotextile in the direction of flow.
 4. All areas of fabric damaged during installation as determined by the Engineer shall be repaired or replaced by the Contractor as specified at no additional cost to the Owner. Should the fabric be damaged during any step of the installation, the damaged section shall be repaired by covering it with a piece of fabric which extends at least 24 inches in all directions beyond the damaged area. The fabric shall be secured by sewing or bonding as approved by the Engineer.

5. At time of installation, fabric will be rejected if it has defects, ribs, holes, flaws, deterioration, or damage incurred during manufacture, transportation, handling, or storage. Damaged materials shall be removed and replaced at no additional cost to the Owner.
6. Fabric shall be placed with long dimension down slope.
7. Fabric shall be protected at all times during construction from contamination by surface run-off and any fabric so contaminated shall be removed and replaced with uncontaminated fabric.

D. Seams and Overlaps of Geotextile:

1. All overlaps shall be a minimum of 18 inches (450 mm).

3.4 COVER MATERIALS OVER GEOTEXTILES

- A. Granular materials shall be placed on geotextiles as shown on the Drawings. During backdumping and spreading, a minimum depth of 6 inches of granular material shall be maintained at all times between the fabric and wheels of trucks or spreading equipment. All equipment used in spreading or traveling on the cover layer for any reason shall exert low ground pressures and shall be approved by the manufacturer and Engineer. Dozer blades, etc., shall not make direct contact with the fabric; however, if tears occur in the fabric during the spreading operation, the granular material shall be cleared from the fabric and the damaged area repaired as previously described.
- B. The granular material shall be spread in the direction of fabric overlap. Large fabric wrinkles which may develop during the spreading operations shall be folded and flattened in the direction of the spreading. Occasionally, large folds may reduce the fabric overlap width. Special care shall be given to maintain proper overlap and fabric continuity.
- C. All equipment spreading cover material or traveling on the cover layer shall avoid making sharp turns, quick stops, or quick starts.
- D. Fabric shall be covered as soon as possible after placement to minimize exposure to sunlight. Fabric shall not be exposed for more than 5 days.

3.5 DISPOSAL OF SCRAP MATERIALS

- A. On completion of installation, the Contractor shall legally dispose of all trash and scrap material off-site or in a location approved by the Owner and Engineer, remove equipment used in connection with the work herein, and shall leave the premises in a neat acceptable manner.

END OF SECTION

SECTION 312000 – EARTH MOVING

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes the preparation of the site, protection, excavation, embankment, drainage, dewatering, for site grading, as shown on the Drawings, and as herein specified.
- B. The Contractor shall accept the site in the condition in which it exists at the time of the award of the Contract.
- C. The Engineer shall determine the suitability of materials that are to be used in the work, and should any materials encountered be unsatisfactory for the purpose intended, they shall be removed from the site at the Contractor's expense.

1.2 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. The latest edition of the following standards, as referenced herein, shall be applicable.
 - a. "Standard Specifications for Highway Materials and Methods of Sampling and Testing, American Association of State Highway and Transportation Officials (AASHTO)."
- B. The Contractor shall comply with the requirements for soil erosion and sedimentation control, and other requirements of governmental authorities having jurisdiction, including the Commonwealth of Virginia.
- C. The Contractor shall provide and pay for all costs in connection with an approved independent testing facility to determine conformance of soils and aggregate with the specifications in accordance with Section "Quality Requirements."

1.3 SUBMITTALS

- A. Samples:
 - 1. The Contractor shall furnish earth materials to the testing laboratory for analysis and report, as directed by the Engineer, or as outlined in the specifications.
- B. Test Results:
 - 1. The testing laboratory shall submit written reports of all tests, investigations, and recommendations to the Contractor and the Engineer.

1.4 PROJECT REQUIREMENTS

- A. Notify the Engineer of any unexpected subsurface condition.
- B. Protection of Existing Utilities:

1. Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate support and protection during earthwork operations, comply with OSHA requirements.
 2. Coordinate interruption and/or termination of utilities with the utility companies and the Owner.
 3. Provide a minimum of 48 hours' notice to the Owner and receive written notice to proceed before interrupting any utility.
 4. Demolish and completely remove from the site any existing underground utilities designated to be removed as shown on the Drawings or as specified in Section "Site Clearing."
 5. Repair any damaged utilities as acceptable to the Engineer, at no additional cost to the Owner.
- C. Protection of Persons and Property:
1. Barricade open excavations occurring as part of this work, and post with warning lights.
 2. Operate warning lights as recommended by authorities having jurisdiction.
 3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
 4. Perform excavation within drip-line of large trees to remain by hand and protect the root system from damage or dryout to the greatest extent possible. Maintain moist conditions for root system and cover exposed roots with burlap. Paint root cuts of 1-inch diameter and larger with emulsified asphalt tree paint.

PART 2 – PRODUCTS

2.1 PRECONSTRUCTION MATERIAL QUALIFICATION TESTING

- A. A 100-pound minimum representative sample shall be obtained from each potential borrow source. If different material gradations are known to exist in the pit, samples shall be obtained for each material. Each sample shall be mixed thoroughly and reduced to test specimen size, in accordance with AASHTO T87. The test shall be performed in the order shown. Failure to pass any test is grounds for disqualification and shall lead to cessation of the test program for that material.
1. Particle Size Analysis:
 - a. Method: ASTM D422.
 - b. Number of Tests: One (1) per potential source.
 - c. Acceptance Criteria: Gradation within specified limits.
 2. Maximum Density Determination:
 - a. Method: ASTM D1557, Modified Proctor.
 - b. Number of Tests: One (1) per potential source.
 3. Re-establish gradation and maximum density of fill material if source is changed during construction.

2.2 MATERIALS

- A. Select Granular Material: Sound, durable, sand, gravel, stone or blends with these materials, free from organic, frozen, or other deleterious materials, and meeting the following gradation requirements:

SIEVE	PERCENT PASSING
2"	100
1/4"	30 - 65
No. 40	5 - 40
No. 200	0 - 10

- B. Selected Fill: Sound, durable, sand, gravel, stone, or blends of these materials, free from organic, frozen or other deleterious materials.

SIEVE	PERCENT PASSING
4"	100
No. 40	0 - 70
No. 200	0 - 10

1. Fines passing No. 200 shall be non-plastic.
2. Particle size analysis shall show no gap grading.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Establish required lines, levels, contours, and datum.
- B. Maintain benchmarks and other elevation control points. Re-establish, if disturbed or destroyed, at no additional cost to the Owner.
- C. Establish location and extent of utilities before commencement of grading operations.

3.2 EXCAVATION

- A. Excavation shall consist, in general, of the excavation of whatever substance is encountered to the lines, grades, and sections shown on the Drawings including excavation as necessary for grading and other similar features.
- B. All suitable materials removed in excavation shall be used in the construction of embankments, subgrade, shoulders, slopes, and at such other places as directed. The Engineer shall be the sole judge of what constitutes suitable material.
- C. During construction, the grading operations shall be executed in such a manner that the excavation will be well drained at all times. All grading shall be finished on neat, regular lines conforming to the sections and contours shown on the Plans.

- D. Removal of materials beyond the indicated subgrade elevations, without authorization by the Engineer, shall be classified as unauthorized excavation and shall be performed at no additional cost to the Owner.
- E. Excavation shall be performed in proper sequence with all other associated operations.
- F. Maintain the slopes of excavation in a safe condition until completion of the grading operation.
- G. All excavation work shall be inspected and approved by the Engineer before proceeding with construction.
- H. Any excess excavation shall be removed from the site to disposal areas at the Contractor's expense.

3.3 FILL

- A. All site fill shall be "selected fill" unless otherwise shown on the Drawings or directed by the Engineer. "Select granular fill" shall be placed in lieu of selected fill where directed by the Engineer.
- B. Before depositing fills, the surface of the ground shall be cleared of all refuse, brush, and large stones. Conform to Section "Site Clearing."
- C. Prior to placing fill over undistributed material, scarify to a minimum depth of 6 inches.
- D. Where fills are made on hillsides or slopes, the slope of the original ground upon which the fill is to be placed shall be plowed or scarified deeply or where the slope ratio of the original ground is steeper than 2 horizontal to 1 vertical, the bank shall be stepped or benched.
- E. The original ground shall be proof rolled until the underlying soil is thoroughly compacted to the satisfaction of the Engineer before any filling is begun. A steel-wheel tandem roller weighing 8 to 10 tons or equipment capable of obtaining the same effort shall be used to obtain a thoroughly compacted subgrade. Remove or recompact any soft or loose soils as determined by the Engineer prior to filling.
- F. A thoroughly and satisfactorily subgrade is defined as having a minimum dry density of 95 percent of the maximum density of the material used. The subgrade material shall be compacted at a moisture content suitable for obtaining the required density.
- G. Place backfill and fill materials in layers not more than 12 inches in loose depth unless shown otherwise on the Drawings. Lift height shall be governed by the ability of the compaction equipment to obtain the required compaction with 12 inches as a maximum lift height. Before compaction, moisten or aerate each layer as necessary to facilitate compaction to the required density. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost, ice, ponded water, or extraneous debris.
- H. When work is suspended during periods of freezing weather, measures shall be taken to prevent fill already in place from freezing. Upon resumption of work after any inclement weather, prepare the exposed surface by proof rolling to identify any zones of soft/loose soils. Soft/loose materials or frozen soils shall be removed and replaced by compacted granular fill.

- I. Moisture Control:
 - 1. Where fill or backfill must be moisture conditioned before compaction, uniformly apply water to the surface and to each layer of fill or backfill. Prevent ponding or other free water on surface subsequent to, or during, compaction operations.
 - 2. Remove and replace, or scarify and air dry, soil that is too wet to permit compaction to specified density. Soil that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a value which will permit compaction to the percentage of maximum density specified.
- J. All fill shall be thoroughly and satisfactorily compacted to 95 percent of the maximum density of material used.

3.4 GRADING

- A. The present and finished grade lines are shown on the Drawings. Grade over the entire area, as shown on the drawings, shall be to the finished subgrade levels. Upon completion of this work, all debris shall be cleaned out and removed from the premises.
- B. All cutting, filling, backfilling and grading necessary shall be done to bring the area to the following grade or subgrade levels:
 - 1. For roadway surface areas to the finished subgrade levels specified on the contract drawings.
 - 2. For areas to be topsoiled and seeded to within 6 inches of the finished grade.
 - 3. For other surface treatments as detailed on the Drawings.
- C. Sufficient grading must be done during the progress of the work so that the entire site shall be well drained and free from water pockets.
- D. Finish grading, including dressing swales, cleaning up excess footing excavation, dressing terraces, disposing of excess material and all other work necessary to prepare the site for topsoil and seeding shall be done after construction of structures and roadway surface areas is substantially complete.

3.5 COMPACTION EQUIPMENT

- A. Compaction equipment used for the Work is subject to approval by the Engineer. Any equipment not originally manufactured for compaction purposes and equipment which is not in proper working order will not be approved. Furnish manufacturer's specifications covering data not obvious from a visual inspection of the equipment and necessary to determine its classification and performance characteristics.

3.6 DRAINAGE AND DEWATERING

- A. Prevent surface, subsurface or ground water from flowing into excavation and from flooding project area, as well as surrounding areas.
- B. Do not allow water to accumulate in excavations. Remove water to prevent soil changes detrimental to the stability of subgrades.

- C. Provide and maintain the pumps, well points, sumps, suction and discharge lines, and other dewatering components necessary to convey water away from excavations.
- D. Provide and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations by dewatering, to collection or run-off areas.
- E. Dewatering operations shall be as directed by the Engineer and performed in accordance with Section "Dewatering."

3.7 FIELD QUALITY CONTROL

- A. Notify the Engineer at least one (1) working day in advance of all phases of filling and backfilling operations.
- B. Compaction testing shall be performed to ascertain the compacted density of the fill and backfill materials in accordance with the following methods:
 - 1. In-place relative density:
 - a. Method: AASHTO T310, Nuclear Method.
 - b. Number of Tests: One (1) per 8-inch vertical lift.
 - 1) Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one (1) test for every 2,000 square feet or less of paved area of building slab, but in no case fewer than three (3) tests.
- C. The Engineer may direct additional tests to establish gradation, maximum density, and in-place density as required by working conditions, at the Contractor's expense.
- D. Acceptance Criteria: The sole criterion for acceptability of in-place fill shall be in situ dry density. Minimum dry density for all fill or backfill shall be 95 percent of the maximum dry density. If a test fails to qualify, the fill shall be further compacted and retested. Subsequent test failures shall be followed by removal and replacement of the material.

3.8 CLEAN UP

- A. Provide and maintain protections or newly filled areas against damage. Upon completion or when directed, correct all damaged and deficient work by building up low spots and remove temporary protections, fencing, shoring and bracing.
- B. Remove all surplus excavated material not required for filling and backfilling and legally dispose of same away from premises.
- C. Leave the premises and work in clean, satisfactory condition, ready to receive subsequent operations.

END OF SECTION

SECTION 312333 – TRENCHING AND BACKFILLING

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes the excavation of trenching, backfilling, compacting, dewatering, excavation support and disposal, as shown on the Contract Drawings, and as herein specified.
- B. The Engineer will determine the suitability of materials that are to be used in the work, and should any materials encountered be unsatisfactory for the purpose intended, they shall be removed from the site at the Contractor's expense.

1.2 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. The latest edition of the following standards, as referenced herein, shall be applicable.
 - a. "Standard Specifications for Highway Materials and Methods of Sampling and Testing, American Association of State Highway and Transportation Officials (AASHTO)."
 - b. American Society for Testing and Materials (ASTM).
 - c. National Electric Code (NEC).
- B. The Contractor shall comply with the requirements for soil erosion and sedimentation control and other requirements of governmental authorities having jurisdiction, including the State.
- C. The Contractor shall provide and pay for all costs in connection with an approved independent testing facility to determine conformance of soils and aggregate with the specifications in accordance with Section "Quality Requirements."

1.3 SUBMITTALS

- A. Samples:
 - 1. The Contractor shall furnish representative earth materials to the testing laboratory for analysis and report, as directed by the Engineer, or as outlined in the specifications.
- B. Test Results:
 - 1. The testing laboratory shall submit written reports of all tests, investigations, findings, and recommendations to the Contractor and the Engineer.

1.4 PROJECT REQUIREMENTS

- A. Notify the Engineer of any unexpected subsurface condition.
- B. Protect excavations by shoring, bracing, sheet piling, or by other methods, as required to ensure the stability of the excavation. Comply with OSHA requirements.

- C. Underpin or otherwise support structures adjacent to the excavation, which may be damaged by the excavation. This includes service lines.
- D. Protection of Existing Utilities:
 - 1. Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations. Comply with OSHA requirements.
 - 2. Coordinate interruption and/or termination of utilities with the utility companies and the Owner.
 - 3. Provide a minimum of 48 hours' notice to the Owner and receive written notice to proceed before interrupting any utility.
- E. Demolish and completely remove from the site any existing underground utilities designated to be removed, as shown on the Drawings or as specified.
- F. Repair any damaged utilities as acceptable to the Owner, Engineer, and utility company at no additional cost to the Owner.
- G. Contractor shall comply with maintenance and protection requirements as approved by the authority having jurisdiction.
- H. Protection of Persons and Property:
 - 1. Barricade open excavations occurring as part of this work and post with warning lights, if required.
 - 2. Operate warning lights as recommended by authorities having jurisdiction.
 - 3. Protect structures, utilities, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
 - 4. Perform excavation within drip-line of trees to remain by hand and protect the root system from damage or dryout to the greatest extent possible. Maintain moist conditions for root system and cover exposed roots with burlap. Paint cut roots of 1-inch diameter and larger with emulsified asphalt tree paint.

PART 2 – PRODUCTS

2.1 PRECONSTRUCTION MATERIAL QUALIFICATION TESTING

- A. General:
 - 1. Sufficient size samples shall be obtained from the potential borrow source to allow completion of tests listed in paragraph B below. Samples may be obtained from test borings, test pits, or from borrow pit faces provided that surficial dry or wet soil is removed to expose undisturbed earth. Tests listed below shall be performed on each sample obtained. A minimum of 3 representative samples from each potential borrow source shall be furnished to the testing laboratory for prequalification testing. Test data shall be provided to the Engineer a minimum of 2 weeks prior to construction for approval of borrow source. Three test reports completed within three months prior to construction may be submitted for commercial earth borrow sources or suppliers of stone products

(crushed stone or graded stone products) in lieu of prequalification tests as approved by the Engineer.

B. Material Tests:

1. Particle Size Analysis:
 - a. Method: ASTM D422.
 - b. Number of Tests: One (1) per sample; three (3) per potential source.
 - c. Acceptance Criteria: Gradation within specified limits.
2. Maximum Density Determination:
 - a. Method: ASTM D1557 - Modified Proctor.
 - b. Number of Tests: One (1) per sample; three (3) per potential source.
3. Re-establish gradation and maximum density of fill material if source is changed during construction.

2.2 MATERIALS

- A. Pipe Zone Bedding: Select mixture of graded crushed stone, free from organic, frozen or other deleterious materials, and meeting the following gradation requirements:

SIEVE	PERCENT PASSING
1-1/2"	100
1"	90 – 100
1/2"	0 – 15

- B. Pipe Zone Backfill: Sound, durable sand, gravel, stone or blends of these materials, free from organic, frozen or other deleterious materials, and meeting the following gradation requirements:

SIEVE	PERCENT PASSING
2"	100
1/4"	30 – 65
No. 40	5 – 40
No. 200	0 – 10

- C. Suitable Material: Sound, durable sand, gravel, stone or blends of these materials, free from organic, frozen or other deleterious materials, and meeting the following gradation requirements:

SIEVE	PERCENT PASSING
4"	100
No. 40	0 – 70
No. 200	0 – 15

1. Run-of-trench material, meeting the above criteria, shall be considered suitable material and shall be used for trench backfill only after tested in accordance with Section "Quality Requirements" and approved by the Engineer. The Contractor shall pay for all additional testing required to determine the conformance of run-of-trench material, if at any time during the Work this material appears to be in non-conformance in the opinion of the Engineer.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Establish required lines, levels, contours, and datum.
- B. Maintain benchmarks and other elevation control points; re-establish if disturbed or destroyed at no additional cost to the Owner.
- C. Establish location and extent of existing utilities prior to commencement of excavation.

3.2 EXCAVATION

- A. All excavation shall be made to such depth as required and of the width shown on the Drawings to provide suitable room for building the structures and laying the pipe(s) they are to contain and for sheeting, shoring, pumping and draining as necessary, and for removing peat, silt, or any other materials which the Engineer may deem unsuitable. Hand trench excavation may be required to protect existing utilities and structures.
- B. Trench excavation for pipes shall be made by open cut to accommodate the pipe or structure at the depths indicated on the Drawings. Excavation shall be made to such a depth and to the width indicated on the Drawings so as to allow a minimum of 8 inches of pipe zone bedding to be placed beneath the bottom of all structures and barrels, bells or couplings of all pipes installed unless otherwise specified on the Drawings.
- C. The bottom of the trench shall be accurately graded to provide a uniform layer of bedding material as required for each section of pipe. Trim and shape trench bottoms and leave free of irregularities, lumps, and projections.
- D. Stockpile excavated subsoil for reuse where directed or approved.
- E. Over excavation/undercut: If, in the opinion of the Engineer, existing material below the trench grade is unsuitable for properly placing bedding material and laying pipe, the Contractor shall excavate and remove the unsuitable material and replace the same with an approved pipe zone bedding material properly compacted.
- F. Stability of Excavation: Slope sides of excavations shall comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavation in safe condition until completion of backfilling.
- G. Removal of materials beyond the indicated subgrade elevations, without authorization by the Engineer, shall be classified as unauthorized excavation and shall be performed at no additional cost to the Owner.

3.3 DEWATERING

- A. The Contractor shall remove all water from the excavation promptly and continuously throughout the progress of the work and shall keep the excavation dry at all times until the work is completed and excavation is backfilled or have sufficient weight to resist uplift pressures. Groundwater levels shall be depressed to a minimum of 2 feet below excavation subgrade. No

pipe or structure is to be laid in water and water shall not be allowed to rise on or flow over any pipe or structure until such time as approved by the Engineer.

- B. Provide a suitable point of discharge from dewatering operations shall be conveyed in a non-erosive manner satisfactory to the Engineer.
- C. Precautions shall be taken to protect uncompleted work from flooding during storms or from other causes. All pipe lines or structures not stable against uplift during construction or prior to completion shall be thoroughly braced or otherwise protected.

3.4 BEDDING AND BACKFILLING

- A. All pipe trenches backfill (pipe zone bedding, pipe zone backfill and trench backfill) shall be compacted by tamping or rolling to achieve a minimum dry density of 90 percent of the modified Proctor maximum dry density of the material used (ASTM D1557). Backfill in pipe trenches to be covered with pavement shall be compacted to a minimum of 95 percent of modified Proctor maximum dry density. Backfill materials shall be placed with water content within plus or minus 4 percent of optimum moisture content per the modified Proctor method (ASTM D1557). Any water used for compaction shall be provided by the Contractor at his own expense. The Contractor is responsible for the repair of any trench settlement at no expense to the owner.
- B. Bedding and backfilling shall be accomplished in three stages unless otherwise specified on the Contract Drawings. The first stage shall involve placement of "pipe zone bedding" as a layer(s) of selected material required to support, or to stabilize unsound or unsatisfactory foundation conditions. The second stage shall involve placement of "pipe zone backfill" from the top of the bedding material up to 1 foot above the pipe. The third stage involves the placement of "trench backfill" in the remainder of the trench up to the surface of the ground or the bottom of any special surface treatment subgrade elevation.
- C. The bedding material shall be placed in the trench after the trench has been excavated a minimum of 8 inches below the bell of the pipe to permit the placing of not less than 8 inches of bedding material unless otherwise specified on the Drawings. Where, in the opinion of the Engineer, more than 8 inches of bedding material shall be required, the excavation shall be performed and bedding placed to the depth ordered by the Engineer.
- D. Provide uniform bearing and support for each section of pipe at every point along the entire length except where necessary to excavate for bell holes, pipe joints, or other required connections. Dig bell holes and depressions for joints after trench bottom has been graded. Dig no deeper, longer, or wider than needed to make the joint connection properly.
- E. The bedding material shall be placed to the full width of trench. The bedding material shall be placed in loose lifts not exceeding 6 inches to the elevation shown on the Drawings or directed by the Engineer. The bedding material shall be tamped and compacted to form a firm and even bearing surface.
- F. Pipe zone backfill shall be placed to the elevation shown on the Drawings in loose lifts not-to-exceed 6 inches in thickness, before compaction. The backfill shall be placed on both sides of the pipe at the same time and to approximately the same elevation. Any pipe that is damaged or moved out of alignment, regardless of cause, shall be replaced or realigned at the Contractor's expense. Each layer shall be thoroughly compacted by hand-tamping or mechanical means

being careful not to damage the pipe. When the pipe zone backfill reaches 1 foot over the top of the pipe, the entire surface shall be compacted by mechanical means.

- G. The remainder, if any, of the trench above the pipe zone backfill shall be backfilled with suitable material in loose lifts not exceeding 6 inches in thickness before compaction. Each layer shall be thoroughly compacted by mechanical means.

3.5 BACKFILLING AROUND STRUCTURES

- A. The Contractor shall not place backfill against any structure without obtaining the approval of the Engineer. No dumping shall be allowed where materials would flow against or around such structures. Backfill material shall be deposited in horizontal layers not exceeding 6 inches in loose thickness or as shown on the Drawings and thoroughly compacted by hand or by mechanical means to the satisfaction of the Engineer.

3.6 SUSPENSION OF WORK

- A. Whenever the work is suspended, excavations shall be protected and the roadways, if any, left unobstructed. Within or adjacent to private property, material shall be stored at such locations as will not unduly interfere with traffic of any nature and in no case shall materials be stored in locations which will cause damage to existing improvements.

3.7 DISPOSAL OF MATERIAL

- A. Excess and unsuitable materials shall be disposed of by the Contractor on the site in an area approved by the Engineer or legally disposed of off-site at the Contractor's expense.

3.8 FIELD QUALITY CONTROL

- A. Notify the Engineer at least 3 working days in advance of all phases of filling and backfilling operations.
- B. In-place density testing shall be performed to ascertain the compacted density of the fill and backfill materials in accordance with the following methods:
 - 1. In-place relative density:
 - a. Method: AASHTO T310, Nuclear Method.
- C. Perform initial density testing to verify that contractors proposed compaction effort will obtain the minimum required densities.
- D. In-place density tests on trench backfills shall be provided for every 500 cubic yards of fill or in vertical lifts not exceeding 2 feet and at least once daily.
- E. One particle size analysis (ASTM D422) and one modified Proctor compaction test (ASTM D1557) shall be completed for every 5,000 cubic yards of material placed.
- F. The Engineer may direct additional tests to establish gradation, maximum density, and in-place density as required by working conditions, at the Contractor's expense.

- G. Acceptance Criteria: The criteria for acceptability of in-place fill shall be in-situ dry density and moisture content. If a test fails to qualify, the fill shall be further compacted and re-tested. Subsequent test failures shall be followed by removal and replacement of the material.

END OF SECTION

SECTION 312500 – EROSION AND SEDIMENT CONTROL

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section covers work necessary for stabilization of soil to prevent erosion and sedimentation during and after construction and land disturbing activities. The work shall include the furnishing of all labor, materials, tools, and equipment to perform the work and services necessary as herein specified and as indicated on the Drawings. This shall include installation, maintenance, and final removal of all temporary soil erosion and sediment control measures. All erosion and sediment control methods and devices used shall conform to the latest requirements imposed by federal, state, and local authorities.
- B. Comply with the latest version of the State or Regional Erosion Control Manual or Guideline.
- C. The minimum areas requiring soil erosion and sediment control measures are indicated on the Drawings. The right is reserved to modify the use, location, and quantities of soil erosion and sediment control measures based on activities of the Contractor and as the Engineer considers to be the best interest of the Owner.
- D. The Contractor shall be responsible for repair of any damage caused and shall be financially responsible for any penalties imposed.

1.2 QUALITY ASSURANCE

- A. Soil erosion and sediment control measures shall be implemented in accordance with the requirements and procedures outlined in this Specification, Contract Drawings and documents, state standards or guidelines for soil erosion and sediment control, and all regulatory authorities having jurisdiction. Where conflicts between requirements exist, the more restrictive rules shall govern.
- B. The Contractor shall provide all temporary control measures shown on the Drawings, or as directed by the Owner, Owner's representative, or soil conservation district for the duration of the contract. Erosion and sediment control Drawings are intended to be a guide to address the stages of work shown. Additional measures not specified on the Drawings may be necessary and shall be implemented to address intermediary stages of work and any conditions that may develop during construction at no cost to the Owner.
- C. Temporary control provisions shall be coordinated with permanent erosion control features to the extent practical to assure economical, effective, and continuous erosion and sediment control throughout the construction and post-construction period.
- D. Soil erosion and sediment control measures shall at all times be satisfactory to the Owner's Representative. Owner's Representative will inform the Contractor of unsatisfactory construction procedures and operations if observed. If the unsatisfactory construction procedures and operations are not responded to and corrected within 48 hours, the Owner's Representative may suspend the performance of any or all other construction until the unsatisfactory condition has been corrected. Such suspension shall not be the basis of any claim by the Contractor for

additional compensation nor for an extension of time to complete the work. Any complaints, fines, etc. relating to ineffective erosion control, shall be the sole responsibility of the Contractor.

- E. The Contractor shall inspect all soil erosion and sediment control measures at least at the beginning and end of each day to ascertain that all devices are functioning properly during construction. Maintenance of all soil erosion and sediment control measures on the project site shall be the responsibility of the Contractor until final stabilization is complete, and until the permanent soil erosion controls are established and in proper working condition.
- F. The Contractor shall protect adjacent properties and watercourses from soil erosion and sediment damage throughout construction.

1.3 GENERAL

- A. Soil erosion stabilization and sediment control measures consist of the following elements:
 - 1. Maintenance of existing permanent or temporary storm drainage piping and channel systems, as necessary.
 - 2. Installation and maintenance of stabilized construction entrance(s).
 - 3. Construction of new permanent and temporary storm drainage piping and channel systems, as necessary.
 - 4. Construction of temporary erosion control facilities such as silt fences, check dams, etc.
 - 5. Topsoil and Seeding: Placement and maintenance of Temporary Seeding on all areas disturbed by construction. Placement of permanent topsoil, fertilizer, and seed, etc., in all areas not occupied by structures or pavement unless shown otherwise.
 - 6. Soil Stabilization Seeding: Placement of fertilizer and seed, etc., in areas as Specified hereinafter.
- B. The Contractor shall be responsible for phasing Work in areas allocated for his exclusive use during this Project, including any proposed stockpile areas, to restrict sediment transport. This will include installation of any temporary erosion control devices, ditches, or other facilities.
- C. The areas set aside for the Contractor's use during the Project may be temporarily developed to provide satisfactory working, staging, and administrative areas for his exclusive use. Preparation of these areas shall be in accordance with other requirements contained within these Specifications and shall be done in a manner to both control all sediment transport away from the area.
- D. Stockpiles remaining in place longer than 14 calendar days shall be considered permanent stockpiles for purposes of erosion and sediment control.
- E. All permanent stockpiles shall be seeded with soil stabilization seed and protected by construction of silt fences completely surrounding stockpiles and located within 10 feet of the toes of the stockpile slopes.
- F. Sediment transport and erosion from working stockpiles shall be controlled and restricted from moving beyond the immediate stockpile area by construction of temporary toe-of-slope ditches and accompanying silt fences as necessary. The Contractor shall keep these temporary facilities in operational condition by regular cleaning, regrading, and maintenance.

- G. The Contractor shall maintain all elements of the Soil Erosion Stabilization and Sedimentation Control systems and facilities to be constructed during this Project for the duration of his activities on this Project.
- H. Formal inspections made jointly by the Contractor and the Engineer shall be conducted every 2 weeks to evaluate the Contractor's conformance to the requirements of these Specifications.
- I. Replacement or repair of failed or overloaded silt fences, check dams, or other temporary erosion control devices shall be accomplished by the Contractor within 24 hours after receiving written notice from the Engineer.
- J. If the Contractor has not complied with any of the above maintenance efforts to the satisfaction of the Engineer within 2 working days after receiving written notification from the Engineer, the Owner shall have the prerogative of engaging others to perform any needed maintenance or cleanup, including removal of accumulated sediment at constructed erosion control facilities, and deduct from the Contractor's monthly partial payment the costs for such efforts in accordance with the General Conditions of the Contract.

1.4 SUBMITTALS

- A. Material Certificates signed by material producer and Contractor, certifying that each material item complies with or exceeds specified requirements.
- B. Results of all tests and investigations, including recommendations.
- C. Submit product data, samples, specifications and manufacturer's installation procedures for approval as directed by Engineer prior to use.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Contractor shall provide all materials necessary to perform the work in accordance with the SWPPP or as shown on the Drawings or specified herein.

2.2 PERMANENT SEED

- A. Refer to Section "Turf and Grasses."

2.3 SOIL STABILIZATION AND TEMPORARY SEED

- A. Temporary Seed: Rye grass, cereal grasses, or other quick growing species suitable to the area as a temporary cover, which will not compete with the grasses specified for permanent cover or as specified in the SWPPP or on the Drawings.

2.4 TOPSOIL

- A. Topsoil shall be as specified under Section "Soil Preparation."

2.5 FERTILIZER

- A. Refer to Section "Turf and Grasses."

2.6 LIME

- A. Ground dolomite limestone not less than 85 percent total carbonates and magnesium, ground so that 50 percent passes through a No. 100 mesh sieve and 90 percent passes a No. 20-mesh sieve. Coarser material will be acceptable provided the specified rates of application are increased proportionately on the basis of quantities passing the No. 100-mesh sieve.

2.7 STRAW MULCH

- A. Threshed straw of oats, wheat, barley, or rye, free from seed of noxious weeds or clean salt hay.

2.8 EROSION CONTROL BLANKET

- A. Erosion Control Blanket (ECB) shall be constructed with a layer of 70 percent straw and 30 percent coconut fiber stitched with degradable thread between a heavyweight UV stabilized polypropylene top net (3 pounds) and a lightweight photodegradable polypropylene bottom net (1.50 pounds). Both the netting and fiber material shall be green in color. Acceptable products shall include SC150 Double Net Straw-Coconut Blanket as manufactured by North American Green; Curlex Double Net (Curlex II) as manufactured by American Excelsior Company or an approved equal.

2.9 HAY BALE

- A. Bales shall be tightly bound, staked with 1 inch by 1 inch hardwood stakes. Hay shall be from mowings of acceptable herbaceous growth free from noxious weeds.

2.10 SILT FENCE

- A. Silt Fence (SF) shall consist of woven geotextile fabric, posts, wire mesh backing, and fasteners meeting the requirements shown on the Drawings.
- B. The woven geotextile fabric shall meet the following specifications.

Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs.)	110	ASTM D 4632
Elongation at Failure (%)	20	ASTM D 4632
Mullen Burst Strength (PSI)	300	ASTM D 3786
Puncture Strength (lbs)	60	ASTM D 4833
Minimum Trapezoidal Tear Strength (lbs)	50	ASTM D 4533
Flow Through Rate (gal/min/sf)	25	ASTM D 4491
Equivalent Opening Size	40-80	ASTM D 4751
Minimum UV Residual (%)	70	ASTM D 4355

2.11 COMPOST FILTER SOCK

- A. Compost infill shall consist of decomposed (matured at least 3 months), weed-free, organic material that is aerobically composted, possess no odors, and contain less than 1%, by dry weight, of man-made material.

Organic Matter Content	25% - 100% (dry weight)
Organic Portion	Fibrous and elongated
pH	6.0 – 8.0
Moisture Content	30% - 60%
Particle Size	100% passing a 1” screen and 10-50% passing a 3/8” screen
Soluble Salt Concentration	5.0 dS/m (mmhos/cm) maximum

- B. Compost filter sock fabric material shall meet the minimum requirements and specifications listed in the following tables.

Material Type	3 mil HDPE	5 mil HDPE	5 mil HDPE	Multi-Filament Polypropylene (MFPP)	Heavy Duty Multi-Filament Polypropylene (HDMFPP)
Material Characteristics	Photodegradable	Photodegradable	Biodegradable	Photodegradable	Photodegradable
Sock Diameters	12”,18”	12”, 18”,24”, 32”	12”, 18”,24”, 32”	12”, 18”,24”, 32”	12”, 18”,24”, 32”
Mesh Opening	3/8”	3/8”	3/8”	3/8”	1/8”
Tensile Strength		26 psi	26 psi	44 psi	202 psi
Ultraviolet Stability % Original Strength (ASTM G-155)	23% at 1000 hr.	23% at 1000 hr.		100% at 1000 hr.	100% at 1000 hr.
Minimum Functional Longevity	6 months	9 months	6 months	1 year	2 years

2.12 MANUFACTURED INSERT INLET PROTECTION

- A. The sack structure shall consist of woven geotextile fabric equal to or exceeding the performance standard for the silt fence fabric.

PART 3 – EXECUTION

3.1 GENERAL

- A. The Contractor shall comply with and implement the Stormwater Pollution Plan provided in the contract documents.
- B. Review the soil erosion and sediment control Drawings as they apply to current conditions. Any deviation from the Drawings must be submitted for approval to the site Engineer in writing at least 72 hours prior to commencing that work.

- C. Initial soil sediment and erosion control devices shall be in place prior to any land disturbing activity in their proper sequence and maintained until permanent protection is established.
- D. The limit of the area of any earthwork operations in progress shall be commensurate with the Contractor's capability and progress in keeping the finished grading, mulching, seeding, and other such permanent control measures current and in accordance with the accepted schedule for construction phasing. Should seasonal limitations make such coordination unrealistic, as determined by the Owner's Representative, temporary erosion control measures shall be provided immediately by the Contractor at no expense of the Owner.
- E. Temporary erosion control measures shall be used to correct conditions which develop during construction that are needed prior to installation of permanent control features, or that are temporarily needed to control erosion that develops during normal construction practices but are not associated with permanent control features on the project.
- F. The Contractor shall incorporate all permanent erosion control features (stabilization) into the project at the earliest practical time to minimize the need for temporary controls.
- G. A stabilized construction entrance (SCE) shall be installed and maintained at any point where construction vehicles enter a public right-to-way, street, or parking area. The SCE shall be used to eliminate mud from the construction area onto public right-of-way. The SCE shall be constructed as shown on the Drawings. Any mud or debris tracked on streets shall be cleaned up immediately.
- H. Dust Control: The Contractor shall provide a commercial grade; enclosed broom mechanical street sweeper to control sediment and/or dust that is tracked on to the adjacent streets. The street sweeper shall be equipped with a water storage tank to wet the area prior to sweeping. Where on site controls do not prevent material from being tracked on to adjacent streets, the street sweeper shall be used to clean the adjacent streets immediately. In addition, at a minimum, the adjacent streets shall be swept at the end of each day or as directed by the Engineer.
- I. Any disturbed or stockpiled areas that will be left exposed more than 14 days or less according to State NPDES General Stormwater Permits shall immediately receive temporary or permanent seeding. Mulch/straw shall be used if the season prevents the establishment of a temporary cover. Disturbed areas shall be limed and fertilized prior to temporary seeding.
- J. Permanent vegetation shall be established as specified on all exposed areas within 7 days or less according to State NPDES General Stormwater Permits after final grading. Mulch as necessary for seed protection and establishment. Lime and fertilize seedbed prior to permanent seeding.
- K. Slopes shall be permanently seeded and mulched. Any slopes that erode easily shall be temporarily seeded and mulched. Any slopes deeper than 3:1 or steeper or as indicated on Drawings shall be protected with Erosion Control Blanket per specifications.
- L. All storm drainage outlets must be stabilized, as specified, before the discharge points become operational. Equip all inlets with inlet protection immediately upon construction.
- M. Manufactured insert inlet protection shall be installed and anchored in accordance with the manufacturers recommendations and design details. The Contractor shall maintain all manufactured insert inlet protection units until the project is stabilized and shall remove and

- dispose of the sediment accumulation properly when the units are more than 1/3 full. Replace and reinstall the unit if necessary.
- N. Discharge from dewatering operations for the excavated areas shall not be directed to surface waters without first properly removing the suspended sediment through filtration and/or settlement. The Contractor shall obtain any required permits associated with dewatering activities.
- O. Silt fence shall be installed at locations on the Drawings and any additional locations necessary for proper sediment control. The Contractor shall maintain the silt fence until the project is stabilized and shall remove and dispose of the silt fence and silt accumulation when 1/3 the height of the fence is reached.
- P. Filter Socks shall be placed at locations indicated on plans or as directed by the Engineer. They should be installed parallel to the base of the slope or other affected area. The Contractor shall maintain the Filter Socks and they shall be inspected weekly and after each rain event. If the Filter Sock requires repair, it shall be repaired in accordance with the manufacturer's recommendations or replaced within 24 hours of inspection notification. Biodegradable filter socks shall be replaced after 6 months; photodegradable filter socks after 1 year. Polypropylene socks shall be replaced according to the manufacturer's recommendations.
- Q. Soil erosion and sediment control shall include but not be limited to the approved measures. The Contractor shall be responsible for providing all additional measures that may be necessary to accomplish the intent of the Drawings.
- R. Comply with all other requirements of authorities having jurisdiction.
- S. Soil Stabilization and Temporary Seeding:
1. Soil stabilization seeding shall consist of the application of the following materials in quantities as further described herein for stockpiles and disturbed areas left inactive for more than 14 days.
 - a. Lime.
 - b. Fertilizer.
 - c. Seed.
 - d. Mulch.
 - e. Maintenance.
 2. Temporary Seeding is to be placed and maintained over all disturbed areas prior to Permanent Seeding. Maintain Temporary Seeding until such time as areas are approved for Permanent Seeding. As a minimum, maintenance shall include the following:
 - a. Fix-up and reseeded of bare areas or re-disturbed areas.
 - b. Mowing for stands of grass or weeds exceeding 6 inches in height.
- T. Topsoil and Permanent Seeding: conform to the requirements of Section "Soil Preparation" and Section "Turf and Grasses."

END OF SECTION

SECTION 329113 – SOIL PREPARATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Section includes general administrative and procedural requirements for all work. The administrative and procedural requirements included in this Section are to expand the requirements specified in Division 01.

1.2 SUMMARY

- A. This section includes provisions for the placement of topsoil in conformance with the lines, grades and thicknesses as shown on the Drawings and as herein specified.
- B. Minimum thickness is 6 inches, for all areas disturbed during construction and not receiving other surface treatment.
- C. The Contractor shall furnish all materials and perform all work in accordance with these specifications, drawings, and instructions provided by NOVA.

1.3 SUBMITTALS

- A. Samples: Furnish earth materials to the testing laboratory for analysis and report, as directed by the Engineer or as outlined in the specifications.
- B. Quality Control Submittals:
 - 1. Test Reports: The testing laboratory shall submit written reports of all tests, investigations, and recommendations to the Contractor and the Engineer. Indicate quantities of materials necessary to bring topsoil into compliance with textural/gradation requirements. Indicate quantity of lime and quantity and analysis of fertilizer.

1.4 REFERENCES

- A. Comply with the latest edition of the following standards:
 - 1. “Standard Specifications, Construction and Materials, Virginia Department of Transportation, Office of Engineering.”
 - 2. “Standard Specifications for Highway Materials and Methods of Sampling and Testing, American Association of State Highway and Transportation Officials (AASHTO).”
 - 3. ASTM International (ASTM)
 - a. C33, Standard Specification for Concrete Aggregates.
 - b. C602, Standard Specification for Agricultural Liming Materials
 - 4. U.S. Bureau of Reclamation (USBR)
 - a. 514.4.4, Reclamation Instructions, Series 510—Land Classification Techniques and Standards, Part 514—Laboratory Procedures, Chapter 4—Particle-Size Analyses.

- b. 14.8.7, Reclamation Instructions, Series 510—Land Classification Techniques and Standards, Part 514—Laboratory Procedures, Chapter 8—Soil Chemical Tests

1.5 QUALITY ASSURANCE

- A. Provide and pay for all costs in connection with an approved independent testing facility to determine conformance of soils and aggregate with the specifications.

1.6 PROJECT CONDITIONS

- A. Coordinate the placement of topsoil with the completion of all underground work including that of the other trades.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Topsoil: Natural, friable, fertile, fine loamy soil possessing the characteristics of representative topsoils in the vicinity which produces a heavy growth; free from subsoil, objectionable weeds, litter, sods, stiff clay, stones larger than 1 inch in diameter, stumps, roots, trash, toxic substances, or any other material which may be harmful to plant growth or hinder planting operations. Contractor is to verify amount stockpiled and supply any additional as needed:
 1. Topsoil shall contain not less than 6% nor more than 20% organic matter as determined by the wet combustion method (chronic acid reduction); topsoil shall have a pH value of not less than 5.5 nor more than 7.0.
 2. Topsoil shall meet the following mechanical analysis:

SIZE OF SCREEN	% OF SOIL RETAINED	% OF SOIL PASSING
1"	0	100
1/4	3	97
No. 100	40-60	40-60

3. Imported topsoil in which more than 60% of the material passing a No. 100 sieve shall be rejected. All percentages are to be based on the dry weight of the samples.
4. Laboratory tests of the topsoil shall be performed by a certified testing laboratory, and shall perform tests for the following:
 - a. Sieve particle size analysis and gradient of mineral content
 - b. Chemical analysis of the following:
 - 1) pH and buffer pH.
 - 2) Percent of organic content.
 - 3) Nutrient levels of phosphorus, potassium magnesium, manganese, iron, zinc and calcium.
 - 4) Soluble salt.
 - 5) Cation exchange capacity (CEC).

- c. Recommended fertilizer and rate of application for low and medium level nutrient soils.

2.2 MATERIAL ACCEPTANCE

- A. Topsoil may be acquired from approved sites that are designated on the Drawings. If no sites are designated, material proposed for use as topsoil must be stockpiled, sampled, and tested prior to use.
- B. Topsoil containing foreign material may be rejected based on visual examination by the Engineer, prior to testing.
- C. Acceptance of topsoil shall be based upon test results. Tested topsoil must be approved in writing by the Engineer before any material is used.

2.3 SOIL AMENDMENT

- A. Textural Amendments: Amend as necessary to conform to required composition by incorporating sand, peat, manure, or sawdust
- B. Fertilizer: Shall be delivered to the site, mixed as specified, in the original unopened standard size bags showing weight, analysis and name of manufacturer. Store fertilizer in a weatherproof place and in such a manner that it shall be kept dry and its effectiveness shall not be impaired.
 - 1. Percentages of nitrogen, phosphorus and potash shall be based on laboratory test recommendations. For the purpose of bidding, assume 10% nitrogen, 6% phosphorus and 4% potash by weight. At least 50% of the total nitrogen shall contain no less than 3% water-insoluble nitrogen. At least 60% of the nitrogen content shall be derived from super-phosphate containing not less than 18% phosphoric acid or bone meal containing 25% to 30% phosphoric acid and 2% to 3% nitrogen. Potash shall be derived from muriate of potash containing 55% to 60% potash.
 - 2. Grass or sodded areas shall have fertilizer applied according to soil text report or as specified on the drawings.
- C. Organic Matter: Leaf matter and yard waste composted sufficiently to break down all woody fibers, seeds, and leaf structures, and free of toxic and non-organic matter. Organic matter shall be commercially prepared compost. Coarse sand shall be clean, sharp, natural sands free of limestone, shale and slate particles, ASTM C33 fine aggregate with a Fines Modulus Index of 2.75 or greater.
- D. Lime: Shall be ground palletized, or pulverized lime manufactured to meet agricultural standards and contain a maximum of 60% oxide.

PART 3 - EXECUTION

3.1 STOCKPILING

- A. Stockpile topsoil from on-site sources or provide from off-site sources and stockpile, if on-site quantities are deficient.

- B. Stockpiles are to contain not less than 200 cubic yards or the minimum required for the project.
- C. Stockpiles are to have a maximum height of 10 feet and be trimmed to uniform surfaces and slopes.
- D. The sites of all stockpiles and adjacent areas, which have been disturbed are to be graded and put into an acceptable condition by seeding, as directed by the Engineer.

3.2 PREPARATION

- A. Preparation - Disk, drag, harrow or hand rake subgrade to a depth of 3 inches to provide bond for topsoil. Topsoil, which must be transported across finished walks, shall be delivered in such a manner that no damage will be done to the walks. The Contractor shall be responsible for the repair of such damage.
- B. Before placing topsoil, rake subsoil surface clear of stones larger than 1.5 inches, debris, and roots. Compact topsoil to form a layer with minimum depth of 4 inches in lawn areas and 12 inches in shrub beds. Topsoil shall be placed so that after final settlement there will be good drainage (and conforming to elevations shown on drawings). Contractor is to maintain surfaces and place any additional topsoil necessary to replace that which may have eroded before acceptance.
- C. Locations containing unsuitable subsoil shall be treated in one of the following manners:
 - 1. Where unsuitability within the construction site is deemed by the Owner to be due to excessive compaction caused by heavy equipment or by the presence of boards, mortar, concrete or other construction materials in subgrade, and where the natural subsoil is other than A.A.S.H.T.O. classification of A6 or 7, the Contractor shall loosen such areas with spikes, discs, or other means to loosen the soil to a condition acceptable by the Owner. The Contractor shall also remove all debris and objectionable material. Soil should be loosened to a minimal depth of 12 inches with additional loosening as required to obtain adequate drainage. Contractor may introduce peat moss, sand, or organic matter into the subsoil to obtain adequate drainage should he so desire. All such remedial measures shall be considered as incidental to the work and no extra payment shall be made for this part of the work; and
 - 2. Where subgrade is deemed by the Owner to be unsuitable because the natural subsoil falls into an AASHTO classification of A6 or 7 and contains moisture in excess of 30%, then such a condition shall be rendered suitable by installation of a subdrainage system or by other means described elsewhere in these specifications. Where such conditions have not been known or revealed prior to planting time and where they have not been recognized in the preparation of drawings and specifications, then the Owner shall issue a change order to install the proper remedial measures, all of which shall be in addition to the contract sum.

3.3 TOPSOIL PLACEMENT

- A. Do not place topsoil when subsoil or topsoil is frozen, excessively wet, or otherwise detrimental to the Work.

- B. Mix soil amendments, lime, and fertilizer with topsoil before placement or spread on topsoil surface and mix thoroughly into entire depth of topsoil before planting or seeding. Delay mixing of fertilizer if planting or seeding will not occur within 3 days.
- C. Place 1/2 of total depth of topsoil and work into subgrade soil to create a transition layer. Place remainder of topsoil to depth after compacting to 75% where seeding and planting are scheduled.
- D. Uniformly distribute to within 1/2 inch of final grades. Fine grade topsoil eliminating rough or low areas and maintaining levels, profiles, and contours of subgrade to ensure positive drainage.
- E. Remove stones exceeding 1 inch, roots, sticks, debris, and foreign matter during and after topsoil placement.
- F. Remove surplus subsoil and topsoil from Site. Grade stockpile area as necessary and place in condition acceptable for planting or seeding.

3.4 CLEANING

- A. Remove all surplus subsoil and topsoil from project site.
- B. Leave the site in clean, satisfactory condition ready to receive subsequent operations.

END OF SECTION

SECTION 329200 – TURF AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This Section includes general administrative and procedural requirements for all work. The administrative and procedural requirements included in this Section are to expand the requirements specified in Division 01.

1.2 SUMMARY

- A. This Section includes the preparation of ground surfaces, fertilization of applicable areas, seeding, mulching of applicable surface areas, and maintenance of turf areas until such time as project is accepted by Engineer. Applicable areas shall include any grass areas that are disturbed or damaged during construction.
- B. Seed shall be sown from April 1 to June 15, or from August 15 to October 15 of given calendar year, unless otherwise approved NOVA.

1.3 SUBMITTALS

- A. Quality Control Submittals:
 - 1. Certification:
 - a. Submit manufacturers or vendor's certified analysis for soil amendments and fertilizer materials.
 - b. Submit vendor's certified analysis for each grass seed mixture required, stating botanical and common name, percentages by weight, percentages by purity, germination, and weed seed.
 - B. Maintenance Instructions: Submit instructions recommending procedures to be implemented for maintenance of landscaped work for one (1) full year. Submit prior to expiration of Contractor's maintenance period.
 - C. Submit description of planned mulching techniques and corresponding manufacturer's installation recommendations for approval by Engineer.

1.4 QUALITY ASSURANCE

- A. All turf and grasses work shall be performed by the Contractor (or Sub-Contractor), with proven expertise in this type of construction.
- B. Package standard products with the manufacturer's certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists, wherever applicable.
- C. The Contractor shall provide and pay for all costs in connection with an approved independent testing facility to determine conformance of materials with the specifications.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver packaged materials in containers, showing weight, analysis, and name of manufacturer. Protect materials from deterioration during delivery, and while stored on site.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Fertilizer:
 - 1. Commercial fertilizer (5-10-5) inorganic, or organic, containing not less than five (5) percent nitrogen, ten (10) percent available phosphoric acid, and five (5) percent water soluble potash.
 - 2. If, as an alternative, the Contractor wishes to substitute for commercial fertilizer 5-10-5, another commercial fertilizer with a 1-2-1 ratio, such as 10-20-10 or 6-12-6, they may do so with the approval of the Engineer and the rate of fertilizer to be used shall be whatever amount is required to furnish the same amount of nitrogen as would be supplied by the 5-10-5.
- B. Seed:
 - 1. Seed shall be fresh, clean, new-crop seed mixed in the proportions specified for species and variety, conforming to Federal and State Standards.
 - 2. Use the following standard mixture blue seal classic, unless a special mixture is otherwise indicated or approved by the Engineer.

SPECIES	% BY WEIGHT	% BY PURITY	% BY GERMINATIO N
Kentucky Bluegrass*	60	85	80
Creeping Red Fescue	20	95	85
Perennial Rye	20	95	85
<i>*Kentucky Bluegrass must consist of a minimum of two varieties.</i>			

- 3. Weed seed content shall not exceed 0.25%.

- C. Mulch:
 - 1. Provide and install a mulch adequate to protect the seeding during its growing period. It shall be the responsibility of the Contractor to determine the appropriate mulching techniques for the particular site conditions and acquire approval of the same from the Engineer.
 - 2. Clean straw for gentle slopes, consisting of stalks of oats, wheat, rye, or other approved crops which are free of noxious weed seeds. Weight shall be based on a fifteen (15) percent moisture content.
 - 3. Mulching blanket for steep slopes and drainage swales: “Curlex Blanket” by American Excelsior, “Ero-Mat” by Contech Construction Products, Inc, or approved equal.
 - 4. Bonded fiber matrix for mulching in areas where slopes are 1.5H:1V or greater or cut or fill slopes 20 feet (6m) or more in height. Product shall be EcoAegis as

manufactured by Canfor, or approved equal meeting U.S. DOT Standard Specification FP-96, Section 713.05(h)

- a. Package Weight: 50-pound (18.6kg) bags.
 - b. Moisture Content: 12 +/- 3 percent by weight.
 - c. Minimum Water Holding Capacity: Approximately 10 times dry weight.
 - d. Composition:
 - 1) Refined Softwood Fiber: (90% by weight).
 - 2) Blended Hydrocolloid-based Binder: (9% by weight).
 - 3) Mineral Activator: (1% by weight).
 - e. Color: Natural – No Dye Products.
- D. Water: Clean and potable.

2.2 ACCESSORIES

- A. Soil Amendments: Soil amendments are not to be made without review and authorization by the Engineer.
1. Lime: Natural limestone containing not less than 85% of total carbonates, ground so that not less than 90% passes a 10-mesh sieve and not less than 50% passes a 100-mesh sieve.
 2. Aluminum Sulfate: Commercial grade.
 3. Peat Humus: FS Q-P-166 and with texture and pH range suitable for intended use.
 4. Bonemeal: Commercial, raw, finely ground; 4% nitrogen and 20% phosphoric acid.
 5. Superphosphate: Soluble mixture of treated minerals; 20% available phosphoric acid.
 6. Sand: Clean, washed sand, free of toxic materials.
 7. Perlite: Conforming to National Bureau of Standards PS 23.
 8. Vermiculite: Horticultural grade, free of toxic substances.
 9. Sawdust: Rotted sawdust, free of chips, stones, sticks, soil, or toxic substances and with 7.5 pounds (2.8 kg) nitrogen uniformly mixed into each cubic yard of sawdust.
 10. Manure: Well-rotted, unleached stable or cattle manure containing not more than 25% by volume of straw, sawdust, or other bedding materials and containing no chemicals or ingredients harmful to plants.
 11. Commercial Fertilizer: Complete fertilizer of neutral character, with some elements derived from organic sources and containing available plant nutrients.
 12. Composted Organic Material: Shall have a minimum organic matter content of 60 percent, as determined by ASTM D-2974, and screened to ¾-inch (1.9 cm).

PART 3 - EXECUTION

3.1 PREPARATION OF TOPSOIL

- A. Clean topsoil of roots, plants, stones, clay lumps and other extraneous materials harmful or toxic to plant growth.
- B. Mix fertilizer into top 2 inches (5 cm) of topsoil at a rate of 10 pounds (3.7 kg) per 1,000 square feet. (92.9 m²)
- C. Mix approved soil amendments into top 2 inches (5cm) of topsoil at necessary rates.

- D. Water dry topsoil to depth of 4 inches (10cm) at least 48 hours prior to seeding to obtain a loose friable seed bed.

3.2 PREPARATION OF UNCHANGED GRADES

- A. Where lawns are to be planted in areas not altered or disturbed by excavating, grading, or stripping, prepare soil for seeding as follows:
 - 1. Till to a depth of not less than 6 inches (15cm).
 - 2. Apply soil amendments and initial fertilizers as specified.
 - 3. Remove high areas and fill in depressions.
 - 4. Till soil to a homogeneous mixture of fine texture, free of lumps, clods, stones, roots, and other extraneous matter.
 - a. Prior to preparation of unchanged areas, remove existing grass, vegetation and turf. Dispose of such materials off the site; do not turn over into soil being prepared for lawns.
 - b. Apply specified commercial fertilizer at rates specified and thoroughly mixed into upper 2 inches (5 cm) of topsoil. Delay application of fertilizer, if lawn planting will not follow within one week.

3.3 SEEDING

- A. Apply seed only when wind velocities are less than five (5) miles per hour (9km/hr).
- B. Sow half the seed with mechanical seeder.
- C. Sow remaining half of the seed at right angles to the direction of the first seeding pattern, using the same method.
- D. Apply seed at the rate of 4 pounds (1.5 kg) per 1,000 square feet (92.9 sq. meters) of disturbed area.
- E. Cover seed to a depth of 1/8-inch (3mm) by raking, harrowing, or cultipacking.
- F. Roll seeded area with roller weighing no more than 150 pounds per foot of roller width.
- G. Water seeded areas to a depth of four (4) inches (10cm) as required during the maintenance period.

3.4 MULCHING

- A. Spread straw uniformly over seeded area with 75% ground coverage and at least 1-1/2 inches loose depth.
 - 1. If, in the opinion of the Engineer, wind will disrupt the mulching, apply asphalt emulsion at a rate of 10 gallons (37.81) per 1,000 square feet (92.9 m²).
- B. Place mulching blanket in accordance with submitted manufacturer's recommendations.
- C. Place bonded fiber matrix mulch material, EcoAegis, at a rate of 3,500 to 4,100 pounds per acre, based on manufacturer's recommendations.

3.5 HYDROSEEDING

- A. Mix specified seed, fertilizer, and pulverized mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.
- B. Apply slurry uniformly to all areas to be seeded. Rate of application as required to obtain specified seed sowing rate.

3.6 PROTECTION

- A. Immediately after seeding, erect barricades and warning signs as required to protect newly planted areas from pedestrian and vehicular traffic. Maintain barricades throughout maintenance period until grass and/or turf is established.
- B. Repair or replace damaged landscape work as directed by Engineer.

3.7 MAINTENANCE

- A. Begin maintenance immediately after seed placement.
- B. Watering:
 - 1. Keep soil moist during seed germination period.
 - 2. Supplement rainfall to produce a total depth penetration of 2 inches per day after germination.
 - 3. Prevent erosion and displacement of seed.
- C. Mowing:
 - 1. When grass reaches 4 inches in height, mow to 2-½ inches in height.
 - 2. Maintain grass between 1-½ inches and 2-½ inches in height.
 - 3. Do not cut off more than 30% of grass leaf in a single mowing.
 - 4. Remove grass clippings.
- D. Reseed and mulch spots larger than 1 square foot not having uniform coverage.
- E. Maintain lawns by watering, fertilizing, weeding, mowing, trimming, and other operations such as rolling, regarding, and replanting as required to establish a smooth, acceptable lawn, free of eroded or bare areas.
- F. Maintain and protect all seeded areas until final acceptance of the Contract. Final acceptance of "Turf and Grasses" will not be made until an acceptable uniform stand of grass is obtained in all new lawn areas, except that the Engineer at their discretion may accept a portion or portions of the "Turf and Grasses" at various times. Upon acceptance by the Engineer / Director's Representative of a seeded area, NOVA will immediately assume responsibility for maintenance and protection of that portion of the Contract Seeding.

END OF SECTION

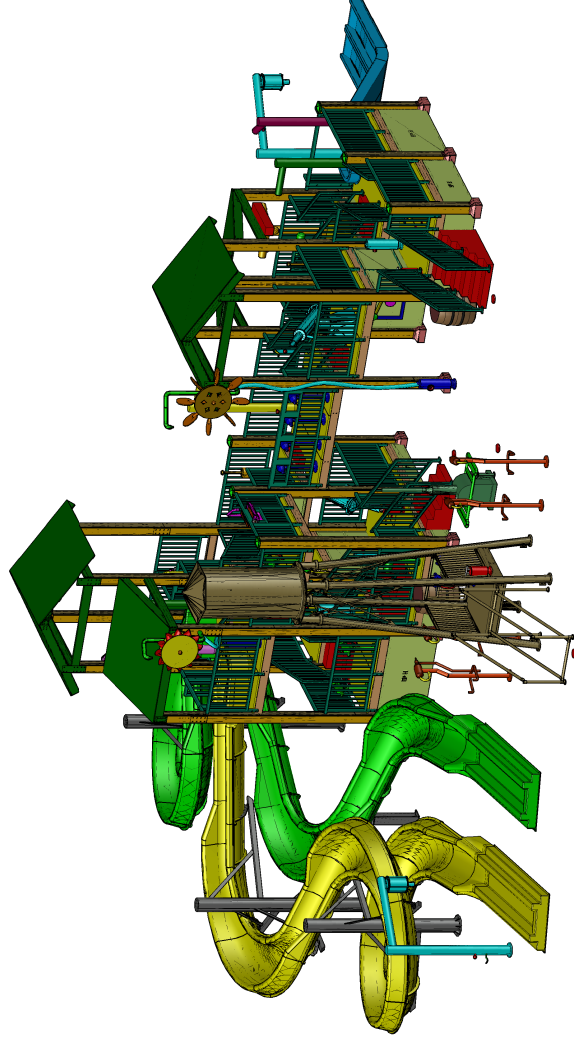
SECTION 6 :
APPENDIX 'A'



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M.D.A. : MODULAR DESIGN ASSEMBLY

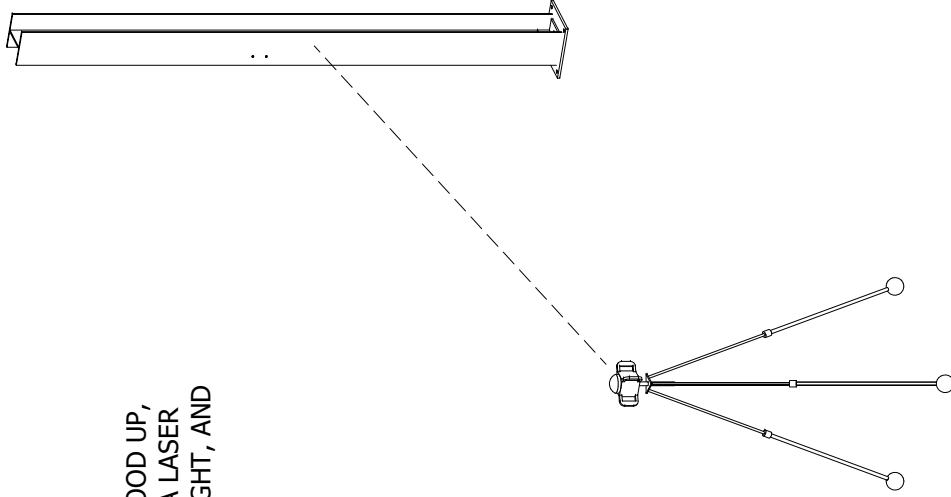
INSTALLATION PROCEDURES FOR WIZARD WORKS MULTI-LEVEL PLAY STRUCTURES



M.D.A. : MODULAR DESIGN ASSEMBLY

STAGE 2: SETTING COLUMN HEIGHTS

- 1: EACH COLUMN IS STOOD UP, MEASURED USING A LASER LEVEL, CUT TO HEIGHT, AND STOOD BACK UP.



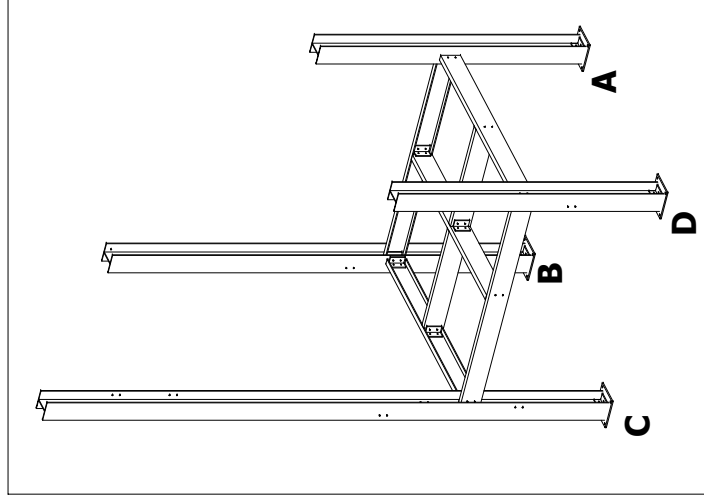
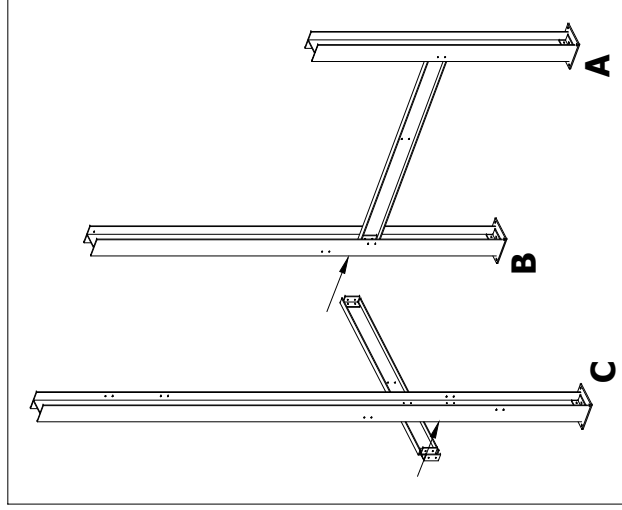
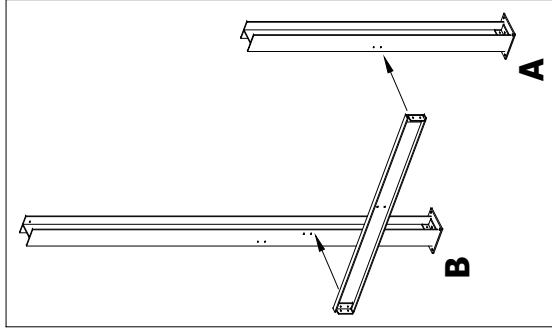


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M.D.A. : MODULAR DESIGN ASSEMBLY

STAGE 3: RAISING THE FIRST COLUMNS & INSTALLING DECK BEAMS

- 1: USING THE LASER LEVEL PROCEDURE, CUT FOUR ADJACENT COLUMNS TO THE CORRECT HEIGHT (A, B, C, D AS SHOWN)
- 2: AFTER FOUR COLUMNS ARE CUT, ERECT TWO COLUMNS AND BOLT ONE ADJOINING BEAM INTO PLACE . (ALL BEAMS ARE PRECUT AND PREDRILLED AND LABELED).
- 4: WHILE TWO CREWMEN ARE HOLDING THE TWO COLUMNS, BRING IN THE THIRD COLUMN AND BOLT IN THE ADJOINING BEAM. NOW THESE COLUMNS SHOULD SUPPORT THEMSELVES.
- 5: THEN BRING IN THE FOURTH COLUMN, AND TIE IN ALL THE ADJOINING BEAMS.



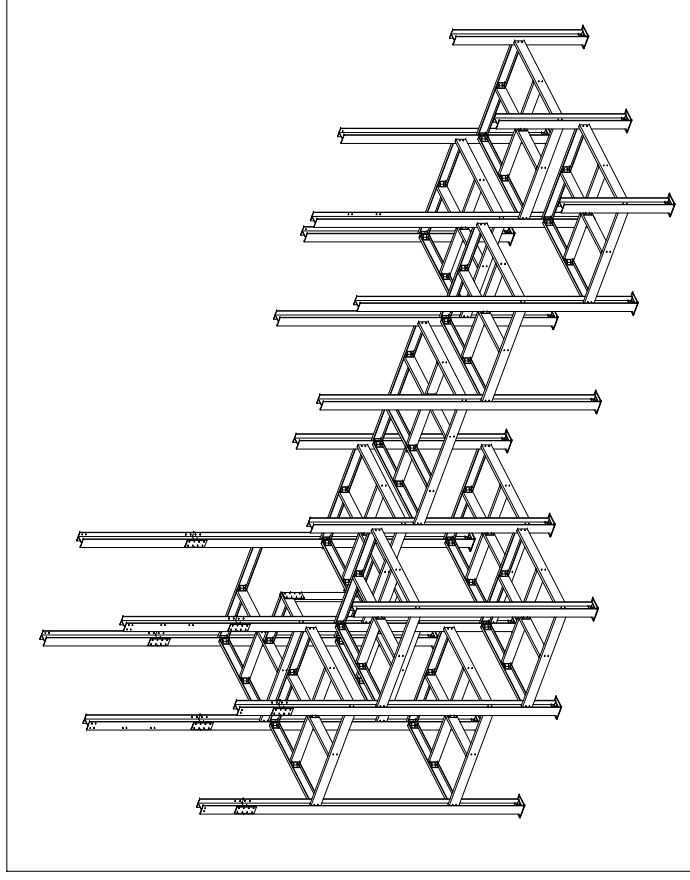
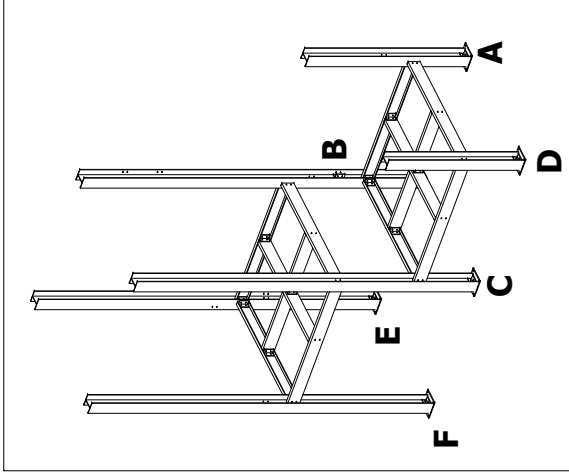
M.D.A. : MODULAR DESIGN ASSEMBLY

STAGE 4: ADDING COLUMNS AND BEAMS



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- 1: USING THE LASER LEVEL PROCEDURE, CONTINUE TO CUT COLUMNS AND ATTACH TO ERECTED COLUMNS.



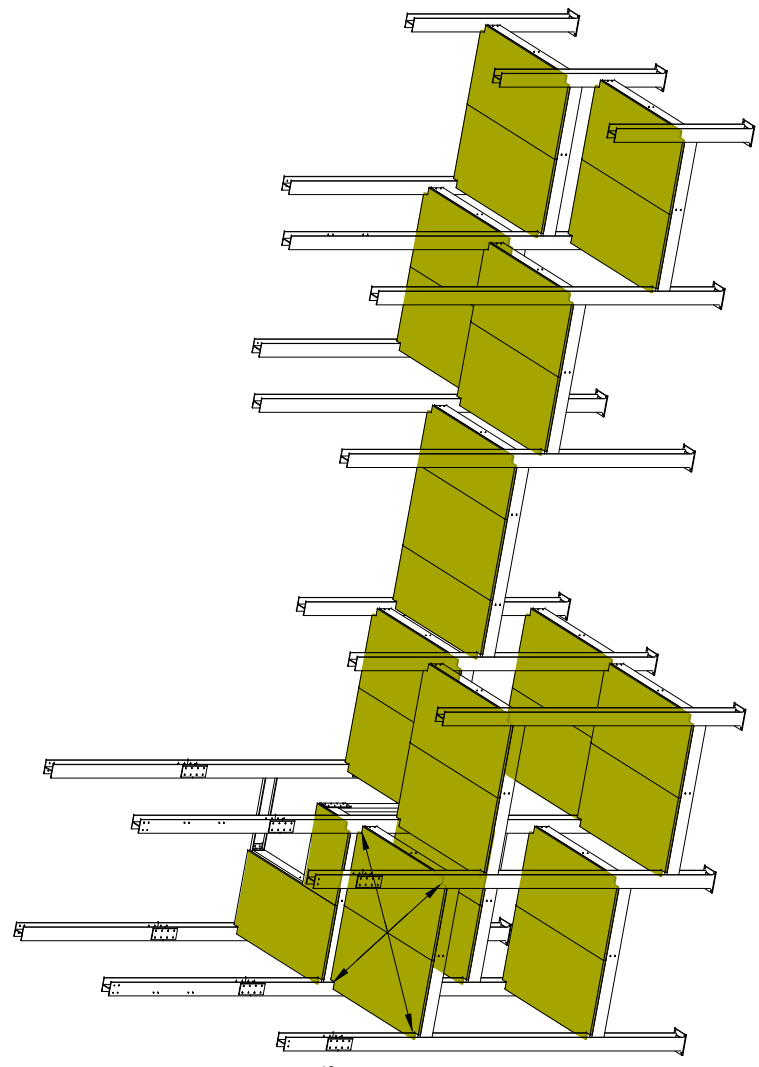
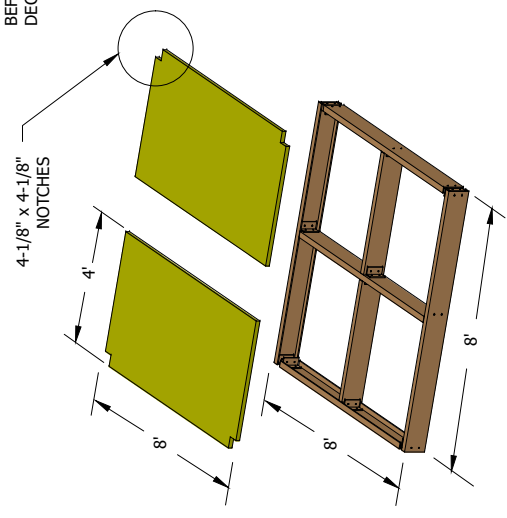


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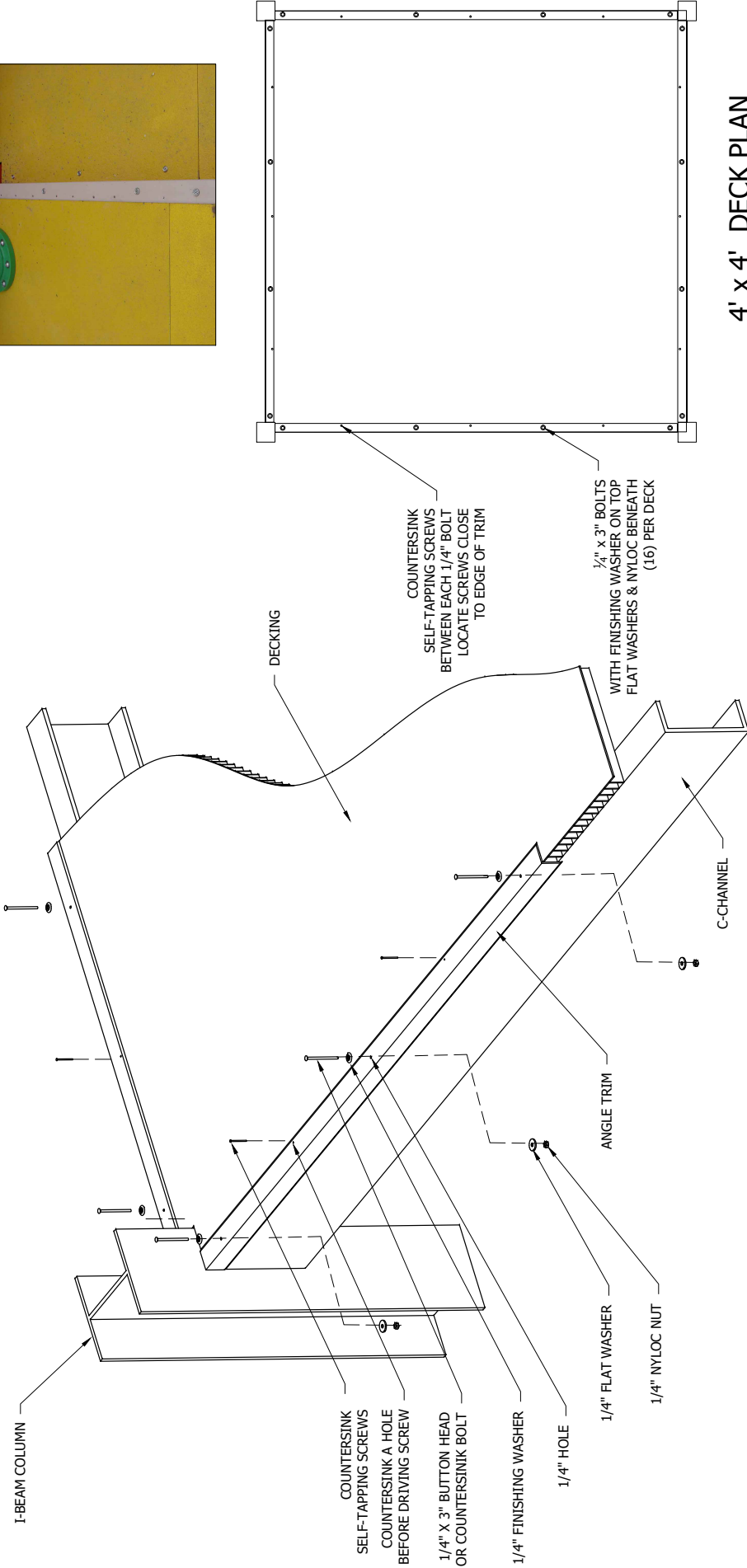
M.D.A.: MODULAR DESIGN ASSEMBLY

STAGE 5: INSTALLING DECK PANELS

- 1: AFTER ALL OF THE COLUMNS ARE SET AND THE BEAMS BOLTED IN, INSTALL THE DECKING. EACH PANEL IS 4' x 8', AND TWO PANELS MAKE ONE DECK. CUT NOTCHES IN CORNERS AT 4-1/8" x 4-1/8". BEFORE BOLTING EACH ONE IN PLACE, IT IS IMPORTANT TO MEASURE AND SQUARE THEM BY MEASURING DIAGONALLY ACROSS THE DECK AND NUDGING THE COLUMN INTO PROPER POSITION.



MEASURE DIAGONALS FOR SQUARENESS BEFORE ANCHORING DECK PANELS.



4' x 4' DECK PLAN



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 14 ELAINE COURT, LATHAM, NY 12110

REV	DATE	DESCRIPTION

JOB : GENERAL
 DRAWING NO. : DT-100
 SHEET NO. : 1 OF 1
 SCALE: NTS
 DRAWN BY: M. ARAGONA
 DATE: 6/11/10

DECK & TRIM INSTALLATION DETAIL

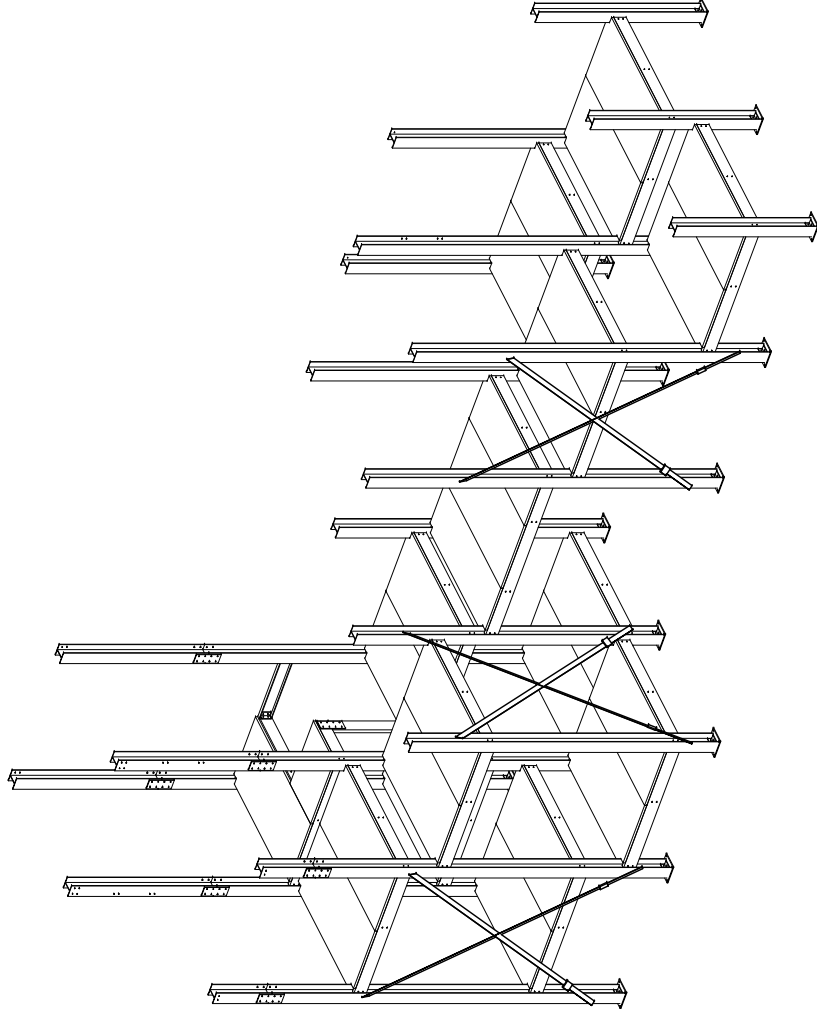
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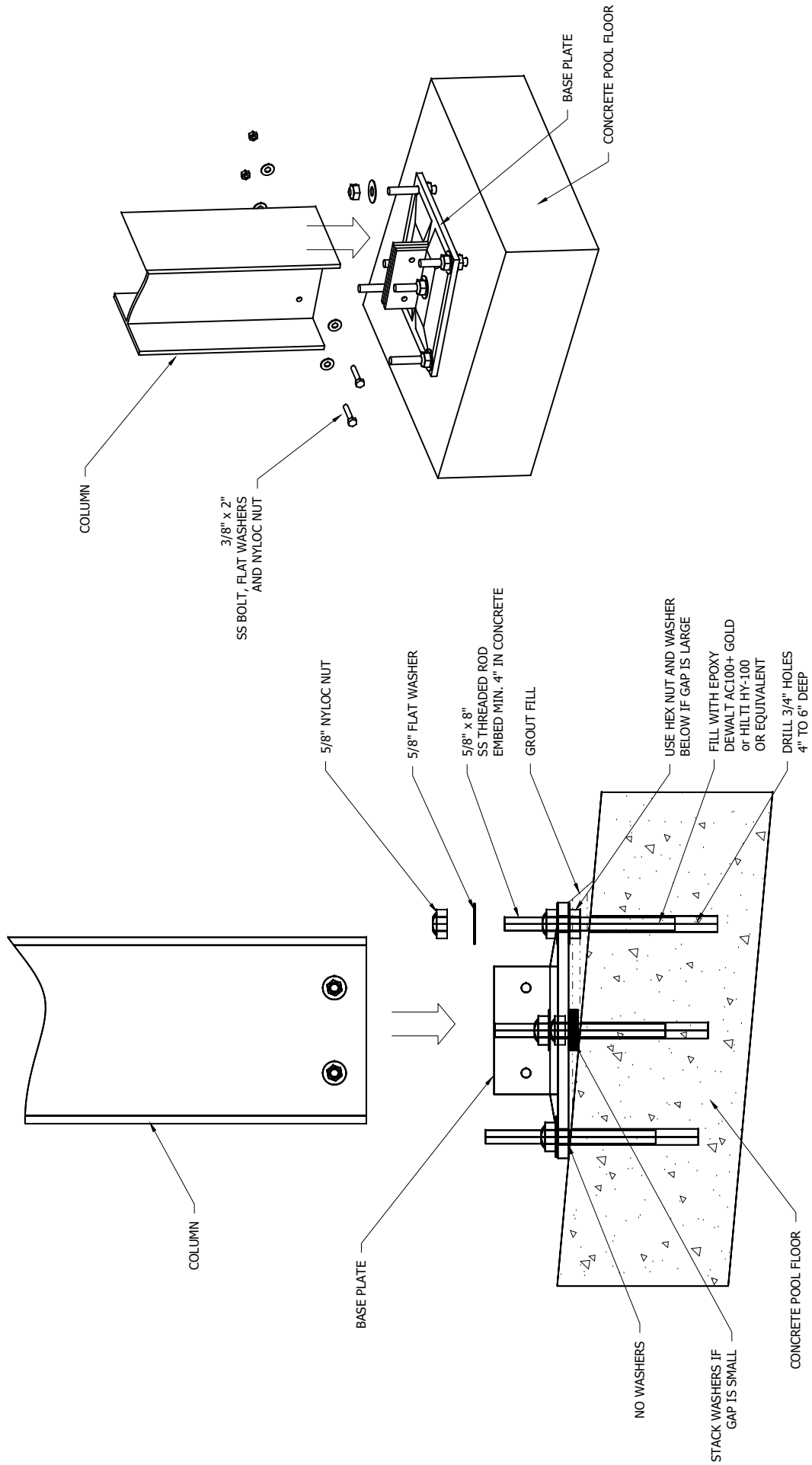
STAGE 6: ADDING COLUMNS AND BEAMS



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- 1: USING SEVERAL RATCHET STRAPS
IN A VARIETY OF LOCATIONS,
PLUMB EACH COLUMN THEN
DRILL AND ANCHOR THE BASE
PLATES. THIS REQUIRES MANY
RATCHET STRAPS AND IT IS
IMPORTANT TO BE CAREFUL
NOT TO PULL PREVIOUSLY
PLUMBED COLUMNS OUT OF
POSITION WHILE TRYING TO
PLUMB THE NEXT ONE.
- 2: DRILL AND ANCHOR ALL THE BASE
PLATES WHILE PLUMBING EACH
COLUMN.





MULTI-LEVEL PLAY STRUCTURE BASE PLATE ANCHOR DETAIL

JOB : GENERAL
 DRAWING NO. : BPAD-100
 SHEET NO. : 1 OF 1
 SCALE: 3/32" = 1"
 DRAWN BY: M. ARAGONA
 DATE: 3/25/10

REV	DATE	DESCRIPTION

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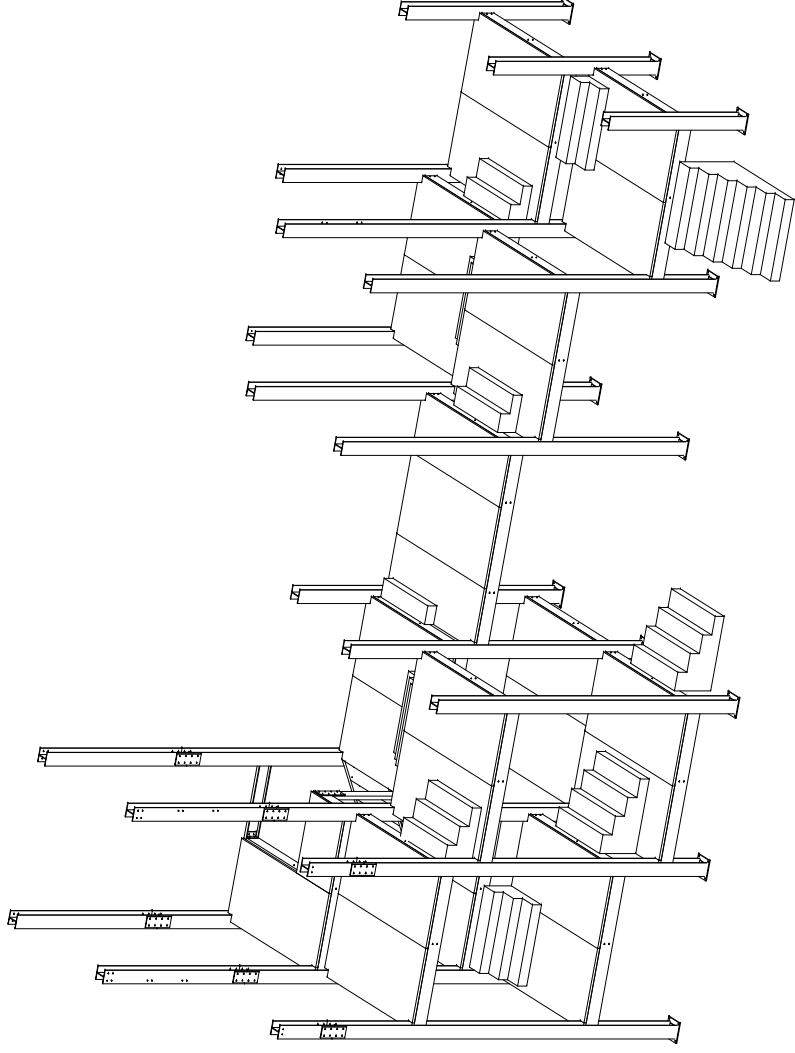


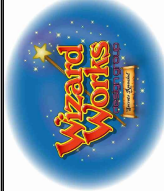
M.D.A. : MODULAR DESIGN ASSEMBLY
STAGE 7: INSTALLING STAIRS

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- 1: AFTER ALL OF THE DECKS ARE INSTALLED AND ALL BASE PLATES ARE ANCHORED, INSTALL THE STAIRS.





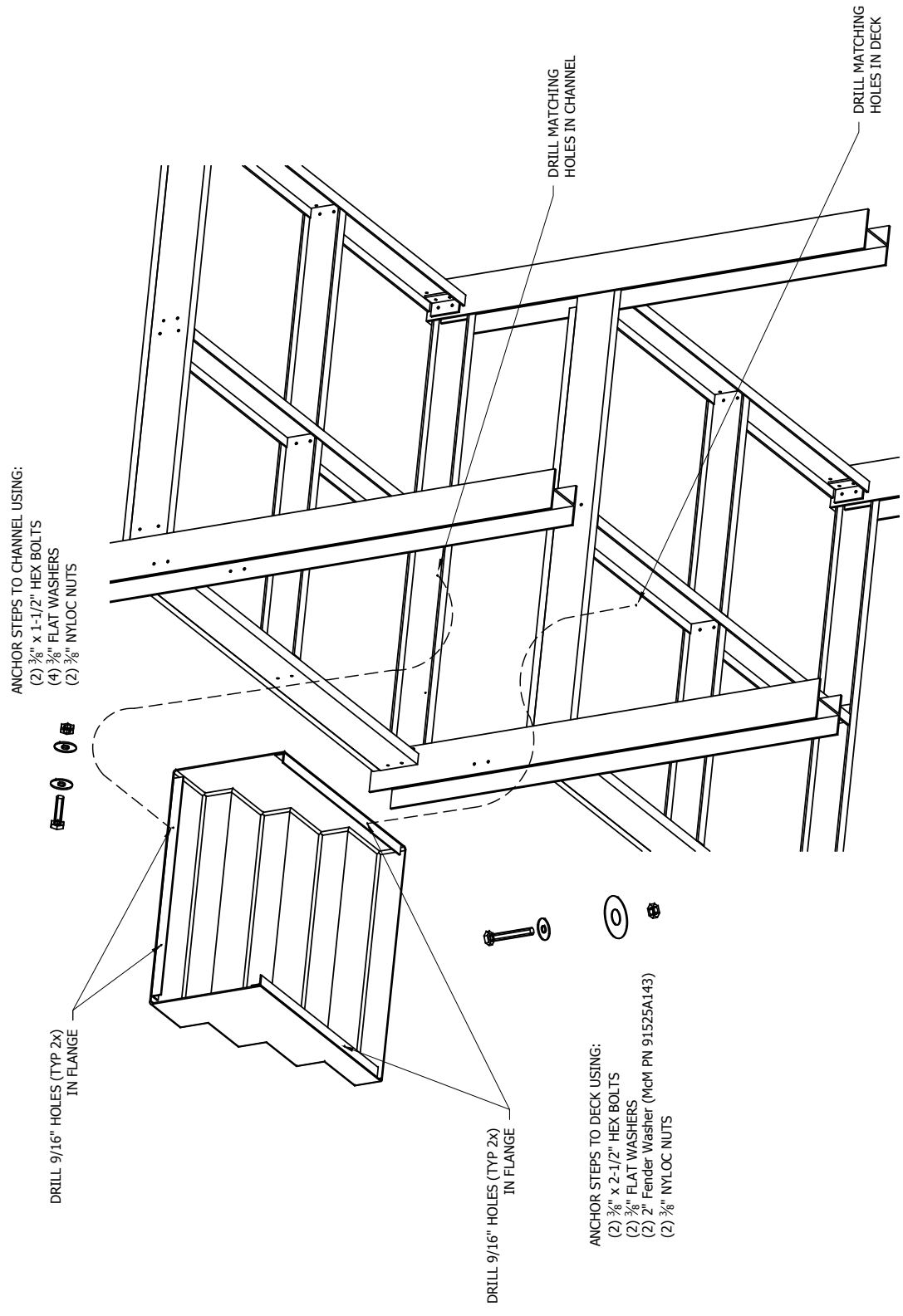
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REV	DATE	DESCRIPTION

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 DRAWING NO. : MSD-100
 SHEET NO. : 1 OF 2
 SCALE: NTS
 DRAWN BY: M. ARAGONA
 DATE: 3/26/11

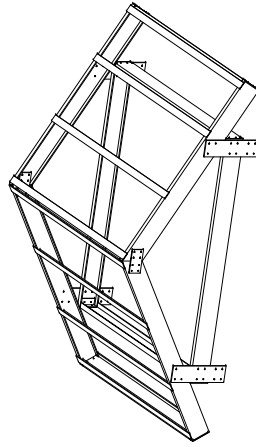
MOLDED STAIR INSTALLATION DETAIL



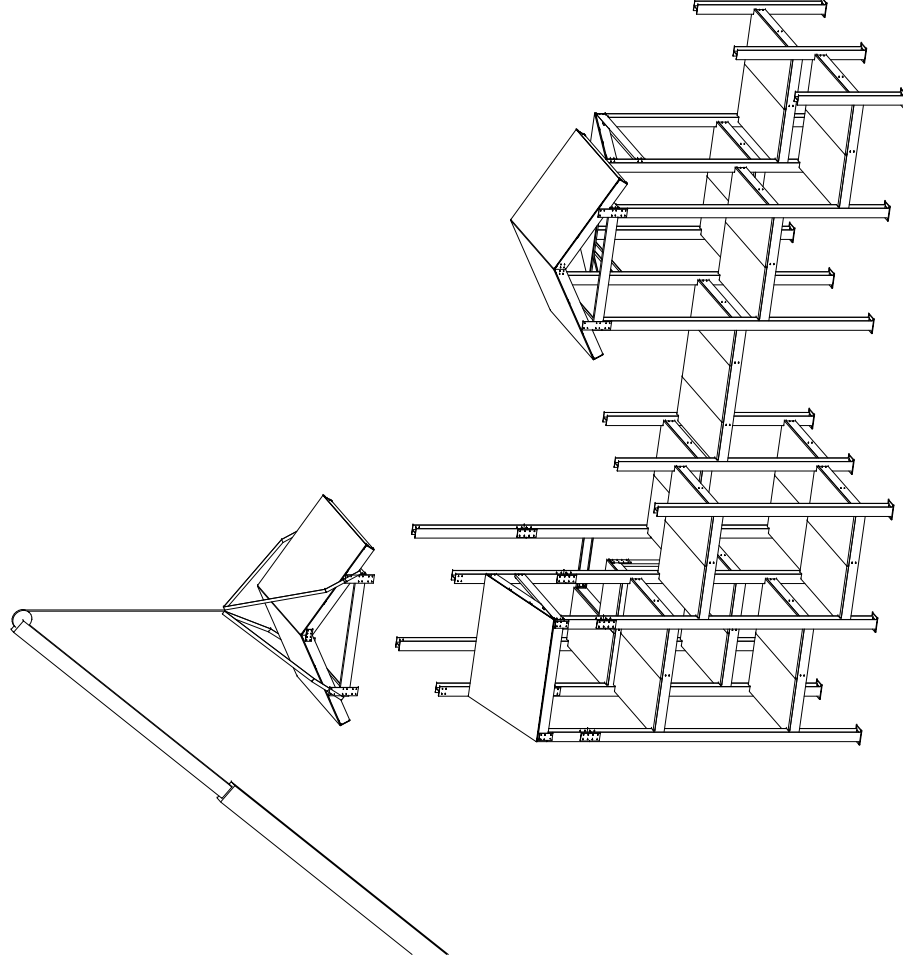
M.D.A. : MODULAR DESIGN ASSEMBLY

STAGE 8: MODULAR ROOFS

- 1: ROOFS ARE FREQUENTLY ASSEMBLED ON THE GROUND AND HOISTED INTO POSITION, THEN BOLTED IN PLACE.



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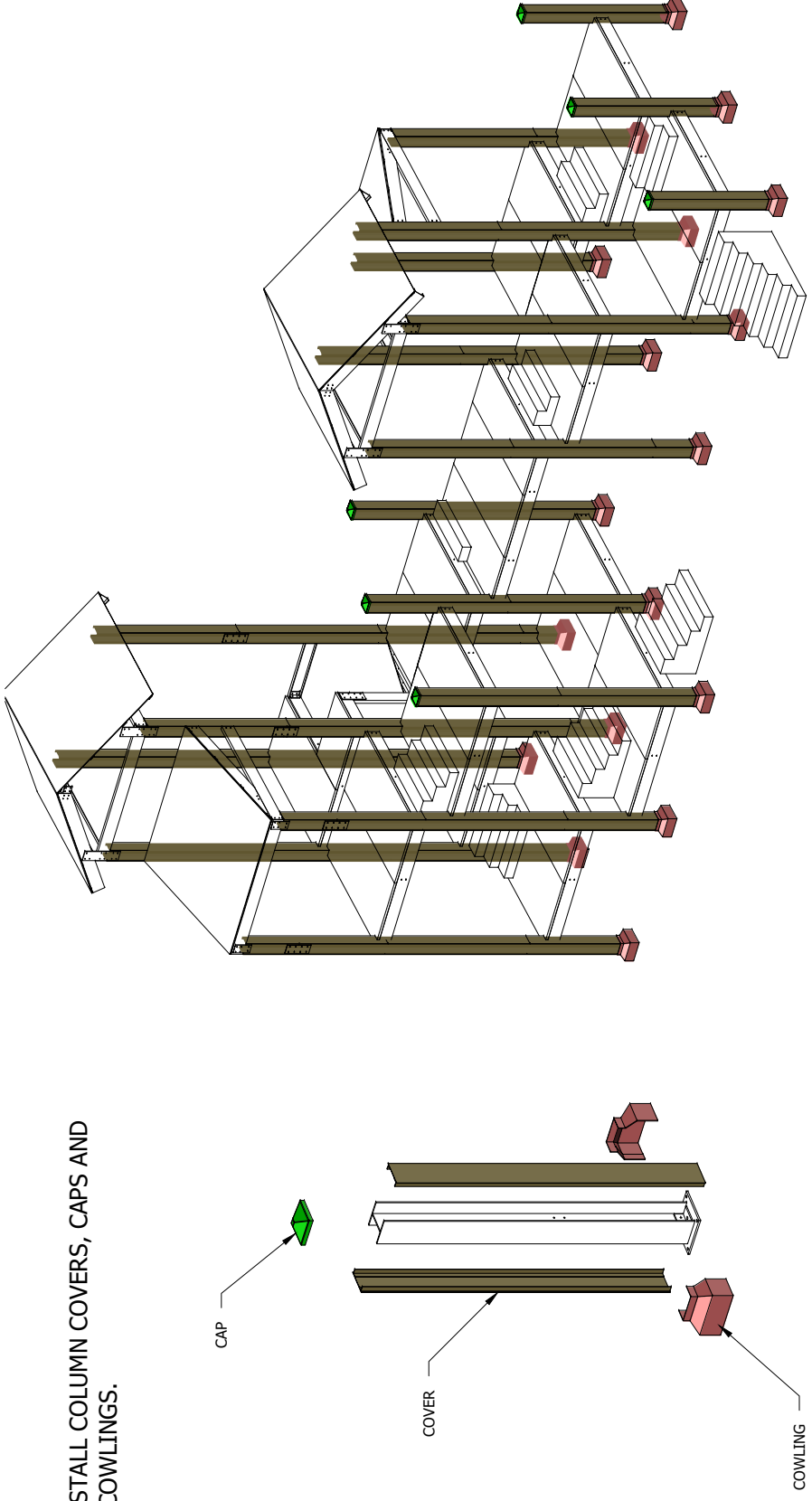


M.D.A. : MODULAR DESIGN ASSEMBLY
STAGE 9: COLUMN COVERS, CAPS AND COWLINGS

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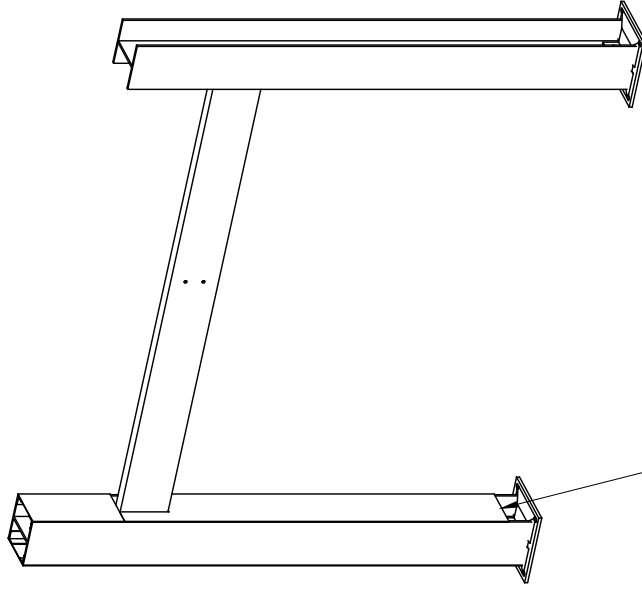
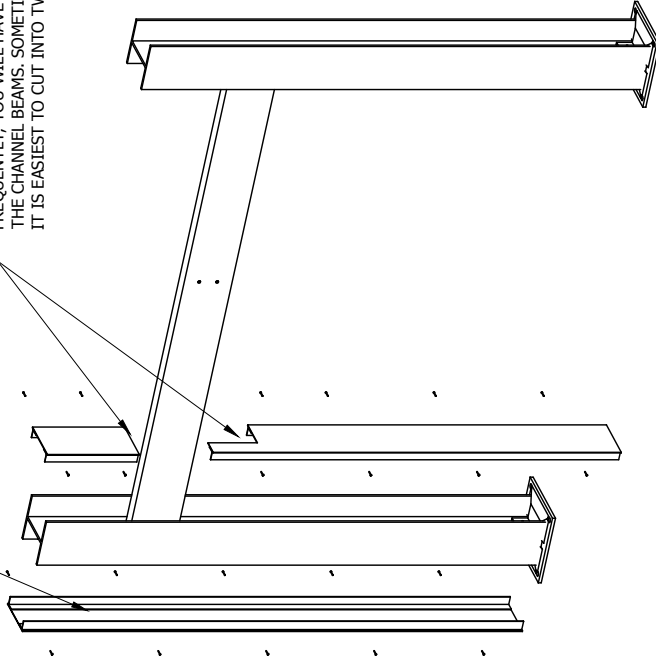


1: INSTALL COLUMN COVERS, CAPS AND COWLINGS.

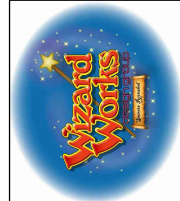


COLUMN COVER SLIPS INTO THE I-BEAM.
USE #6 SELF-TAPPING SCREWS THROUGH
THE I-BEAM INTO THE COLUMN COVER ANGLE
TO FASTEN.

FREQUENTLY, YOU WILL HAVE TO NOTCH AROUND
THE CHANNEL BEAMS. SOMETIMES YOU WILL FIND
IT IS EASIEST TO CUT INTO TWO PIECES.



IT IS NOT CRITICAL FOR THE COVER
TO REACH THE BOTTOM OF THE I-BEAM
SINCE THE COWLINGS WILL CONCEAL
THE ENTIRE BASE.



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14 Elaine Court, Latham, NY 12110

DESCRIPTION

DATE

REV

JOB : GENERAL

DRAWING NO. : COLCOV-FI

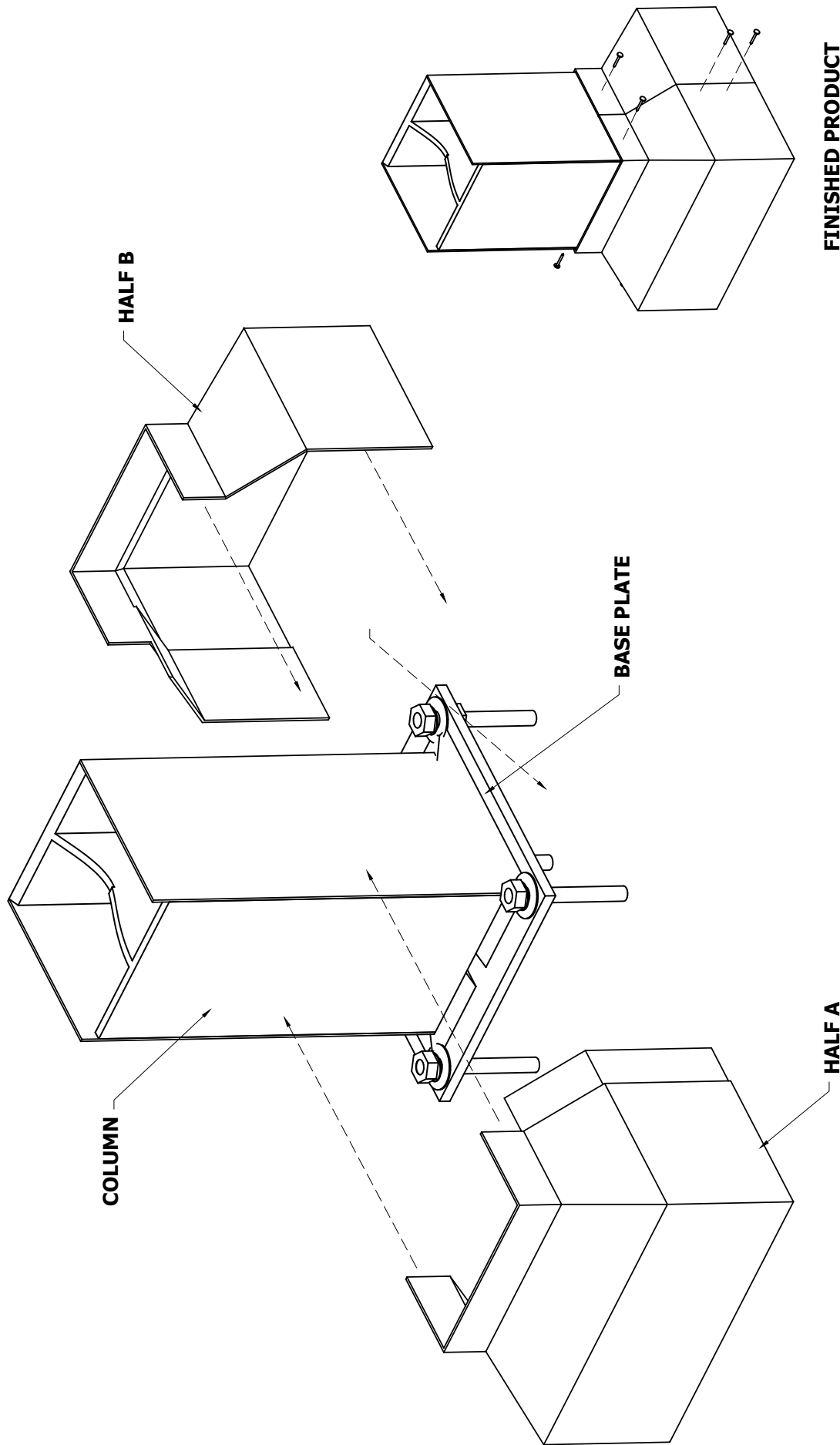
SHEET NO. : 1

SCALE:

DRAWN BY: M. ARAGONA

DATE: 7/19/13

COLUMN COVER FIELD INSTALLATION



FINISHED PRODUCT

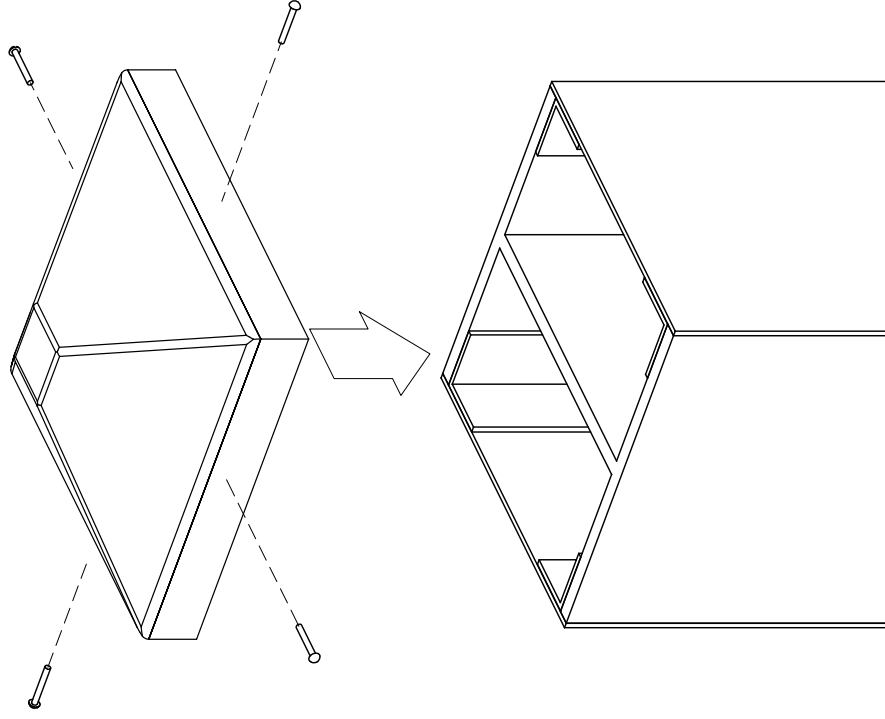
**BASE PLATE COWLING
FIELD INSTALLATIONI**

JOB : N/A
 DRAWING NO. : BPC-100
 SHEET NO. : 1 OF 2
 SCALE: NTS
 DRAWN BY: M. ARAGONA
 DATE: 6/13/16

REV	DATE	DESCRIPTION

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THE CAP IS NOT A SQUARE,
IT IS A RECTANGLE SO IT
ONLY FITS ON ONE WAY.

USE (4) #6 SELF-TAPPING
SCREWS.



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REV	DATE	DESCRIPTION

JOB : GENERAL
DRAWING NO. :
SHEET NO. : 1
SCALE:
DRAWN BY: M. ARAGONA
DATE: 4/17/17

COLUMN CAP INSTALLATION

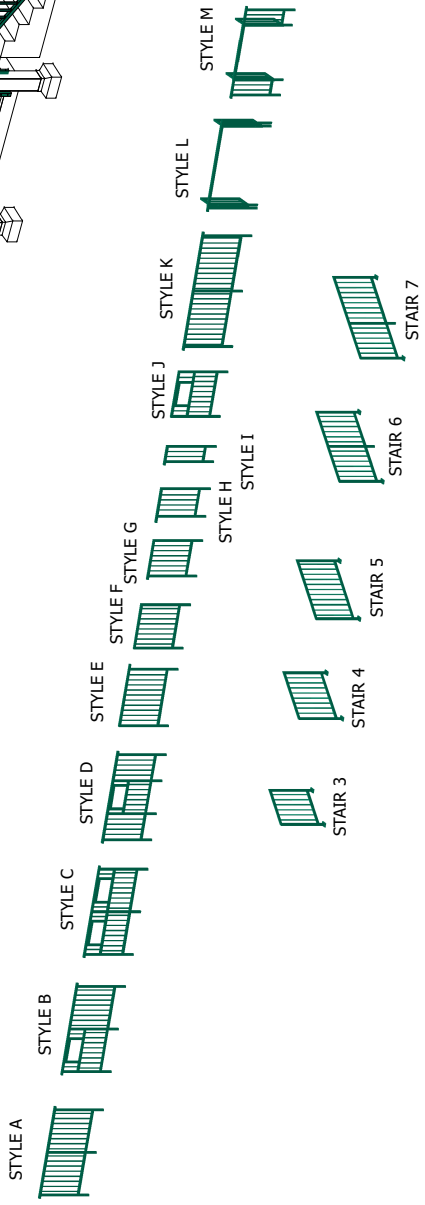
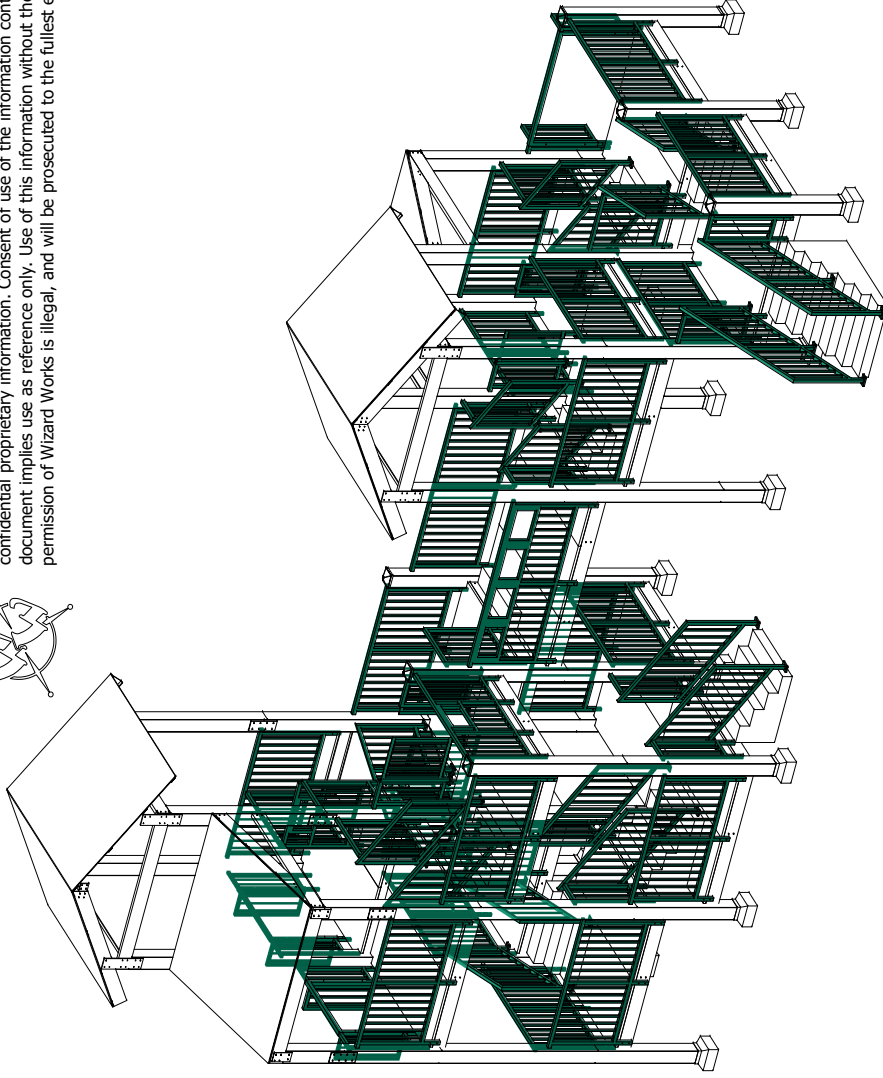
M.D.A. : MODULAR DESIGN ASSEMBLY

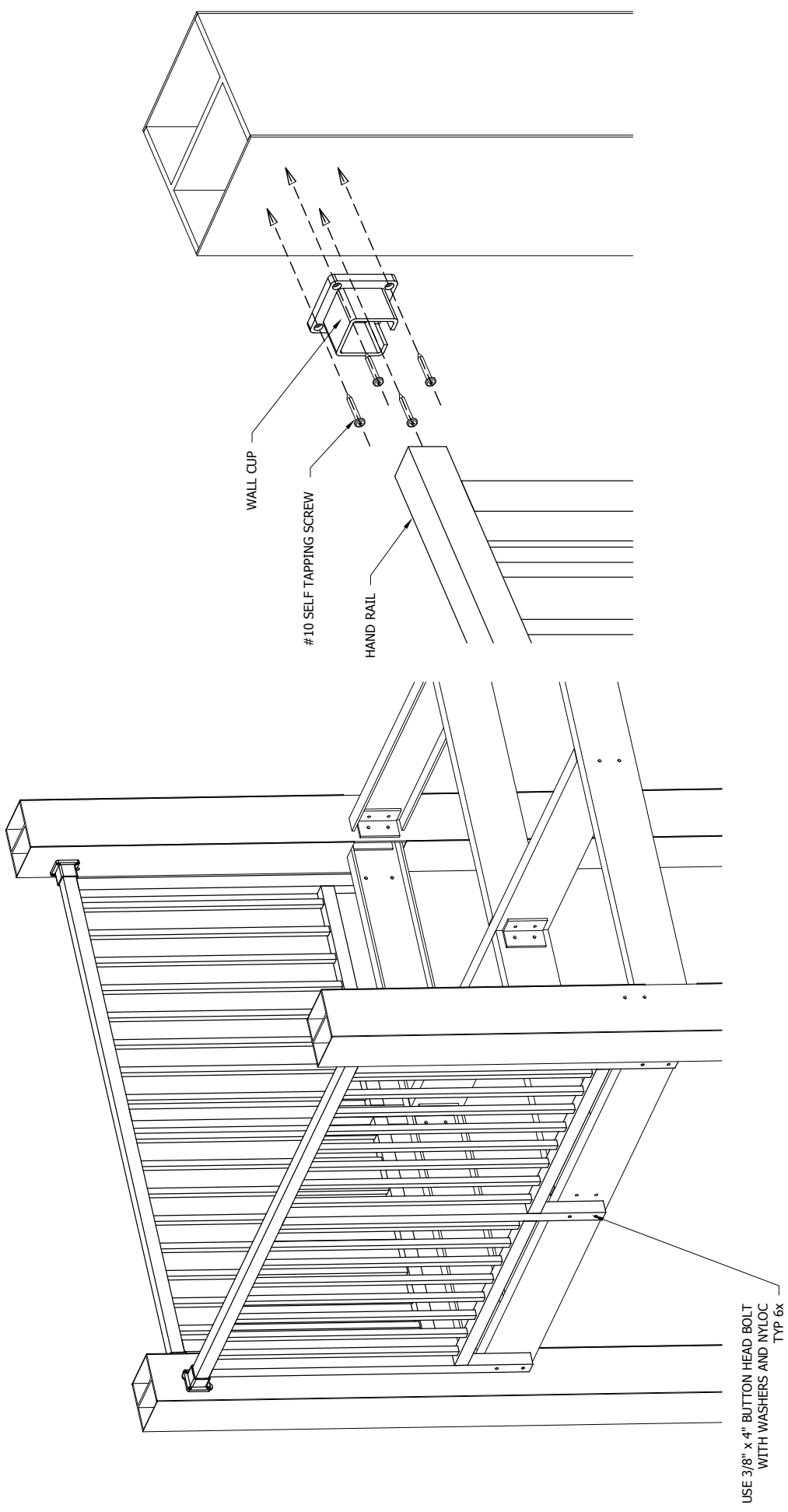
STAGE 10: HANDRAILS

1: ALL THE HANDRAILS ARE LABELED AND DESIGNED TO FIT INTO A PRE-DETERMINED LOCATION



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HANDRAIL INSTALLATION DETAIL

JOB : GENERAL
 DRAWING NO. : FRP-DK-HR-100
 SHEET NO. : 2 OF 2
 SCALE: NTS
 DRAWN BY: M. ARAGONA
 DATE: 3/26/11

REV	DATE	DESCRIPTION

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USE 3/8" x 4" BUTTON HEAD BOLT
 WITH WASHERS AND NYLOC
 TYP 6x

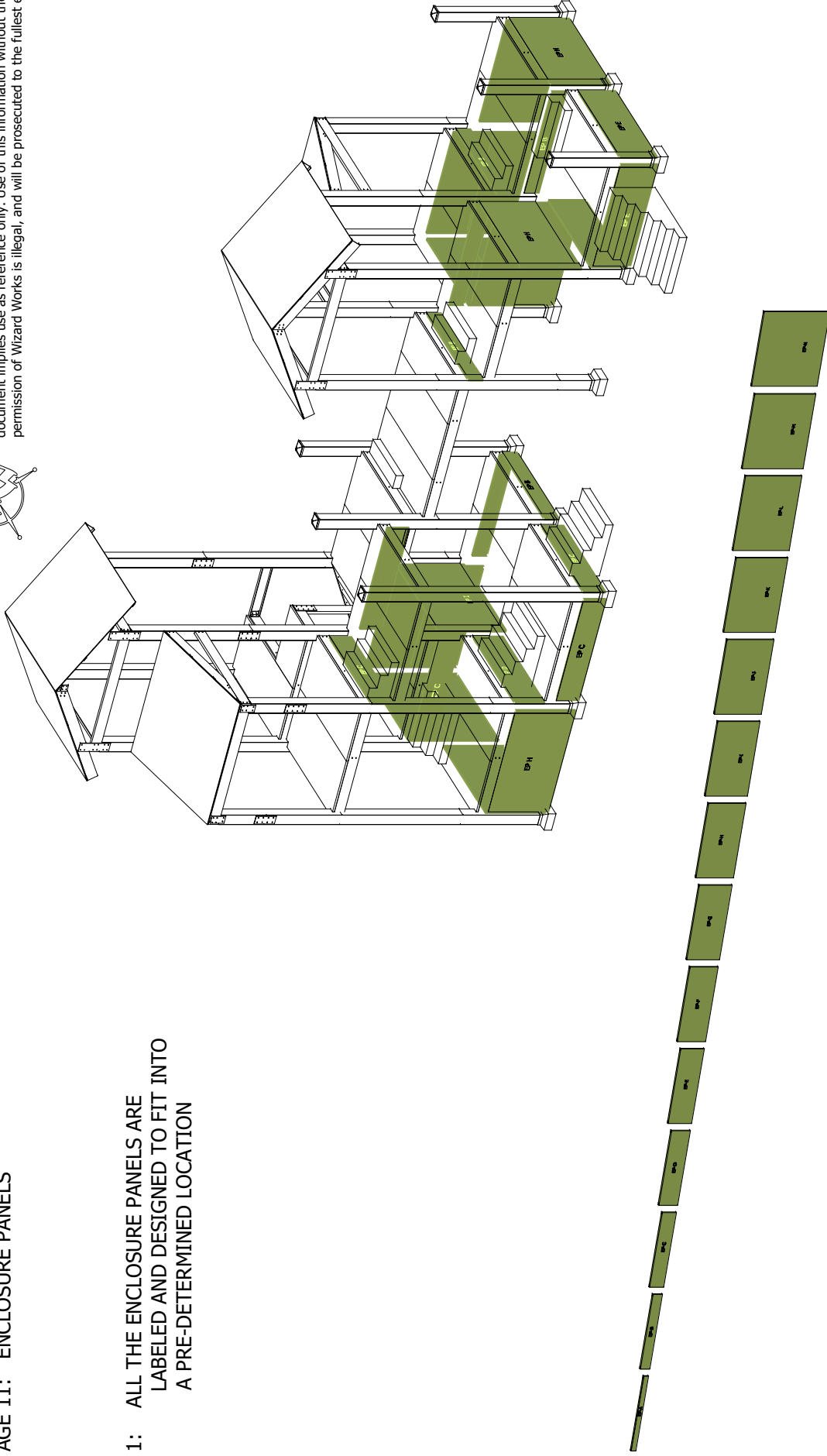
M.D.A. : MODULAR DESIGN ASSEMBLY

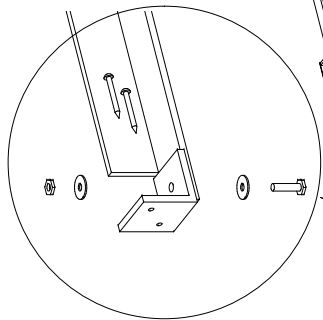
STAGE 11: ENCLOSURE PANELS

- 1: ALL THE ENCLOSURE PANELS ARE LABELED AND DESIGNED TO FIT INTO A PRE-DETERMINED LOCATION



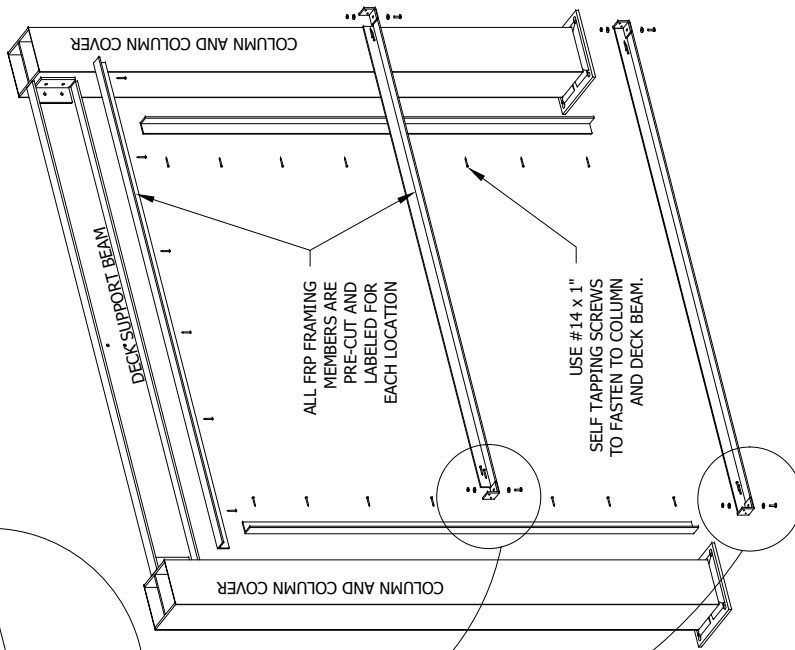
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BOLT CLIP TO FRAMING BEAM
USING 1/4" x 1" BOLT, WASHERS, NYLOC.

USE (2) #14 x 1" SELF TAPPING SCREW
TO FASTEN TO COLUMN.



COLUMN AND COLUMN COVER

DECK SUPPORT BEAM

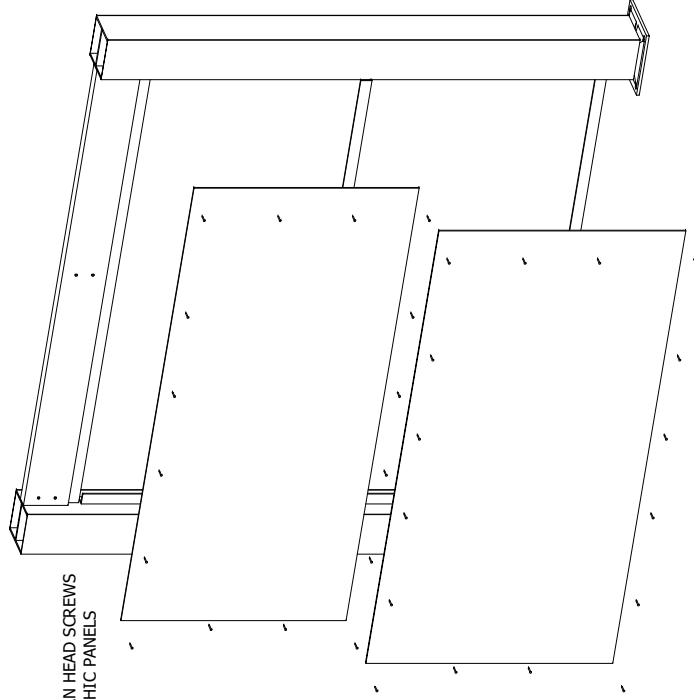
ALL FRP FRAMING
MEMBERS ARE
PRE-CUT AND
LABELED FOR
EACH LOCATION

USE #14 x 1"
SELF TAPPING SCREWS
TO FASTEN TO COLUMN
AND DECK BEAM.

COLUMN AND COLUMN COVER

EACH GRAPHIC PANEL IS
PRE-CUT AND LABELED FOR
EACH LOCATION.

USE #14 x 1"
SELF TAPPING PAN HEAD SCREWS
TO FASTEN GRAPHIC PANELS
TO FRAMING.



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REV

DATE

DESCRIPTION

JOB : GENERAL
DRAWING NO. : ENCLPNI
SHEET NO. : 1 OF 1
SCALE:
DRAWN BY: M. ARAGONA
DATE: 9/18/23

ENCLOSURE PANELS INSTALLATION DETAIL

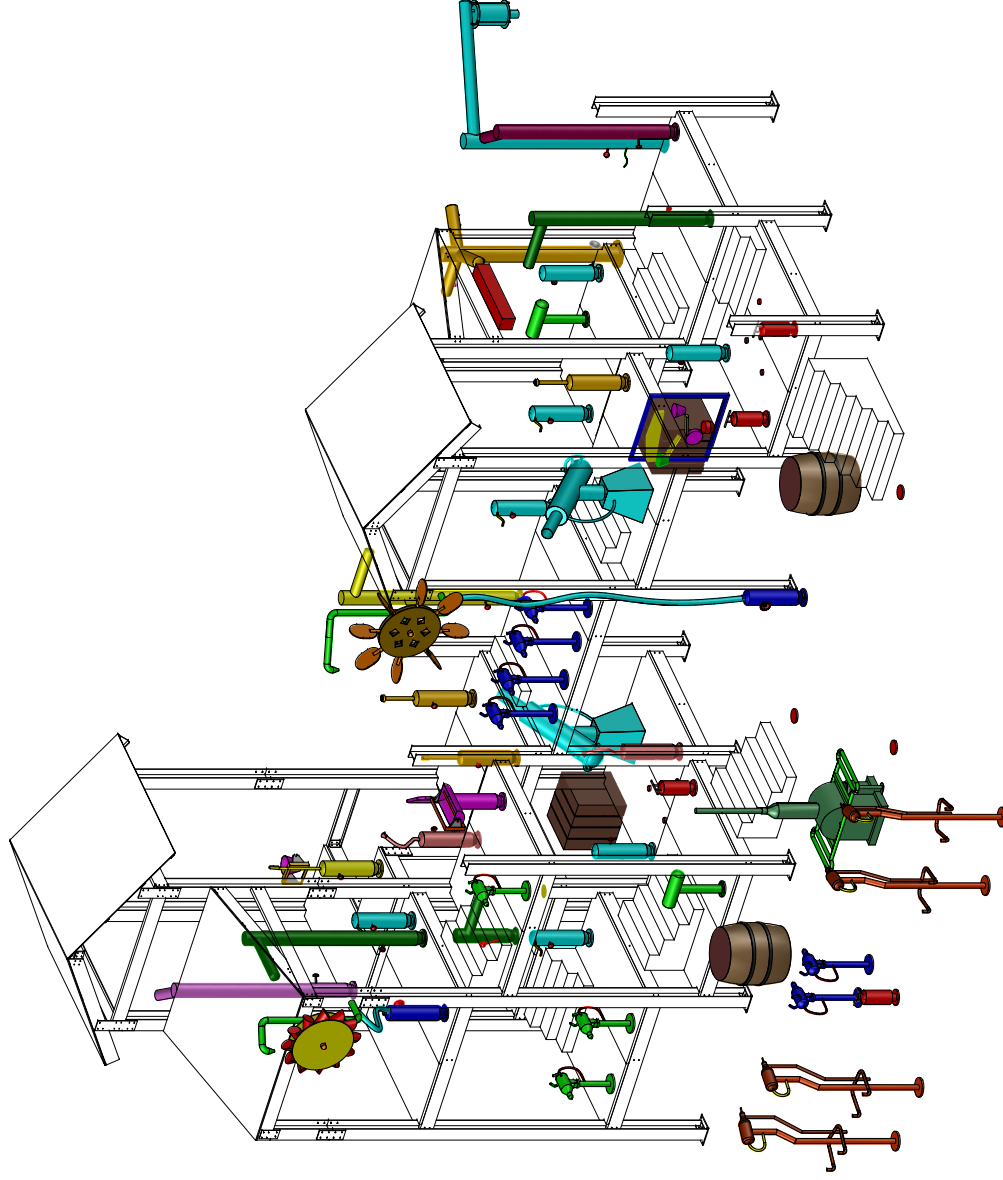
M.D.A.: MODULAR DESIGN ASSEMBLY

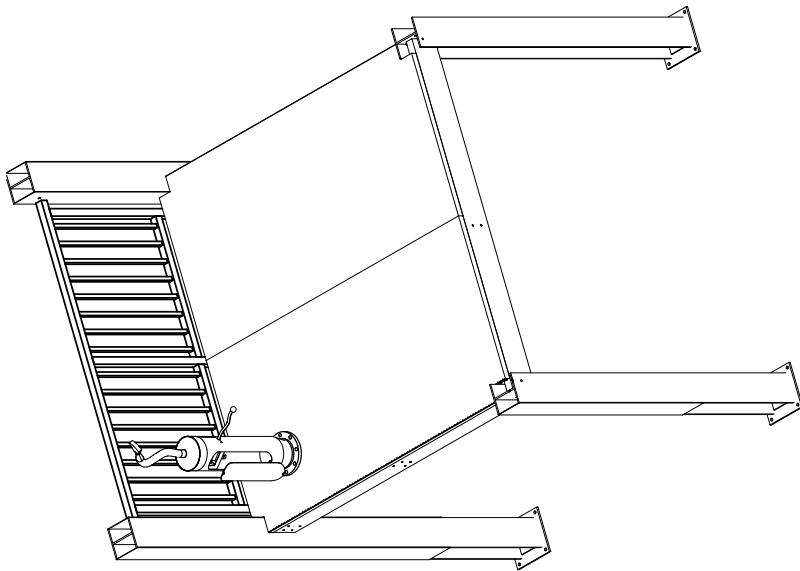
STAGE 12: INTERACTIVE PLAY ELEMENTS

- 1: ALL OF THE INTERACTIVE PLAY FEATURES ARE DESIGNED TO BE MOUNTED IN A PARTICULAR LOCATION. EACH PROJECT WILL COME WITH A MAP THAT SHOWS THE LOCATIONS OF THE PLAY FEATURES.
2. DRILL, ANCHOR AND PLUMB EACH PLAY FEATURE IN IT'S LOCATION.



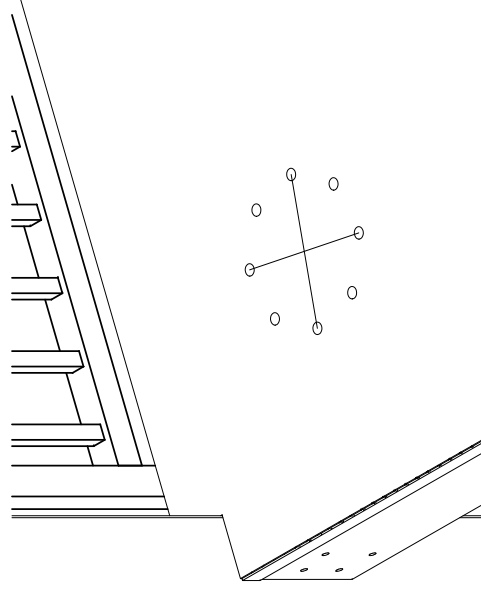
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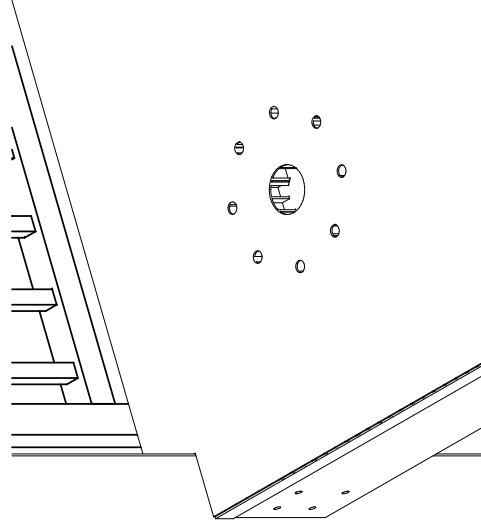


POSITION THE FEATURE ON THE DECK IN THE INTENDED LOCATION. PAY ATTENTION TO THE FOLLOWING ISSUES:

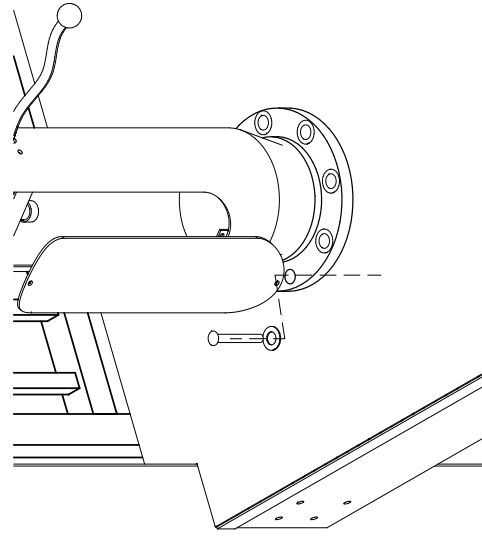
1. DO NOT OBSTRUCT MAIN PASSAGE WAYS AND STAIRS.
2. ROTATE THE DEVICE SO THAT THE ACTIVATOR (ROPE, BUTTON, ETC) FORCES THE PATRON TO STAND IN A DESIRABLE LOCATION.
3. MAKE SURE THE ACCESS DOOR IS IN A POSITION TO ALLOW MAINTENANCE PERSONNEL TO WORK INSIDE THE FEATURE AND THE GRAPHIC IS VISIBLE.
4. MAKE SURE THAT THE SPRAY EFFECT HAS CLEARANCE AROUND AND ABOVE THE FEATURE TO ALLOW IT'S FULLEST EFFECT.
5. IF YOU ARE TRYING TO CENTER THE PLAY FEATURE ON THE DECK, BE CAREFUL THAT THE 3" HOLE THAT YOU WILL DRILL THROUGH THE DECK DOES NOT CUT THROUGH THE BEAM BENEATH. IT IS OK TO CUT THE ESCUTCHEON PLATE WHEN THE FEATURE IS NEARBY THE BEAM, AND YOU CAN DRILL THROUGH THE BEAM FLANGE TO CAPTURE THE BOLT AND NUT.
6. MARK THE BOLT HOLES.



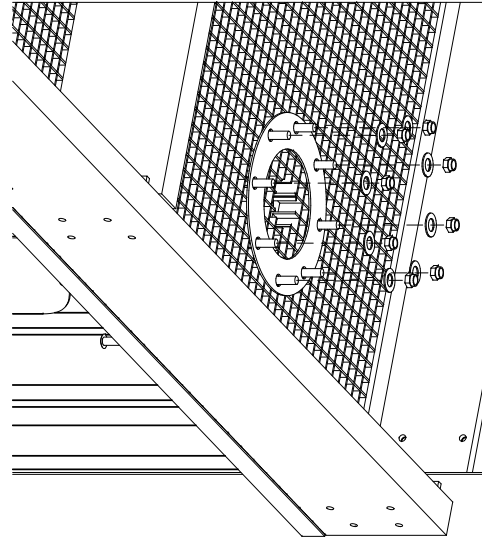
REMOVE THE FEATURE AND DRAW LINES TO CONNECT OPPOSITE HOLES TO FIND CENTER



USING 3" AND 3/4" DIAMOND HOLE SAWS, DRILL THROUGH DECK AS SHOWN



REPOSITION THE FEATURE AND DROP IN THE 1/2" x 4" BUTTON HEAD BOLTS. MAKE SURE THE WASHERS DO NOT EXTEND BEYOND THE FLANGE.



BENEATH THE DECK, INSTALL THE ESCUTCHEON PLATE, WASHERS & NYLOCS.

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REV	DATE	DESCRIPTION

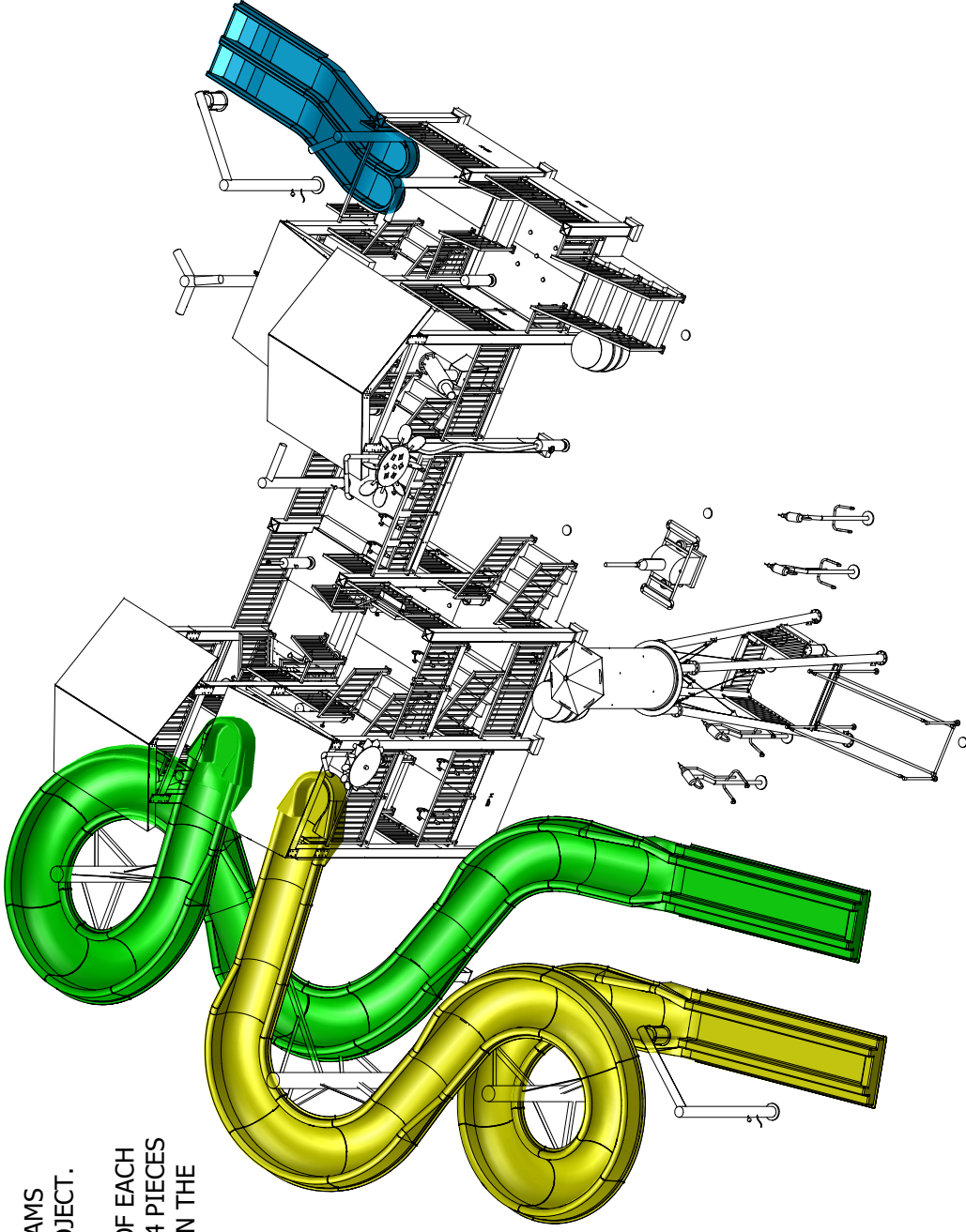
JOB : GENERAL
 DRAWING NO. : FEATURE INSTALL
 SHEET NO. : 1 OF 4
 SCALE:
 DRAWN BY: M. ARAGONA
 DATE: 3/26/15

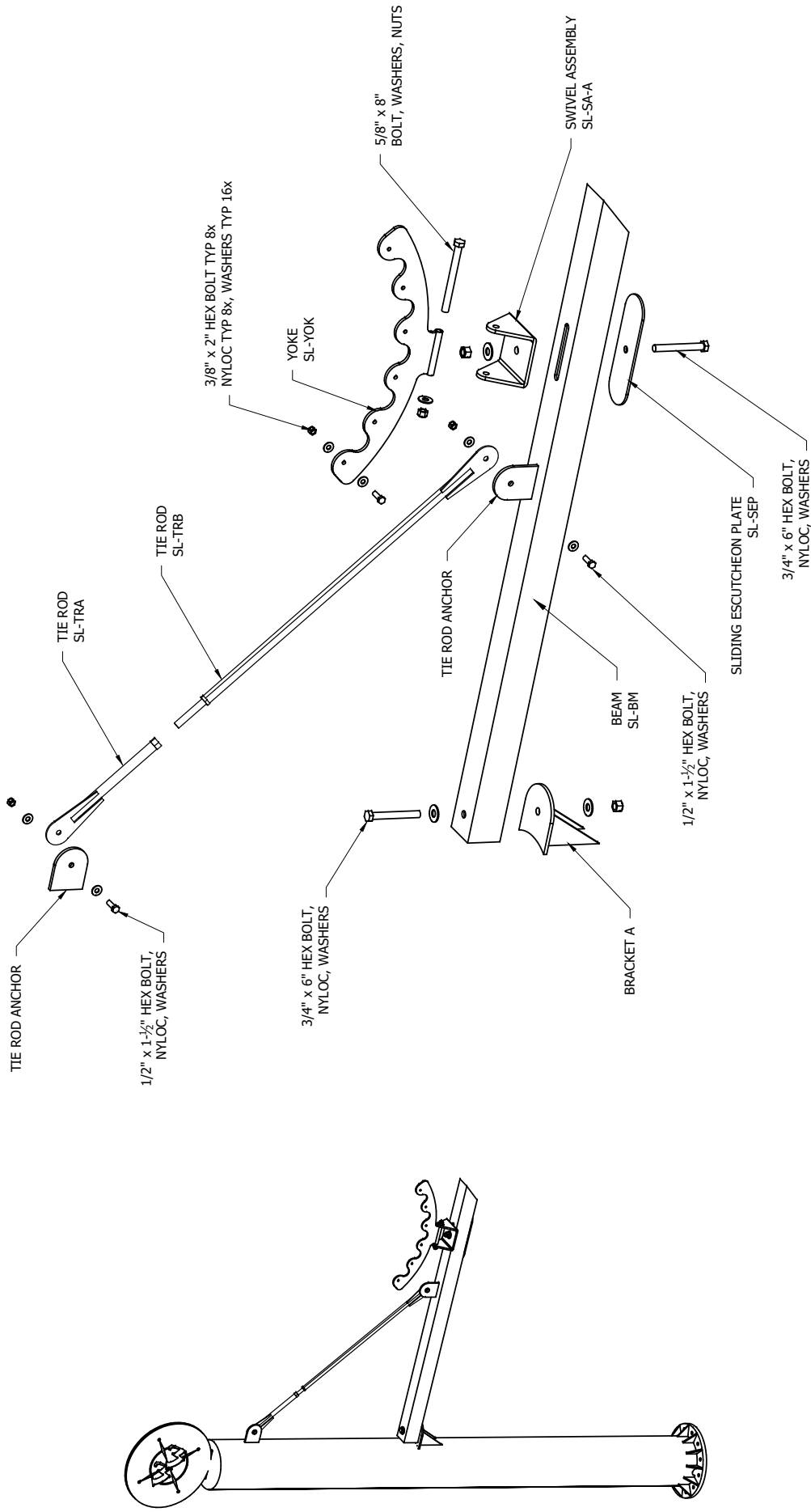
PLAY FEATURE INSTALLATION DETAIL

M.D.A. : MODULAR DESIGN ASSEMBLY

STAGE 13: WATER SLIDES

- 1: WATER SLIDE ASSEMBLY DIAGRAMS ARE PROVIDED FOR EACH PROJECT. THE SLIDE SECTIONS BOLT TOGETHER AT THE FLANGES OF EACH SECTION. SECTIONS OF 3 OR 4 PIECES ARE ASSEMBLED TOGETHER ON THE GROUND THEN HOISTED.
- 2: EACH PROJECT HAS A CUSTOM-DESIGNED SUPPORT STRUCTURE SIMILAR TO THE ATTACHED DESIGN.



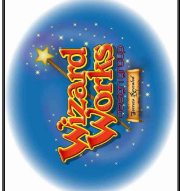


SLIDE SUPPORT SYSTEM PARTS ASSEMBLY

JOB : GENERAL
 DRAWING NO. : SLDSP-100
 SHEET NO. : 9 OF 14
 SCALE:
 DRAWN BY: M. ARAGONA
 DATE: 8-4-22

REV	DATE	DESCRIPTION

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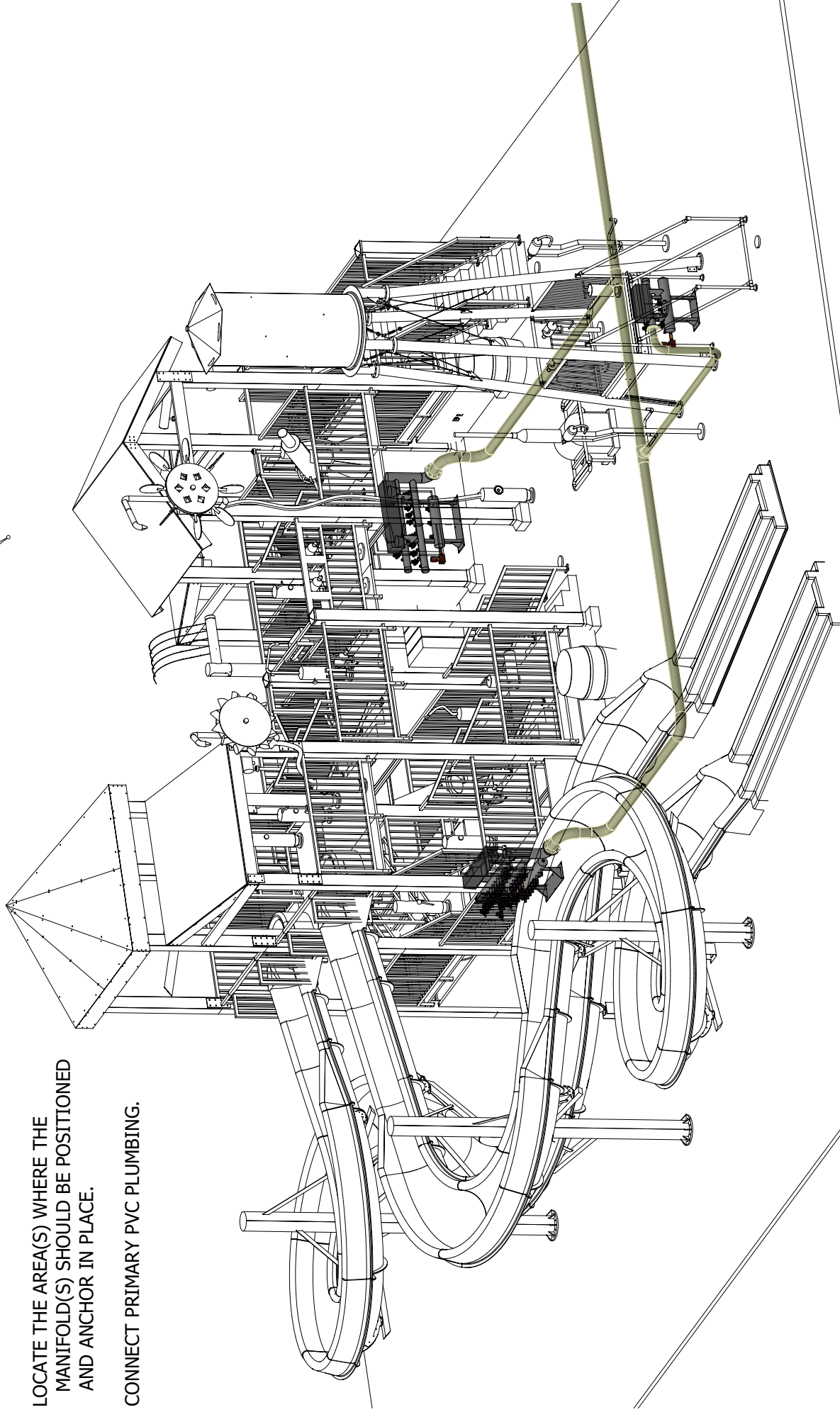
M.D.A. : MODULAR DESIGN ASSEMBLY

STAGE 14: MANIFOLDS INSTALLATION

- 1: LOCATE THE AREA(S) WHERE THE MANIFOLD(S) SHOULD BE POSITIONED AND ANCHOR IN PLACE.**
- 2: CONNECT PRIMARY PVC PLUMBING.**



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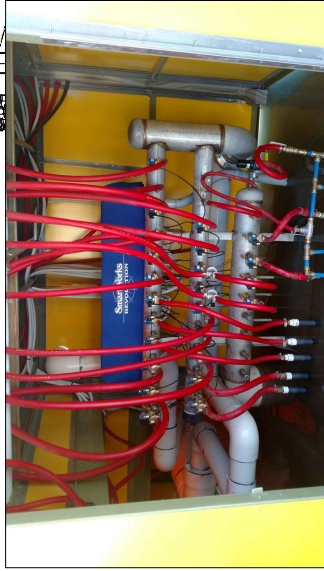
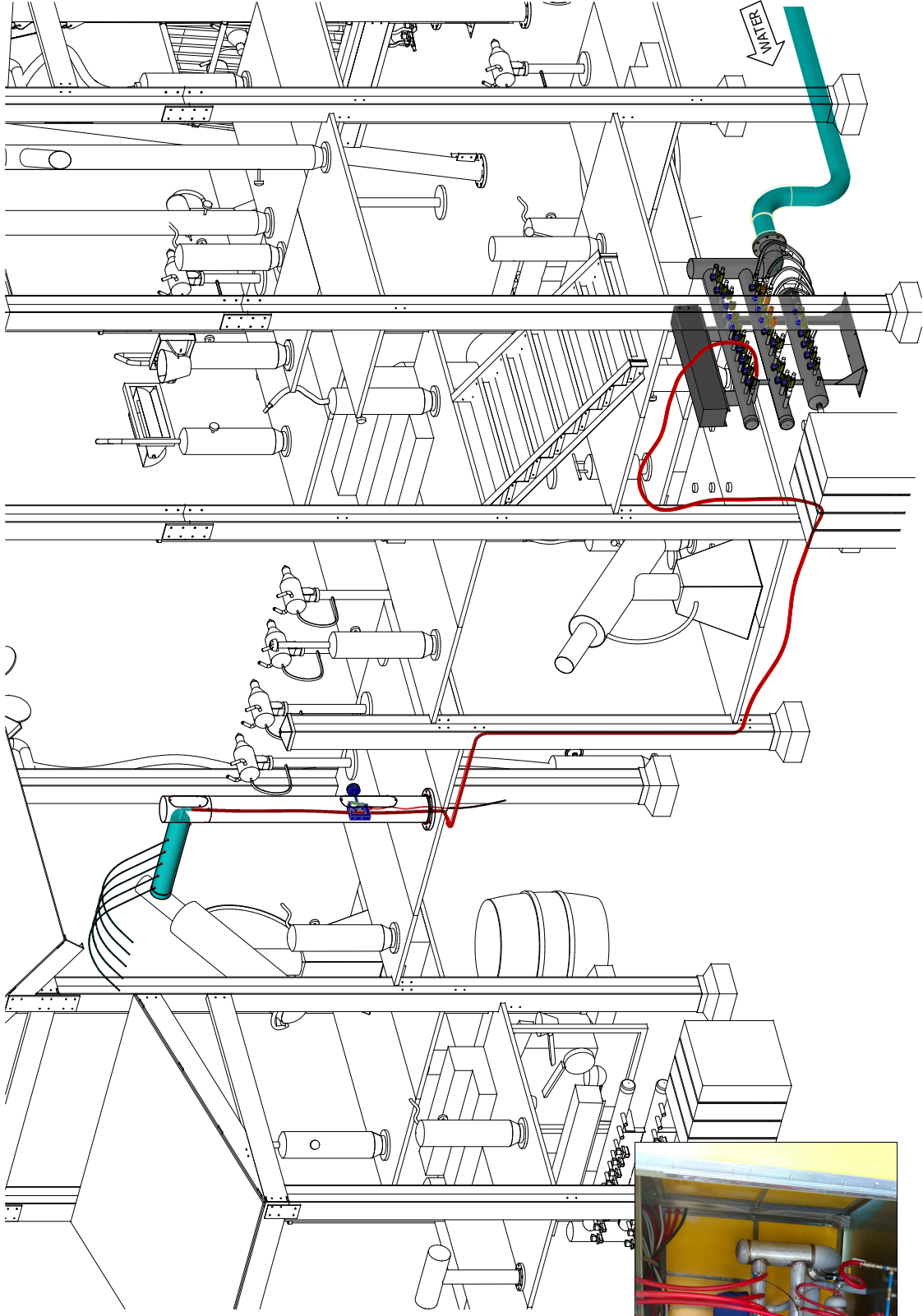
M.D.A. : MODULAR DESIGN ASSEMBLY

STAGE 15: HOSE INSTALLATION

- 1: ROUTE HOSES FROM MANIFOLD TO ALL INTERACTIVE PLAY FEATURES.

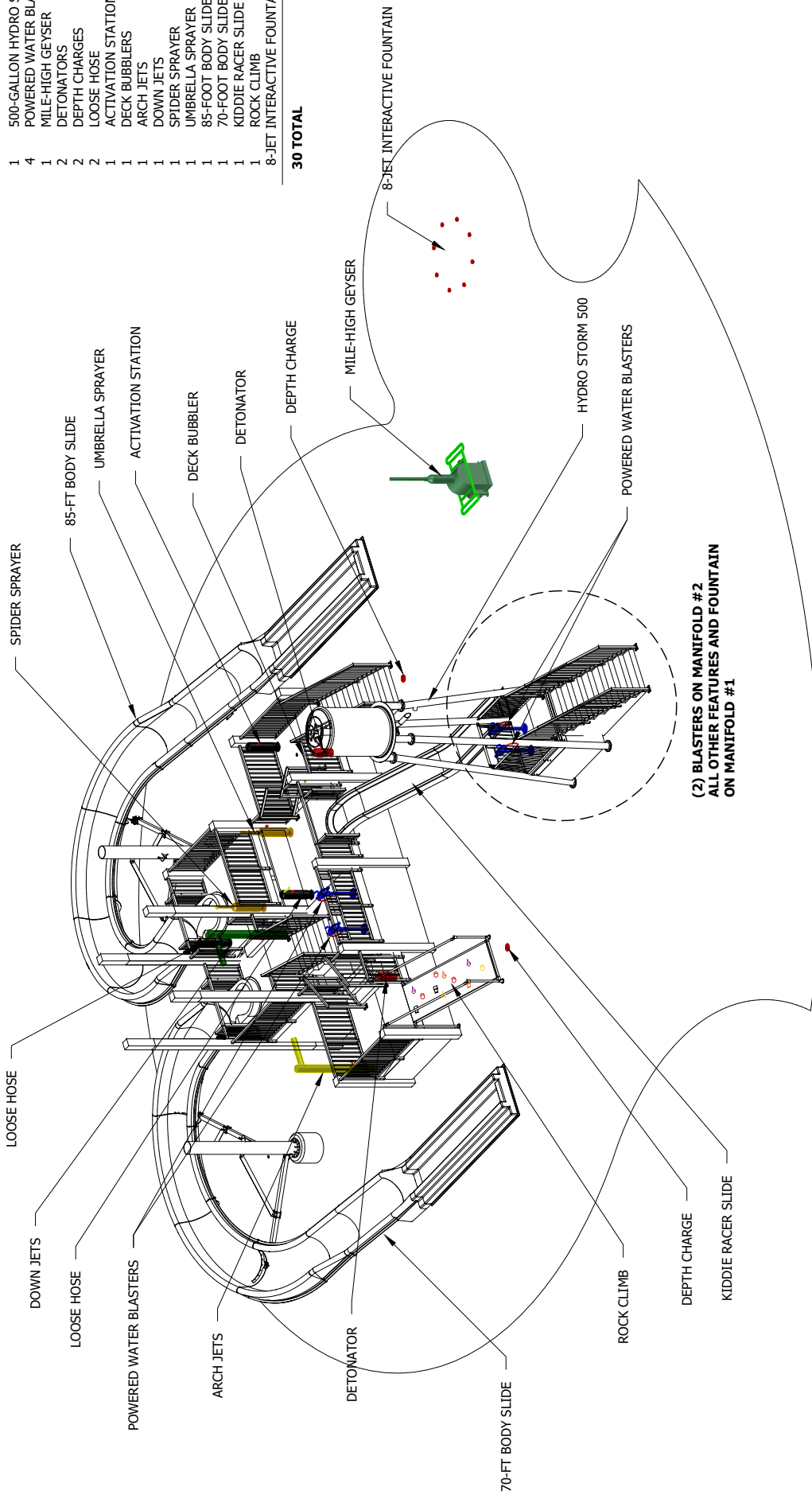


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LIST OF PLAY FEATURES

- 1 500-GALLON HYDRO STORM
 - 4 POWERED WATER BLASTERS
 - 1 MILE-HIGH GEYSER
 - 2 DETONATORS
 - 2 DEPTH CHARGES
 - 2 LOOSE HOSE
 - 1 ACTIVATION STATION
 - 1 DECK BUBBLERS
 - 1 ARCH JETS
 - 1 DOWN JETS
 - 1 SPIDER SPRAYER
 - 1 UMBRELLA SPRAYER
 - 1 85-FOOT BODY SLIDE
 - 1 70-FOOT BODY SLIDE
 - 1 KIDDIE RACER SLIDE
 - 1 ROCK CLIMB
 - 1 8-JET INTERACTIVE FOUNTAIN
- 30 TOTAL**

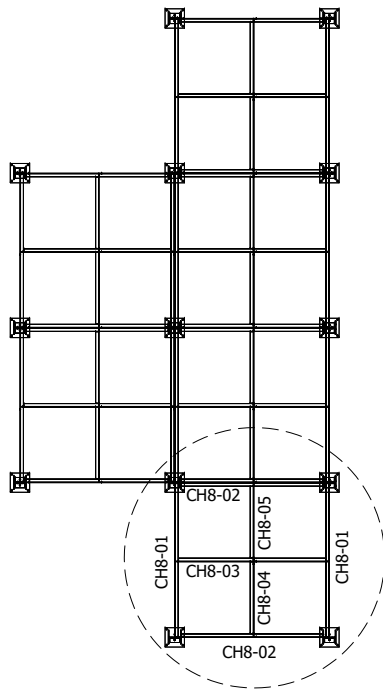
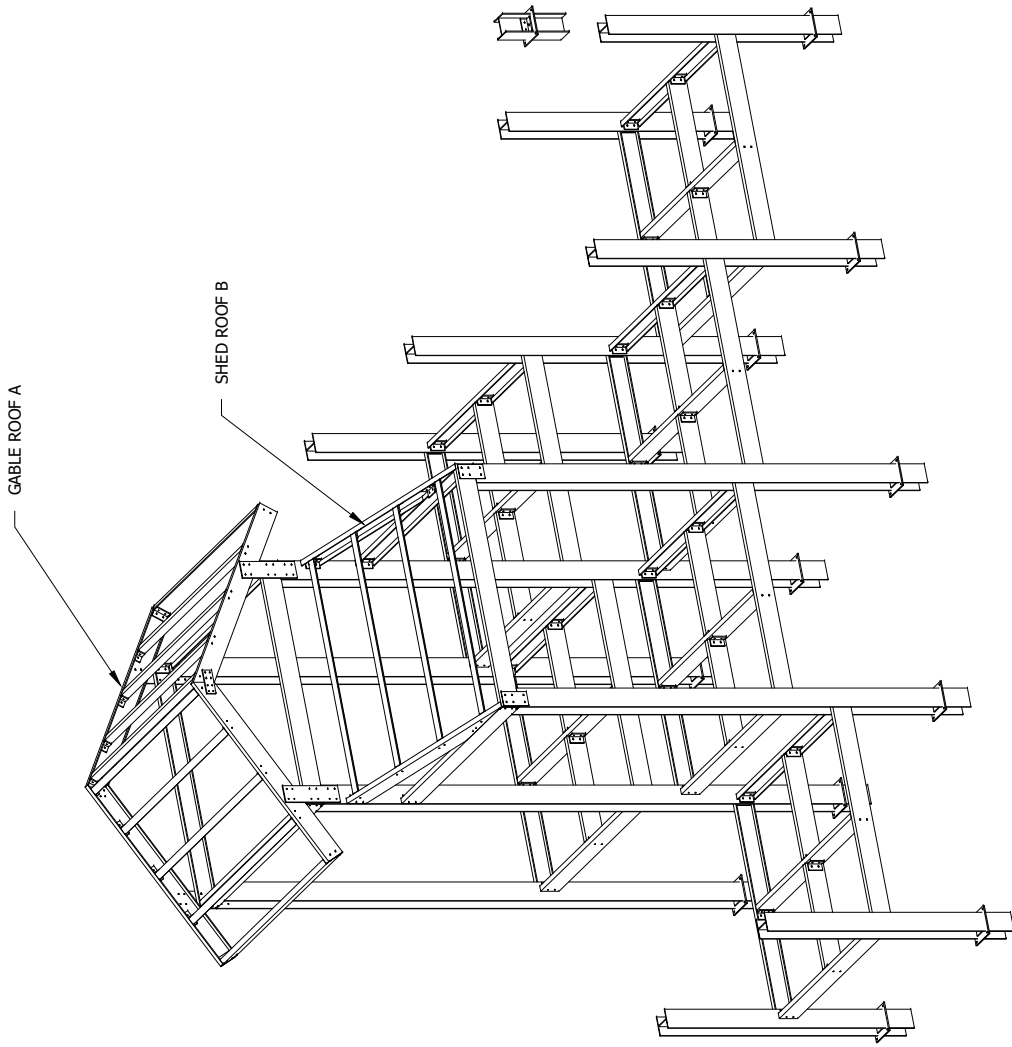


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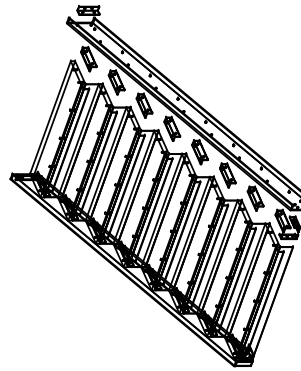
REV	DATE	DESCRIPTION

JOB : NOVA PARKS
DRAWING NO. :
SHEET NO. : 4
SCALE:
DRAWN BY: M. ARAGONA
DATE: 9.9.24

**MODIFIED ADVENTURE XL MLPs
PLAY FEATURES I.D.**



TYP DECK CONFIGURATION



HYDRO STORM FRP STAIRS



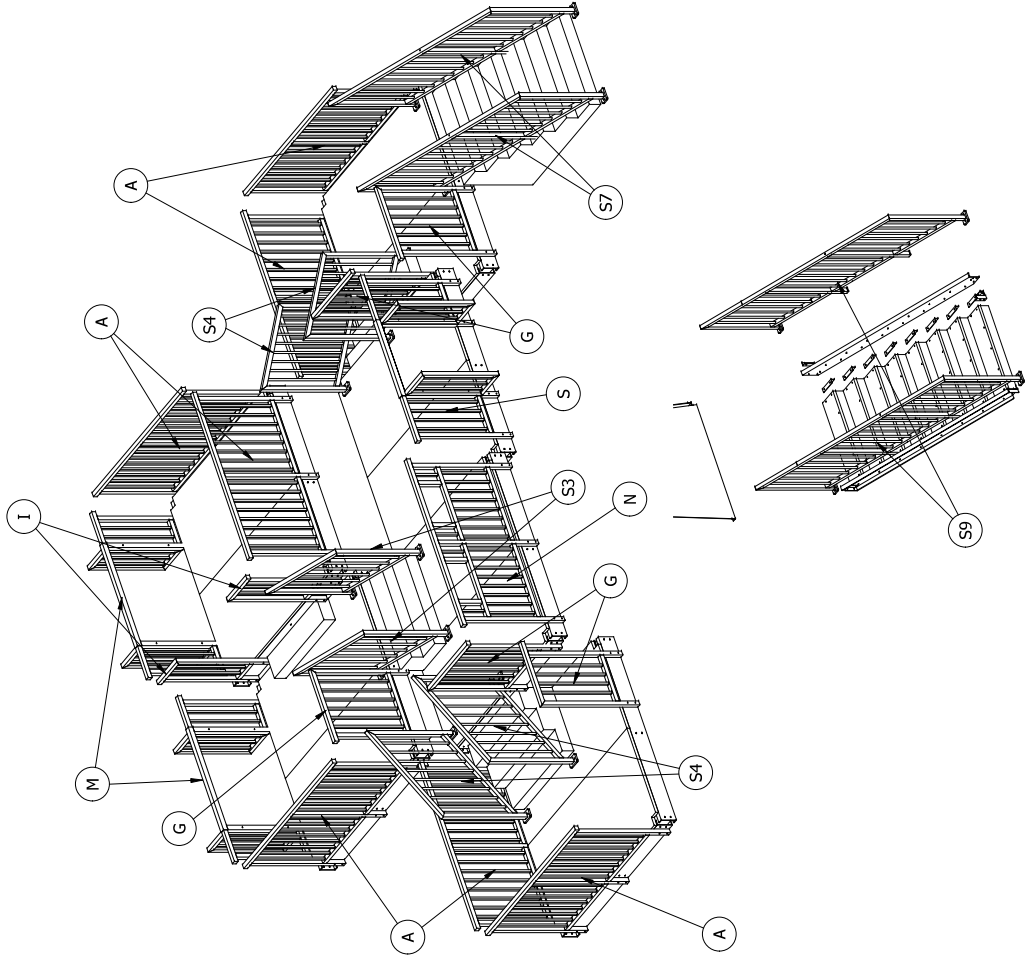
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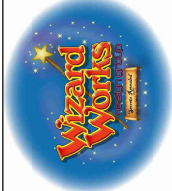
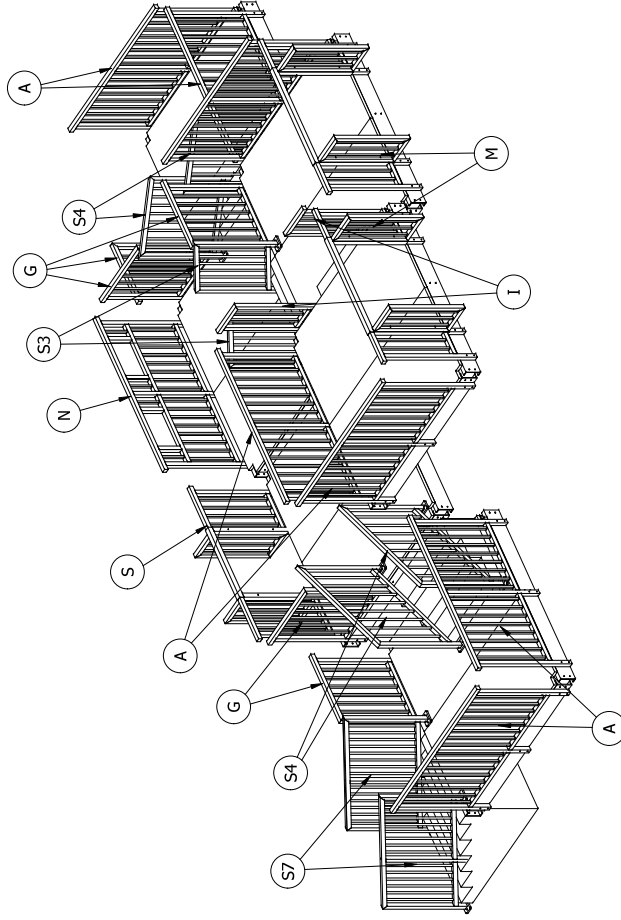
REV	DATE	DESCRIPTION

JOB : ALGONKIAN
 DRAWING NO. : NPAP-AXLWLP5-FAB
 SHEET NO. : 5 OF 46
 SCALE:
 DRAWN BY: M. ARAGONA
 DATE: 2.6.25

ADVENTURE XL SERIES
 ISOMETRIC VIEW



HYDRO STORM STAIRS

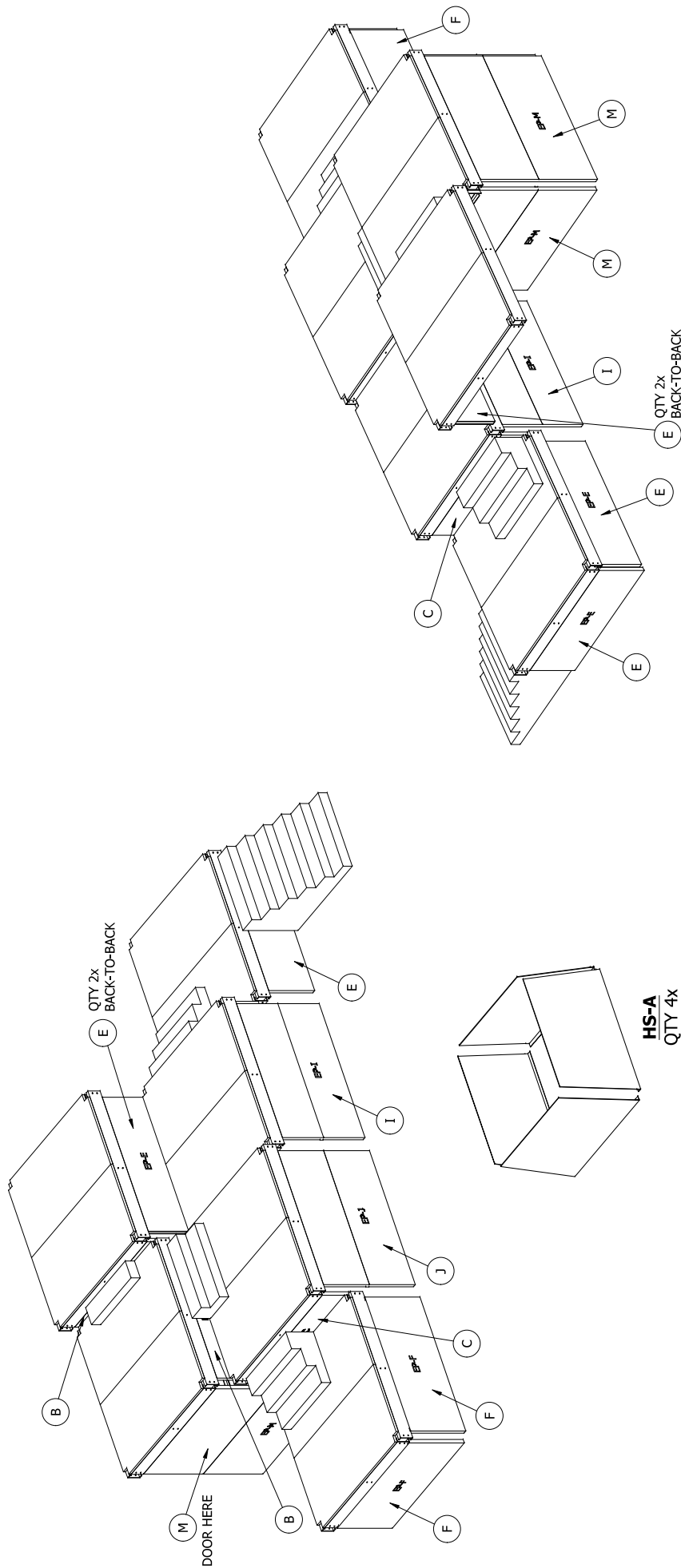


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REV	DATE	DESCRIPTION

JOB : ALGONKIAN
 DRAWING NO. : NPAP-AXLHR-FAB
 SHEET NO. : 3 OF 15
 SCALE:
 DRAWN BY: M. ARAGONA
 DATE: 4.22.25

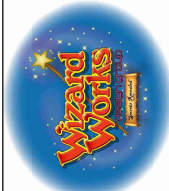
**ADVENTURE XL SERIES
 HANDRAIL FABRICATION DETAIL
 ISOMETRIC VIEWS**



HYDRO STORM EP'S

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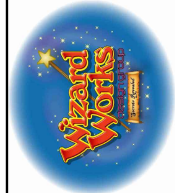
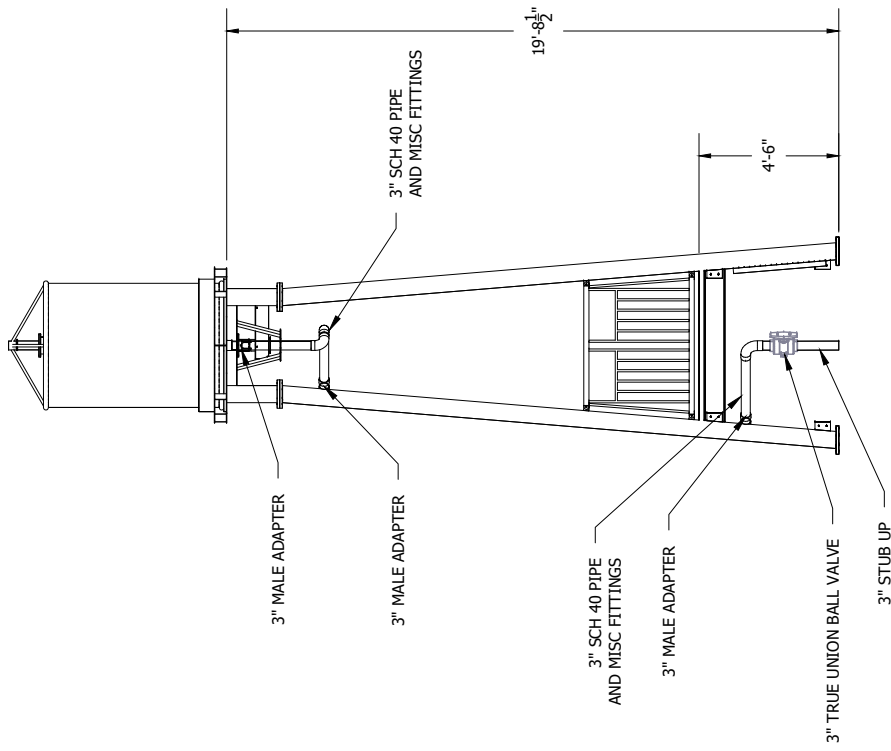
14 ELAINE COURT, LATHAM, NY 12110



REV	DATE	DESCRIPTION

JOB : ALGONKIAN
 DRAWING NO. : NPAP-AXLEP-FAB
 SHEET NO. : 4 OF 10
 SCALE:
 DRAWN BY: M. ARAGONA
 DATE: 4.22.25

**ADVENTURE XL SERIES
 ENCLOSURE PANELS DETAIL
 ISOMETRIC VIEWS**



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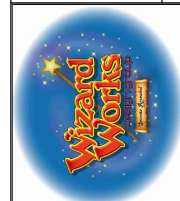
DESCRIPTION

DATE

REV

JOB : VOLCANO BAY
 DRAWING NO. : HS-500-NPVB
 SHEET NO. : 1 of 1
 SCALE: 1/4" = 1'
 DRAWN BY: M. ARAGONA
 DATE: 2.27.26

**HYDRO STORM
 FIELD PLUMBING**



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REV	DATE	DESCRIPTION

JOB : ALGONKIAN
 DRAWING NO. : NPA-MF-100
 SHEET NO. : 3 OF 3
 SCALE: NTS
 DRAWN BY: MDA
 DATE: 5.23.25

MANIFOLD 1 VALVE IDENTIFICATION

