



Hulsey McCormick & Wallace
ENGINEERING • ENVIRONMENT • SCIENCE



Technical Specifications
For South Cove Park
Multi-Court Improvements
Oconee County, South Carolina
HMW Project No. OCO 001
February 2018



Development

Environment

Water

Mapping

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SOUTH COVE PARK MULTI-COURT IMPROVEMENTS

TECHNICAL SPECIFICATIONS



Prepared for Oconee County

HMW Project No. OCO 001



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February 2018

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DIVISION 1
GENERAL REQUIREMENTS

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PART 1 - GENERAL

1.1 LOCATION OF WORK

All of the work of this Contract shall be installed at locations shown on the drawings.

1.2 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials, equipment, tools, services and incidentals to complete all work required by these specifications and as shown on the drawings.
- B. The Contractor shall perform the work complete, in place, and ready for continuous service, and shall include repairs, testing, permits, clean-up, replacements and restoration required as a result of damages caused during this construction.
- C. All materials, equipment, skills, tools and labor which are reasonable and properly inferable and necessary for the proper completion of the work in a substantial manner and in compliance with the requirements stated or implied by these specifications or drawing shall be furnished and installed by the Contractor without additional compensation, whether specifically indicated in the contract documents or not.
- D. The Contractor shall comply with all municipal, county, state, federal, and other codes which are applicable to the proposed construction work.

1.3 GENERAL DESCRIPTION OF WORK TO BE PERFORMED

- A. Furnish all labor, materials, equipment and incidentals required and construct the Project, in its entirety as shown on the drawings and specified herein.
- B. The work includes, but is not necessarily limited to, the following:
 - Construction of a new multi-court recreation facility consisting of tennis and pickleball courts. Construction will include installation of erosion control measures, removal and disposal of existing pavement and base materials, grading, installation of the court surface, nets, fencing and court surface paint markings.

1.4 WORK SEQUENCE

- A. All work to be done under this contract shall be done with minimum inconvenience to the public using South Cove Park.

1.5 CONSTRUCTION AREAS

- A. Contractor shall limit his use of the construction areas for work and for storage, to allow for:
 - 1. Work by other contractors.
 - 2. Owner use.
- B. Coordinate use of work site.

- C. Assume full responsibility for the protection and safekeeping of products under this contract, stored on the site.
- D. Move and store products, under Contractor's control which interfere with operations of the Owner or separate Contractor.
- E. Obtain and pay for the use of additional storage or work areas needed for operations.

1.6 PLANS AND SPECIFICATIONS

- A. The technical specifications consist of three parts: General, Products, and Execution. The General Section contains General Requirements which govern the work. Products and Execution modify and supplement the General Requirements. The Products and Execution parts shall always govern whenever there appears to be a conflict.

- B. Intent

All work called for in the specifications applicable to this contract, but not shown on the plans in their present form, or vice versa, shall be of like effect as if shown or mentioned in both. Work not specified in either the plans or in the specifications, but involved in carrying out their intent or in the complete and proper execution of the work, is required and shall be performed by the Contractor as though it were specifically delineated or described.

The apparent silence of the specifications as to any detail, or the apparent omission from them of a detailed description concerning any work to be done and materials to be furnished, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the best quality is to be used, and interpretation of these specifications shall be made upon that basis. The inclusion of the General Requirements (or work specified elsewhere) in the general part of the specifications is only for the convenience of the Contractor, and shall not be interpreted as a complete list of related specification sections.

1.7 OWNER OCCUPANCY

Owner will have full access to and use of the existing site during the entire period of construction. Cooperate with Owner's representative in all construction operations to minimize conflict and to facilitate Owner usage.

1.8 PARTIAL OWNER OCCUPANCY

The Contractor shall schedule his operations for completion of portions of the work, as designated, for the Owner's occupancy prior to substantial completion of the entire work.

PART 2 - PRODUCTS

Not used

PART 3 - EXECUTION

Not used

END OF SECTION

PART 1 - GENERAL

1.1 SCOPE

- A. Construction staking shall include all of the surveying work required to layout the work and control the location of the finished project. The Contractor shall have the full responsibility for constructing the project to the correct horizontal and vertical alignment, as shown on the drawings, as specified, or as ordered by the Engineer. The Contractor shall assume all costs associated with rectifying work constructed in the wrong location.
- B. From the information shown on the drawings and the information to be provided as indicated under project conditions below, the Contractor shall:
 - 1. Be responsible for setting reference points and/or offsets, establishment of baselines and all other layout, staking, and all other surveying required for the construction of the project.
 - 2. Safeguard all reference points, stakes, grade marks, horizontal and vertical control points, and shall bear the cost of re-establishing same if disturbed.
 - 3. Stake out the permanent and temporary easements or the limits of construction to ensure that the work is not deviating from the indicated limits.
 - 4. Be responsible for all damage done to reference points, baselines, center lines and temporary bench marks, and shall be responsible for the cost of re-establishment of reference points, baselines, center lines and temporary bench marks as a result of the operations.
- C. Baselines shall be defined as the line to which the location of the work is referenced; i.e., edge of pavement, road centerline, property line, right-of-way or survey line.
- D. Record drawing surveys shall be performed in accordance with Section 01782 of these specifications.

1.2 PROJECT CONDITIONS

- A. The drawings provide the location and/or coordinates of principal components of the project. The alignment of some components of the project may be indicated in the specifications. The Engineer may order changes to the location of some of the components of the project or provide clarification to questions regarding the correct alignment.
- B. The Engineer will provide the following:
 - 1. One vertical control point on the project site with its elevation.
 - 2. Two Horizontal control points on the project with coordinates.

1.3 QUALITY ASSURANCE

- A. The level of detail of survey required shall be that from which the correct location of the pipeline or appurtenances can be established for the construction and verified by the Engineer.
- B. Any deviations from the drawings shall be confirmed by the Engineer prior to construction of that portion of the project.

PART 2 - PRODUCTS

The contractor shall provide all equipment and field supplies, including but not limited to, stakes, hubs, PK nails, flagging, paint, etc. necessary to perform construction staking.

PART 3 - EXECUTION

3.1 STAKING PRECISION

The precision of construction staking required shall be that from which the correct location and elevation of the water line, gravity sanitary sewer or sanitary sewer force main can be established for construction and verified by the Engineer. Where the location of components of the water line, sanitary sewer or force main (e.g. fittings, valves, road crossings, manholes) are not dimensioned, the establishment of the location of these components shall be based upon scaling these locations from the drawings with relation to survey reference points.

3.2 REFERENCE POINTS

- A. Reference points shall be placed, at or no more than three feet from the outside of the construction easement or right-of-way. The location of the reference points shall be recorded in a log with a copy provided to the Engineer for use, prior to verifying reference point locations. Distances shall be accurately measured to 0.01 foot.
- B. The Contractor shall give the Engineer reasonable notice that reference points are set. The reference point locations must be verified by the Engineer prior to commencing clearing and grubbing operations.

END OF SECTION

PART 1 - GENERAL

1.1 SCOPE

- A. Permits and Responsibilities
 - 1. The Contractor shall, at no additional cost to the Owner, be responsible for obtaining all necessary licenses and permits, including building permits and land disturbance permits, and for complying with any applicable federal, state, county and municipal laws, ordinances, codes and regulations, in connection with the performance of the work.
- B. The Contractor shall take proper safety and health precautions to protect the work, the workers, the public and the property of others.
- C. Prior to commencing any work, the Contractor shall submit a job-specific Health and Safety Plan to the Owner for their records.
- D. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the work.
- E. The Contractor shall post a copy of the construction permit in a conspicuous location on site.
- F. ~~Prior to commencing construction, the Contractor shall attend the preconstruction meeting required by the General Permit in the Storm Water Pollution Prevention Plan documents.~~

END OF SECTION

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PART 1 - GENERAL

1.1 DESCRIPTION

- A. Whenever reference is made to conforming to the standards of any technical society, organization, body, code or standard, it shall be construed to mean the latest standard, code, or specification adopted and published at the time of advertisement for bids. This shall include the furnishing of materials, testing of materials, fabrication and installation practices. In those cases where the Contractor's quality standards establish more stringent quality requirements, the more stringent requirement shall prevail. Such standards are made a part hereof to the extent which is indicated or intended.
- B. The inclusion of an organization under one category does not preclude that organization's standards from applying to another category.
- C. In addition, all work shall comply with the applicable requirements of local codes, utilities and other authorities having jurisdiction.
- D. All material and equipment for which a UL Standard, an AGA or NSF approval, or an ASME requirement is established, shall be so approved and labeled or stamped. The label or stamp shall be conspicuous and not covered, painted, or otherwise obscured from visual inspection.
- E. The standards which apply to this project are not necessarily restricted to those organizations which are listed in Article 1.02.

1.2 STANDARD ORGANIZATIONS

A. Piping and Valves

| | |
|-------|--|
| ACPA | American Concrete Pipe Association |
| ANSI | American National Standards Institute |
| API | American Petroleum Institute |
| ASME | American Society of Mechanical Engineers |
| AWWA | American Water Works Association |
| CISPI | Cast Iron Soil Pipe Institute |
| DIPRA | Ductile Iron Pipe Research Association |
| FCI | Fluid Controls Institute |
| MSS | Manufacturers Standardization Society |
| NCPI | National Clay Pipe Institute |
| NSF | National Sanitation Foundation |
| PPI | Plastic Pipe Institute |
| | Uni-Bell PVC Pipe Association |

B. Materials

| | |
|--------|--|
| AASHTO | American Association of State Highway and Transportation Officials |
| ANSI | American National Standards Institute |
| ASTM | American Society for Testing and Materials |

C. Painting and Surface Preparation

| | |
|------|---|
| NACE | National Association of Corrosion Engineers |
| SSPC | Steel Structures Painting Council |

D. Electrical and Instrumentation

| | |
|-------|--|
| AEIC | Association of Edison Illuminating Companies |
| AIEE | American Institute of Electrical Engineers |
| EIA | Electronic Industries Association |
| ICEA | Insulated Cable Engineers Association |
| IEEE | Institute of Electrical and Electronic Engineers |
| IES | Illuminating Engineering Society |
| IPC | Institute of Printed Circuits |
| IPCEA | Insulated Power Cable Engineers Association |
| ISA | Instrument Society of America |
| NEC | National Electric Code |
| NEMA | National Electrical Manufacturers Association |
| NFPA | National Fire Protection Association |
| TIA | Telecommunications Industries Association |
| UL | Underwriters Laboratories |
| VRCI | Variable Resistive Components Institute |

E. Aluminum

| | |
|------|--|
| AA | Aluminum Association |
| AAMA | American Architectural Manufacturers Association |

F. Steel and Concrete

| | |
|------|--|
| ACI | American Concrete Institute |
| AISC | American Institute of Steel Construction, Inc. |
| AISI | American Iron and Steel Institute |
| CRSI | Concrete Reinforcing Steel Institute |
| NRMA | National Ready-Mix Association |
| PCA | Portland Cement Association |
| PCI | Prestressed Concrete Institute |

G. Welding

| | |
|------|--|
| ASME | American Society of Mechanical Engineers |
| AWS | American Welding Society |

H. Government and Technical Organizations

| | |
|------|--|
| AIA | American Institute of Architecture |
| APHA | American Public Health Association |
| APWA | American Public Works Association |
| ASA | American Standards Association |
| ASAE | American Society of Agricultural Engineers |
| ASCE | American Society of Civil Engineers |

| | |
|--------|--|
| ASQC | American Society of Quality Control |
| ASSE | American Society of Sanitary Engineers |
| CFR | Code of Federal Regulations |
| CSI | Construction Specifications Institute |
| EDA | Economic Development Administration |
| EPA | Environmental Protection Agency |
| FCC | Federal Communications Commission |
| FmHA | Farmers Home Administration |
| FS | Federal Specifications |
| IAI | International Association of Identification |
| ISEA | Industrial Safety Equipment Association |
| ISO | International Organization for Standardization |
| ITE | Institute of Traffic Engineers |
| NBFU | National Board of Fire Underwriters |
| (NFPA) | National Fluid Power Association |
| NBS | National Bureau of Standards |
| NISO | National Information Standards Organization |
| OSHA | Occupational Safety and Health Administration |
| SI | Salt Institute |
| SPI | The Society of the Plastics Industry, Inc. |
| USDC | United States Department of Commerce |
| WEF | Water Environment Federation |

I. General Building Construction

| | |
|--------|--|
| AHA | American Hardboard Association |
| AHAM | Association of Home Appliance Manufacturers |
| AITC | American Institute of Timber Construction |
| APA | American Parquet Association, Inc. |
| APA | American Plywood Association |
| BHMA | Builders Hardware Manufacturers Association |
| BIFMA | Business and Institutional Furniture Manufacturers Association |
| DHI | Door and Hardware Institute |
| FM | Factory Mutual Fire Insurance Company |
| HPMA | Hardwood Plywood Manufacturers Association |
| HTI | Hand Tools Institute |
| IME | Institute of Makers of Explosives |
| ISANTA | International Staple, Nail and Tool Association |
| ISDSI | Insulated Steel Door Systems Institute |
| IWS | Insect Screening Weavers Association |
| MBMA | Metal Building Manufacturers Association |
| NAAMM | National Association of Architectural Metal Manufacturers |
| NAGDM | National Association of Garage Door Manufacturers |
| NCCLS | National Committee for Clinical Laboratory Standards |
| NFPA | National Fire Protection Association |
| NFSA | National Fertilizer Solutions Association |
| NKCA | National Kitchen Cabinet Association |
| NWMA | National Woodwork Manufacturers Association |
| NWWDA | National Wood Window and Door Association |
| RMA | Rubber Manufacturers Association |
| SBC | SBC Standard Building Code |

| | | |
|----|--|---|
| | SDI | Steel Door Institute |
| | SIA | Scaffold Industry Association |
| | SMA | Screen Manufacturers Association |
| | SPRI | Single-Ply Roofing Institute |
| | TCA | Tile Council of America |
| | UBC | Uniform Building Code |
| J. | Roadways | |
| | AREA | American Railway Engineering Association |
| | DOT | Department of Transportation |
| | SSRBC | Standard Specifications for Construction of Transportation Systems, Georgia Department of Transportation |
| K. | Plumbing | |
| | AGA | American Gas Association |
| | NSF | National Sanitation Foundation |
| | PDI | Plumbing Drainage Institute |
| | SPC | SBCC Standard Plumbing Code |
| L. | Refrigeration, Heating, and Air Conditioning | |
| | AMCA | Air Movement and Control Association |
| | ARI | American Refrigeration Institute |
| | ASHRAE | American Society of Heating, Refrigeration, and Air Conditioning Engineers |
| | ASME | American Society of Mechanical Engineers |
| | CGA | Compressed Gas Association |
| | CTI | Cooling Tower Institute |
| | HEI | Heat Exchange Institute |
| | IAR | International Institute of Ammonia Refrigeration |
| | NB | National Board of Boilers and Pressure Vessel Inspectors |
| | PFMA | Power Fan Manufacturers Association |
| | SAE | Society of Automotive Engineers |
| | SMACNA | Sheet Metal and Air Conditioning Contractors National Association |
| | SMC | SBCC Standard Mechanical Code |
| | TEMA | Tubular Exchangers Manufacturers Association |
| M. | Equipment | |
| | AFBMA | Anti-Friction Bearing Manufacturers Association, Inc. |
| | AGMA | American Gear Manufacturers Association |
| | ALI | Automotive Lift Institute |
| | CEMA | Conveyor Equipment Manufacturers Association |
| | CMAA | Crane Manufacturers Association of America |
| | DEMA | Diesel Engine Manufacturers Association |
| | MMA | Monorail Manufacturers Association |
| | OPEI | Outdoor Power Equipment Institute, Inc. |
| | PTI | Power Tool Institute, Inc. |
| | RIA | Robotic Industries Association |
| | SAMA | Scientific Apparatus Makers Association |

1.3 SYMBOLS

Symbols and material legends shall be as scheduled on the drawings.

END OF SECTION

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PART 1 - GENERAL

1.1 SCOPE

- A. Work under this section includes all scheduling and administration of pre-construction and progress meetings as herein specified and necessary for the proper and complete performance of this work.
- B. Scheduling and Administration by Engineer/Owner:
 - 1. Prepare agenda.
 - 2. Make physical arrangements for the meetings.
 - 3. Preside at meetings.
 - 4. Record minutes and include significant proceedings and decisions.
 - 5. Distribute copies of the minutes to participants.

1.2 PRE-CONSTRUCTION CONFERENCE

- A. The Engineer shall schedule the pre-construction conference prior to the issuance of the Notice to Proceed.
- B. Representatives of the following parties are to be in attendance at the meeting;
 - 1. Owner
 - 2. Engineer
 - 3. Contractor and superintendent
 - 4. Major subcontractors
 - 5. Representatives of governmental or regulatory agencies when appropriate
- C. The agenda for the pre-construction conference shall consist of the following as a minimum:
 - 1. Distribute and discuss a list of major subcontractors and a tentative construction schedule.
 - 2. Critical work sequencing.
 - 3. Designation of responsible personnel and emergency telephone numbers.
 - 4. Processing of field decisions and change orders.
 - 5. Adequacy of distribution of contract documents.

6. Schedule and submittal of shop drawings, product data and samples.
7. Pay request format, submittal cutoff date, pay date and retainage.
8. Procedures for maintaining record documents.
9. Use of premises, including office and storage areas and owner's requirements.
10. Major equipment deliveries and priorities.
11. Safety and first aid procedures.
12. Security procedures.
13. Housekeeping procedures.
14. Work hours.

1.3 PROJECT COORDINATION MEETINGS

- A. Schedule regular monthly meetings as directed by the Engineer.
- B. Hold called meetings as the progress of the work dictates.
- C. The meetings shall be held at the location indicated by the Engineer.
- D. Schedule regular weekly teleconferences as directed by the Engineer.
- E. Representatives of the following parties are to be in attendance at the meetings/teleconferences:
 1. Engineer
 2. Contractor and superintendent
 3. Major subcontractors as pertinent to the agenda
 4. Owner's representative as appropriate
 5. Representatives of governmental or other regulatory agencies as appropriate
- F. The minimum agenda for progress meetings shall consist of the following.
 1. Review and approve minutes of previous meetings.
 2. Review work progress since last meeting.
 3. Note field observations, problems and decisions.
 4. Identify problems which impede planned progress.

5. Review off-site fabrication problems.
6. Review Contractor's corrective measures and procedures to regain planned schedule.
7. Review Contractor's revision to the construction schedule.
8. Review submittal schedule; expedite as required to maintain schedule.
9. Maintenance of quality and work standards.
10. Review changes proposed by Owner for their effect on the construction schedule and completion date.
11. Complete other current business.

END OF SECTION

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PART 1 - GENERAL**1.1 SCOPE**

- A. The work under this section includes submittal to the Engineer of shop drawings, product data and samples required by the various sections of these specifications.
- B. Submittal Contents: The submittal contents required are specified in each section.
- C. Definitions: Submittals are categorized as follows:
 - 1. Shop Drawings
 - a. Shop drawings shall include technical data, drawings, diagrams, procedure and methodology, performance curves, schedules, templates, patterns, test reports, calculations, instruction, measurements and similar information as applicable to the specific item for which the shop drawing is prepared.
 - b. Provide newly-prepared information, on reproducible sheets, with graphic information at accurate scale (except as otherwise indicated) or appropriate number of prints hereof, with name or preparer (firm name) indicated. The contract drawings shall not be traced or reproduced by any method for use as or in lieu of detail shop drawings. Show dimensions and note which are based on field measurement. Identify materials and products in the work shown. Indicate compliance with standards and special coordination requirements. Do not allow shop drawing copies without appropriate final "Action" markings by the Engineer to be used in connection with the work.
 - c. Drawings shall be presented in a clear and thorough manner. Details shall be identified by reference to sheet and detail, specification section, schedule or room numbers shown on the Contract Drawings.
 - d. Minimum assembly drawings sheet size shall be 24 x 36-inches.
 - e. Minimum detail sheet size shall be 8-1/2 x 11-inches.
 - f. Minimum Scale:
 - 1) Assembly Drawings Sheet, Scale: 1 – inch = 30 feet.
 - 2) Detail Sheet, Scale: ¼ - inch = 1 foot.
 - 2. Product Data
 - a. Product data include standard printed information on materials, products and systems not specially prepared for this project, other than the designation of selections from among available choices printed therein.

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

- b. Collect required data into one submittal for each unit of work or system, and mark each copy to show which choices and options are applicable to the project. Include manufacturer's standard printed recommendations for application and use, compliance with standards, application of labels and seals, notation of field measurements which have been checked and special coordination requirements.
3. Samples
- a. Samples include both fabricated and un-fabricated physical examples of materials, products and units of work, both as complete units and as smaller portions of units of work, either for limited visual inspection or, where indicated, for more detailed testing and analysis.
 - b. Provide units identical with final condition of proposed materials or products for the work. Include "range" samples, not less than three units, where unavoidable variations must be expected, and describe or identify variations between units of each set. Provide full set of optional samples where the Engineer's selection is required. Prepare samples to match the Engineer's sample where indicated. Include information with each sample to show generic description, source or product name and manufacturer, limitations and compliance with standards. Samples are submitted for review and confirmation of color, pattern, texture and "kind" by the Engineer. Engineer will note "test" samples, except as otherwise indicated for other requirements, which are the exclusive responsibility of the Contractor.
4. Miscellaneous submittals related directly to the work (non-administrative) include warranties, maintenance agreements, workmanship bonds, project photographs, survey data and reports, physical work records, statements of applicability, quality testing and certifying reports, copies of industry standards, record drawings, field measurement data, operating and maintenance materials, overrun stock, security/protection/safety keys and similar information, devices and materials applicable to the work but not processed as shop drawings, product data or samples.

1.2 SPECIFIC CATEGORY REQUIREMENTS

- A. General: Except as otherwise indicated in the individual work sections, comply with general requirements specified herein for each indicated category of submittal.
 - 1. Submittals shall contain:
 - a. Three (3) sets of shop drawings, manufacturer's literature, etc. to be retained by the Engineer, plus the number of copies required by the Contractor, Manufacturer, etc.
 - b. The date of submittal and the dates of any previous submittals
 - c. The project title.

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

- d. Numerical submittal numbers, starting with 1.0, 2.0, etc. Revisions to be numbered 1.1, 1.2, etc.
- e. The names of:
 - 1) Contractor
 - 2) Supplier
 - 3) Manufacturer
- f. Identification of the product, with the specification section number, permanent equipment tag numbers and applicable drawing no.
- g. Field dimensions, clearly identified as such.
- h. Relation to adjacent or critical features of the work or materials.
- i. Applicable standards, such as ASTM or federal specification numbers.
- j. Notification to the Engineer in writing, at time of submissions, of any deviations on the submittals from requirements of the contract documents.
- k. Identification of revisions on re-submittals.
- l. An 8 x 3-inch blank space for Contractor and Engineer stamps.
- m. Contractor's stamp, initialed or signed, certifying the review of submittal, verification of products, field measurements and field construction criteria and coordination of the information within the submittal with requirements of the work and of contract documents.
- n. Submittal sheets or drawings showing more than the particular item under consideration shall have all but the pertinent description of the item for which review is requested crossed out.

1.3 ROUTING OF SUBMITTALS

- A. Submittals and routing correspondence shall be routed as follows:
 - 1. Supplier to Contractor (through representative if applicable).
 - 2. Contractor to Engineer
 - 3. Engineer to Contractor and Owner
 - 4. Contractor to Supplier

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

1.4 ADDRESS FOR COMMUNICATIONS

Engineer: Hulsey McCormick & Wallace, Inc.
106 Clair Drive
Piedmont, SC 29673
(864) 269-0890 FAX (864) 269-9030

PART 2 - PRODUCTS

2.1 SHOP DRAWINGS

- A. Unless otherwise specifically directed by the Engineer, make all shop drawings accurately to a scale sufficiently large to show all pertinent features of the item and its method of connection to the work.
- B. One reproducible for all submittals larger than 11 x 17- inches and no more than three prints of other submittals will be returned to the Contractor.

2.2 MANUFACTURER'S LITERATURE

- A. Where content of submitted literature from manufacturers includes data not pertinent to this submittal, clearly indicate which portion of the contents is being submitted for the Engineer's review.
- B. Submit the number of copies which are required to be returned (not to exceed three) plus three copies which will be retained by the Engineer.

2.3 SAMPLES

- A. Samples shall illustrate materials, equipment or workmanship and established standards by which completed work is judged.
- B. Unless otherwise specifically directed by the Engineer, all samples shall be of the precise article proposed to be furnished.
- C. Submit all samples in the quantity which is required to be returned plus one sample which will be retained by the Engineer.

2.4 COLORS

- A. Unless the precise color and pattern is specifically described in the contract documents, wherever a choice of color or pattern is available in a specified product, submit accurate color charts and pattern charts to the Engineer for review and selection.
- B. Unless all available colors and patterns have identical costs and identical wearing capabilities, and are identically suited to the installation, completely describe the relative costs and capabilities of each.

2.5 OPERATION, MAINTENANCE AND SERVICE MANUALS

- A. Prepare and submit for the Owner's use two (2) copies of O&M Manual for each piece of equipment.
 - 1. Submit Manuals 60 days prior to delivery of equipment.
- B. Manuals shall be specific to the equipment supplied.
 - 1. Manuals applicable to many different configurations and which require the operator to selectively read portions of the instructions will not be accepted.
 - 2. The equipment model that the Manual applies to shall be indicated by an arrow.
- C. Provide a Table of Contents specific to each Manual.
- D. At the beginning of each Manual, provide a description of the equipment to include model numbers, purchase order numbers, serial numbers, motor information, and performance and design criteria.
- E. Correlate Manuals with the approved shop drawings and include the following minimum information:
 - 1. Parts list, including recommended spare parts list.
 - 2. Guaranties.
 - 3. Recommended maintenance instructions.
 - 4. Recommended lubricants and lubrication instructions.
 - 5. Address and telephone number of the source for repairs, spare parts and service.
 - 6. Detailed description of operating procedure for the item of equipment specifically written for this installation, including start-up and shut-down procedures.
 - 7. Equipment performance specifications, including pump curves.
 - 8. Results of start-up and any further recommendations resulting from start-up.
 - 9. Current cost for each recommended spare part and agreement to provide updated costs at Owner's request.
- F. Provide a maintenance and lubrication schedule to be a summary of all preventative maintenance and lubrication, including the following information:
 - 1. Title.
 - 2. Type of activity (inspection, adjustment, oil change, etc.).

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

3. Brief description of activity.
 4. Type of lubricant.
 5. Frequency (daily, weekly, etc.).
- G. The manufacturer shall provide the Owner with a log chart to record all servicing and maintenance required during the equipment warranty period.
- H. For process oriented equipment, treatment plants, etc., provide a detailed description of the process operation and trouble-shooting of problems.
- I. Provide clear and legible copies. Type parts lists, etc.
- J. Layout and detail drawings shall be reduced to a maximum size of 11" x 17", unless written approval is received from the Engineer prior to submittal of Manuals.
- K. Provide a clearly labeled three-ring binder for Manuals having a thickness greater than 1/2". Provide sheet lifters if binder is more than 1/2 full.
1. Provide multiple binders for Manuals having a thickness greater than 2".

PART 3 - EXECUTION**3.1 CONTRACTOR'S COORDINATION OF SUBMITTALS**

- A. Prior to submittal for the Engineer's review, the Contractor shall use all means necessary to fully coordinate all material, including the following procedures:
1. Determine and verify all field dimensions and conditions, catalog numbers and similar data.
 2. Coordinate as required with all trades and all public agencies involved.
 3. Submit a written statement of review and compliance with the requirements of all applicable technical Specifications as well as the requirements of this section.
 4. Clearly indicate in a letter or memorandum on the manufacturer's or fabricator's letterhead, all deviations from the contract documents.
- B. Each and every copy of the shop drawings and data shall bear the Contractor's stamp showing that they have been so checked. Shop drawing submittal to the Engineer without the Contractor's stamp will be returned to the Contractor for conformance with this requirement.
- C. The Owner may back charge the Contractor for costs associated with having to review a particular shop drawing, product data or sample more than two times to receive a "No Exceptions Taken" mark.
- D. Grouping of Submittals

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

1. Unless otherwise specifically permitted by the Engineer, make all submittals in groups containing all associated items.
 2. No review will be given to partial submittals of shop drawings for items which interconnect and/or are interdependent. It is the Contractor's responsibility to assemble the shop drawings for all such interconnecting and/or interdependent items, check them, and then make one submittal to the Engineer along with Contractor's comments as to compliance, non-compliance or features requiring special attention.
- E. **Schedule of Submittals:** Within 30 days of contract award and prior to any shop drawing submittal, the Contractor shall submit a schedule showing the estimated date of submittal and the desired approval date for each shop drawing anticipated. A reasonable period shall be scheduled for review and comments. Time lost due to unacceptable submittals shall be the Contractor's responsibility and some time allowance for re-submittal shall be provided. The schedule shall provide for submittal of items which relate to one another to be submitted concurrently.

3.2 TIMING OF SUBMITTALS

- A. **Engineer Review**
1. Allow a minimum of 30 days for the Engineer's initial processing of each submittal requiring review and response, except allow longer periods where processing must be delayed for coordination with subsequent submittals. The Engineer will advise the Contractor promptly when it is determined that a submittal being processed must be delayed for coordination. Allow a minimum of two weeks for reprocessing each submittal. Advise the Engineer on each submittal as to whether processing time is critical to progress of the Work, and therefore the work would be expedited if processing time could be foreshortened.
 2. Acceptable submittals will be marked "No Exceptions Taken". A minimum of three (3) copies will be retained by the Engineer for Engineer's and the Owner's use and the remaining copies will be returned to the Contractor.
 3. Submittals requiring minor corrections before the product is acceptable will be marked "Make Corrections Noted". The Contractor may order, fabricate and ship the items included in the submittals, provided the indicated corrections are made. Drawings must be resubmitted for review and marked "No Exceptions Taken" prior to installation or use of products.
 4. Submittals marked "Revise and Resubmit" must be revised to reflect required changes and the initial review procedure repeated.
 5. The "Rejected" notation is used to indicate products which are not acceptable. Upon return of a submittal so marked, the Contractor shall repeat the initial review procedure utilizing acceptable products.
 6. Only two copies of items marked "Revise and Resubmit" and "Rejected" will be reviewed and marked. One copy will be retained by the Engineer and the other

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

copy with all remaining unmarked copies will be returned to the Contractor for re-submittal.

- B. No work or products shall be installed without a drawing or submittal bearing the “No Exceptions Taken” notation. The Contractor shall maintain at the job site a complete set of shop drawings bearing the Engineer’s stamp.
- C. Substitutions: In the event the Contractor obtains the Engineer’s approval for the use of products other than those which are listed first in the contract documents, the Contractor shall, at the Contractor’s own expense and using methods approved by the Engineer, make any changes to structures, piping and electrical work that may be necessary to accommodate these products.
- D. Use of the “No Exceptions Taken” notation on shop drawings or other submittals is general and shall not relieve the Contractor of the responsibility of furnishing products of the proper dimension, size, quality, quantity, materials and all performance characteristics, to efficiently perform the requirements and intent of the contract documents. The Engineer’s review shall not relieve the Contractor of responsibility for errors of any kind on the shop drawings. Review is intended only to assure conformance with the design concept of the project and compliance with the information given in the contract documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site. The Contractor is also responsible for information that pertains solely to the fabrication processes or to the technique of construction and for the coordination of the work of all trades.

3.3 RESUBMISSION REQUIREMENTS

- A. Shop Drawings
 - 1. Revise initial drawings as required and resubmit as specified for initial submittal, with the re-submittal number shown.
 - 2. Indicate on drawings all changes which have been made other than those requested by the Engineer.
- B. Project Data and Samples: Resubmit new data and samples as specified for initial submittal, with re-submittal number shown.

END OF SECTION

PART 1 - GENERAL

1.1 SCOPE

- A. This section includes testing which the Owner may require, beyond that testing required of the manufacturer, to determine if materials provided for the project meet the requirements of these specifications.
- B. This work also includes all testing required by the Owner to verify work performed by the Contractor is in accordance with the requirements of these specifications, i.e., concrete strength and slump testing, soil compaction, etc.
- C. This work does not include materials testing required in various sections of these specifications to be performed by the manufacturer, e.g., testing of pipe.
- D. The testing laboratory or laboratories will be selected by the Owner. The testing laboratory or laboratories will work for the Owner.

1.2 PAYMENT FOR TESTING SERVICES

- A. The cost of testing services required by the contract shall be paid for by the Owner; i.e., concrete testing, soil compaction, and asphalt testing, etc.
- B. The cost of additional testing services not specifically required in the specifications, but requested by the Owner or Engineer, shall be paid for by the Owner.
- C. The cost of material testing described in various sections of these specifications or as required in referenced standards to be provided by a material manufacturer, shall be included in the price bid for that item and shall not be paid for by the Owner.
- D. The cost of retesting any item that fails to meet the requirements of these specifications shall be paid for by the Contractor. Retesting shall be performed by the testing laboratory working for the Owner.

1.3 LABORATORY DUTIES

- A. Cooperate with the Owner, Engineer and Contractor.
- B. Provide qualified personnel promptly on notice.
- C. Perform specified inspections, sampling and testing of materials.
 - 1. Comply with specified standards, ASTM, other recognized authorities, and as specified.
 - 2. Ascertain compliance with requirements of the contract documents.
- D. Promptly notify the Engineer and Contractor of irregularity or deficiency of work which are observed during performance of services.

TESTING LABORATORY SERVICES

- E. Promptly submit three copies (two copies to the Engineer and one copy to the Contractor) of report of inspections and tests in addition to any additional copies requested by the Contractor with the following information included:
 - 1. Date issued
 - 2. Project title and number
 - 3. Testing Laboratory name and address
 - 4. Name and signature of inspector
 - 5. Date of inspection or sampling
 - 6. Record of temperature and weather
 - 7. Date of test
 - 8. Identification of product and Specification section
 - 9. Location of Project
 - 10. Type of inspection or test
 - 11. Results of test
 - 12. Observation regarding compliance with the contract documents
- F. Perform additional services as required.
- G. The laboratory is not authorized to release, revoke, alter or enlarge on requirements of the contract documents, or approve or accept any portion of the work.

1.4 CONTRACTOR RESPONSIBILITIES

- A. Cooperate with laboratory personnel; provide access to work and/or manufacturer's requirements.
- B. Provide to the laboratory, representative samples, in required quantities, of materials to be tested.
- C. Furnish copies of mill test reports.
- D. Furnish required labor and facilities to:
 - 1. Coordinate with the Owner's field technician to obtain and handle samples at the site;
 - 2. Facilitate inspections and tests;

TESTING LABORATORY SERVICES

- 3. Build or furnish a holding box for concrete cylinders or other samples as required by the laboratory.

- E. Notify the laboratory sufficiently in advance of operation to allow for the assignment of personnel and schedules of tests. Contractor shall make reasonable efforts to minimize the number of trips by laboratory personnel.

- F. Laboratory Tests: Where such inspection and testing are to be conducted by an independent laboratory agency, the sample(s) shall be selected by such laboratory or agency, or the Engineer, and shipped to the laboratory by the Contractor at Contractor's expense.

- G. Copies of all correspondence between the Contractor and testing agencies shall be provided to the Engineer.

1.5 QUALITY ASSURANCE

Testing shall be in accordance with all pertinent codes and regulations and with procedures and requirements of the American Society for Testing and Materials (ASTM).

1.6 PRODUCT HANDLING

Promptly process and distribute all required copies of test reports and related instructions to insure all necessary retesting or replacement of materials with the least possible delay in the progress of the work.

1.7 FURNISHING MATERIALS

The Contractor shall be responsible for furnishing all materials necessary for testing.

1.8 CODE COMPLIANCE TESTING

Inspections and tests required by codes or ordinances or by a plan approval authority, and made by a legally constituted authority, shall be the responsibility of, and shall be paid for by the Contractor, unless otherwise provided in the contract documents.

1.9 CONTRACTOR'S CONVENIENCE TESTING

Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor and at the Contractor's expense.

1.10 TESTING SCHEDULE

- A. Establishing Schedule
 - 1. The Contractor shall, by advance discussion with the testing laboratory, determine the time required for the laboratory to perform its tests and to issue each of its findings, and make all arrangements for the testing laboratory to be on site to provide the required testing.

 - 2. Provide sufficient time for laboratory testing within the construction schedule.

TESTING LABORATORY SERVICES

- B. When changes of construction schedule are necessary during construction, coordinate all such changes of schedule with the testing laboratory as required.
- C. When the testing laboratory is ready to test according to the determined schedule, but is prevented from testing or taking specimens due to incompleteness of the work, all extra costs for testing attributable to the delay will be back-charged to the Contractor and shall not be borne by the Owner.

1.11 SAMPLING SPECIMENS

Unless otherwise indicated in the contract documents, all specimens and samples for tests will be sampled by the testing laboratory or the Engineer.

1.12 TRANSPORTING SAMPLES

The Contractor shall be responsible for transporting all samples, except those taken by testing laboratory personnel, to the testing laboratory.

END OF SECTION

PART 1 - GENERAL

1.1 SCOPE

- A. Temporary facilities required for this work include, but are not necessarily limited to:
 - 1. Temporary utilities such as water and electricity
 - 2. First aid facilities
 - 3. Sanitary facilities
 - 4. Potable water
 - 5. Temporary enclosures and construction facilities

1.2 GENERAL

- A. First aid facilities, sanitary facilities and potable water shall be available on the project site on the first day that any activities are conducted on site. The other facilities shall be provided as the schedule of the project warrants.
- B. Maintenance: Use all means necessary to maintain temporary facilities in proper and safe condition throughout progress of the work. In the event of loss or damage, immediately make all repairs and replacements necessary, at no additional cost to the Owner.
- C. Removal: Remove all such temporary facilities and controls as rapidly as progress of the work will permit.
- D. Contractor shall maintain access to Owner's facilities during the course of construction. Any temporary closing of Owner access shall be coordinated with the Owner's schedule.

1.3 TEMPORARY UTILITIES

- A. General
 - 1. Provide and pay all costs for all water, electricity and other utilities required for the performance of the work.
 - 2. Pay all costs for temporary utilities until project completion.
 - 3. Costs for temporary utilities shall include all power, water and the like necessary for testing equipment as required by the contract documents.
- B. Temporary Water: Provide all necessary temporary piping, and upon completion of the work, remove all such temporary piping. Provide and remove water meters.
- C. Temporary Electricity
 - 1. Provide all necessary wiring for the Contractor's use.

2. Furnish, locate and install area distribution boxes such that the individual trades may use their own construction type extension cords to obtain adequate power, and artificial lighting at all points where required by inspectors and for safety.

1.4 FIRST AID FACILITIES

The contractor shall provide a suitable first aid station, equipped with all facilities and medical supplies necessary to administer emergency first aid treatment. The Contractor shall have standing arrangements for the removal and hospital treatment of any injured person. All first aid facilities and emergency ambulance service shall be made available by the Contractor to the Owner and the Engineer's personnel.

1.5 SANITARY FACILITIES

Prior to starting the work, the Contractor shall furnish, for use of Contractor's personnel on the job, all necessary toilet facilities which shall be secluded from public observation. These facilities shall be either chemical toilets or shall be connected to the Owner's sanitary sewer system. All facilities, regardless of type, shall be kept in a clean and sanitary condition and shall comply with the requirements and regulations of the area in which the work is performed. Adequacy of these facilities will be subject to the Engineer's review and maintenance of same must be satisfactory to the Engineer at all times.

1.6 POTABLE WATER

The Contractor shall be responsible for furnishing a supply of potable drinking water for employees, subcontractors, inspectors, engineers, the Owner, and others who are associated with the work.

1.7 ENCLOSURES AND CONSTRUCTION FACILITIES

Furnish, install and maintain for the duration of construction, all required scaffolds, tarpaulins, canopies, steps, bridges, platforms and other temporary construction necessary for proper completion of the Work in compliance with all pertinent safety and other regulations.

1.8 STORAGE AND PARKING FACILITIES

Storage for the Contractor's equipment and materials and parking facilities for the Contractor's and Contractor's subcontractors' personnel shall be determined at the pre-construction meeting. The storage and work facilities provided by the Owner shall not be used for parking by the Contractor's or subcontractor's personnel.

END OF SECTION

PART 1 - GENERAL

1.1 BARRICADES, LIGHTS AND SIGNALS

- A. The Contractor shall furnish and erect such barricades, fences, lights and danger signals and shall provide such other precautionary measures for the protection of persons or property and of the work as necessary. Barricades shall be painted in a color that will be visible at night. From sunset to sunrise, the Contractor shall furnish and maintain at least one light at each barricade and sufficient numbers of barricades shall be erected to keep vehicles from being driven on or into any work under construction.
- B. The Contractor will be held responsible for all damage to the work due to failure of barricades, signs and lights. Whenever evidence is found of such damage, the Contractor shall immediately remove the damaged portion and replace it at Contractor's cost and expense. The Contractor's responsibility for the maintenance of barricades, signs and lights shall not cease until the project has been accepted by the Owner.

1.2 SECURITY

- A. The contractor is to maintain, at a minimum, the level of security provided by the Owner prior to the start of construction.

END OF SECTION

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PART 1 - GENERAL

1.1 SCOPE

Limit blowing dust caused by construction operations by applying water or employing other appropriate means or methods to maintain dust control, subject to the approval of the Owner. At a minimum, this may require the use of a water wagon twice a day to suppress dusty conditions.

1.2 PROTECTION OF ADJACENT PROPERTY

- A. The bidders shall visit the site and note the buildings, landscaping, roads, parking areas and other facilities near the work site that may be damaged by their operations. The Contractor shall make adequate provision to fully protect the surrounding area and will be held fully responsible for all damages resulting from Contractor's operations.

- B. Protect all existing facilities (indoors or out) from damage by dust, fumes, spray or spills (indoors or out). Protect motors, bearings, electrical gear, instrumentation and building or other surfaces from dirt, dust, welding fumes, paint spray, spills or droppings causing wear, corrosion, malfunction, failure or defacement by enclosure, sprinkling or other dust palliatives, masking and covering, exhausting or containment.

END OF SECTION

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PART 1 - GENERAL

1.1 SCOPE

- A. The Contractor shall provide transportation of all equipment, materials and products furnished under these contract documents to the work site. In addition, the Contractor shall provide preparation for shipment, loading, unloading, handling and preparation for installation and all other work and incidental items necessary or convenient to the Contractor for the satisfactory prosecution and completion of the work.
- B. All equipment, materials and products damaged during transportation or handling shall be repaired or replaced by the Contractor at no additional cost to the Owner prior to being incorporated into the work.

1.2 TRANSPORTATION

- A. All equipment shall be suitably boxed, crated or otherwise protected during transportation.
- B. Where equipment will be installed using existing cranes or hoisting equipment, the Contractor shall ensure that the weights of the assembled sections do not exceed the capacity of the cranes or hoisting equipment.
- C. Small items and appurtenances such as gauges, valves, switches, instruments and probes which could be damaged during shipment shall be removed from the equipment prior to shipment, packaged and shipped separately. All openings shall be plugged or sealed to prevent the entrance of water or dirt.

1.3 HANDLING

- A. All equipment, materials and products shall be carefully handled to prevent damage or excessive deflections during unloading or transportation.
- B. Lifting and handling drawings and instructions furnished by the manufacturer or supplier shall be strictly followed. Eyebolts or lifting lugs furnished on the equipment shall be used in handling the equipment. Shafts and operating mechanisms shall not be used as lifting points. Spreader bars or lifting beams shall be used when the distance between lifting points exceeds that permitted by standard industry practice.
- C. Under no circumstances shall equipment or products such as pipe, structural steel, castings, reinforcement, lumber, piles, poles, etc., be thrown or rolled off of trucks onto the ground.
- D. Slings and chains shall be padded as required to prevent damage to protective coatings and finishes.

1.4 OWNER FURNISHED EQUIPMENT

- A. Owner furnished equipment, if any, shall mean any Owner equipment purchased and required by these specifications to be installed by the Contractor.
- B. The Owner shall be responsible for transportation to the site of all Owner furnished equipment.
- C. The Contractor shall off-load and store all Owner furnished equipment per this section of these specifications.

END OF SECTION

PART 1 - GENERAL

1.1 SCOPE

The work under this section includes, but is not necessarily limited to, the furnishing of all labor, tools and materials necessary to properly store and protect all materials, equipment, products and the like, as necessary for the proper and complete performance of the work.

1.2 STORAGE AND PROTECTION

A. Storage

1. Maintain ample way for foot traffic at all times, except as otherwise approved by the Engineer.
2. All property damaged by reason of storing of material shall be properly replaced at no additional cost to the Owner.
3. Packaged materials shall be delivered in original unopened containers and so stored until ready for use.
4. All materials shall meet the requirements of these specifications at the time that they are used in the work.
5. Store products in accordance with manufacturer's instructions.

B. Protection

1. Use all means necessary to protect the materials, equipment and products of every section before, during and after installation and to protect the installed work and materials of all other trades.
2. All materials shall be delivered, stored and handled to prevent the inclusion of foreign materials and damage by water, breakage, vandalism or other causes.
3. Substantially constructed weather-tight storage sheds, with raised floors, shall be provided and maintained as may be required to adequately protect those materials and products stored on the Site which may require protection from damage by the elements.

C. Replacements: In the event of damage, immediately make all repairs and replacements necessary for the approval of the Engineer and at no additional cost to the Owner.

D. Equipment and products stored outdoors shall be supported above the ground on suitable wooden blocks or braces arranged to prevent excessive deflection or bending between supports. Items such as pipe, structural steel and sheet construction products shall be stored with one end elevated to facilitate drainage.

STORAGE AND PROTECTION

- E. Unless otherwise permitted in writing by the Engineer, building products and materials such as cement, grout, plaster, gypsum board, particleboard, resilient flooring, acoustical tile, paneling, finish lumber, insulation, wiring, etc., shall be stored indoors in a dry location. Building products such as rough lumber, plywood, concrete block and structural tile may be stored outdoors under a properly secured waterproof covering.
- F. Tarps and other coverings shall be supported above the stored equipment or materials on wooden strips to provide ventilation under the cover and minimize condensation. Tarps and covers shall be arranged to prevent ponding of water.

1.3 EXTENDED STORAGE

In the event that certain items of major equipment such as air compressors, pumps and mechanical aerators have to be stored for an extended period of time, the Contractor shall provide satisfactory long-term storage facilities which are acceptable to the Engineer. The Contractor shall provide all special packaging, protective coatings, power, nitrogen purge, desiccants, lubricants and exercising necessary or recommended by the manufacturer to properly maintain and protect the equipment during the period of extended storage.

1.4 OWNER FURNISHED EQUIPMENT

The Contractor shall provide storage and protection for all Owner furnished equipment and materials, including extended storage as specified above.

END OF SECTION

PART 1 - GENERAL

1.1 SCOPE

This section covers the general cleaning which the Contractor shall be required to perform both during construction and before final acceptance of the project unless otherwise shown on the drawings or specified elsewhere in these specifications.

1.2 QUALITY ASSURANCE

- A. Daily, and more often if necessary, conduct inspections verifying that requirements of cleanliness are being met.
- B. In addition to the standards described in this section, comply with all pertinent requirements of governmental agencies having jurisdiction.

1.3 HAZARD CONTROL

- A. The Contractor shall store volatile wastes in covered metal containers and remove from premises daily.
- B. The Contractor shall prevent accumulation of wastes which create hazardous conditions.
- C. Burning or burying rubbish and waste materials on the site shall not be allowed.
- D. Disposal of volatile wastes into sanitary storm sewers shall not be allowed.

1.4 DISPOSAL OF SURPLUS MATERIALS

- A. Unless otherwise shown on the drawings, specified or directed, the Contractor shall legally dispose off the site all surplus excavated materials and materials and equipment from demolition and shall provide Contractor's own suitable, off-site spoil area, or utilize a site designated by the Owner.
- B. The Owner shall have the opportunity to inspect any removed equipment or materials prior to disposal by the Contractor. If said equipment and/or materials are determined to be salvageable by the Owner, the Contractor shall transport said equipment and material to a building or area designated by the Owner.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS AND EQUIPMENT

Provide all required personnel, equipment and materials needed to maintain the specified standard of cleanliness.

2.2 COMPATIBILITY

Use only the cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material or as approved by the Engineer.

PART 3 - EXECUTION

3.1 PROGRESS CLEANING

A. General

1. Retain all stored items in an orderly arrangement allowing maximum access, not impeding drainage or traffic and providing the required protection of materials.
2. Do not allow the accumulation of scrap, debris, waste material and other items not required for construction of this work.
3. At least each week, and more often as necessary, completely remove all scrap, debris and waste material from the job site.
4. Provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection and protection of the environment.

B. Site

1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris and waste material. Remove all such items to the place designated for their storage.
2. Weekly, and more often if necessary, inspect all arrangements of materials stored on the site; restack or otherwise service all arrangements to meet the requirements of paragraph 3.1 above.
3. At all times maintain the site in a neat and orderly condition which meets the approval of the Engineer.

3.2 FINAL CLEANING

- A. Definitions: Except as otherwise specifically provided, “clean” for the purpose of this Section shall be interpreted as meaning the level of cleanliness generally provided by commercial building maintenance subcontractors using commercial quality building maintenance equipment and materials.
- B. General: Prior to completion of the work, remove from the job site all tools, surplus materials, equipment, scrap, debris and waste. Conduct final cleaning as described in 3.1 above.
- C. Site: Unless otherwise specifically directed by the Engineer, hose down all paved areas on the site and all public sidewalks directly adjacent to the site; rake clean other surfaces of the grounds. Completely remove all resultant debris.
- D. Restoration of Landscape Damage: Any landscape feature scarred or damaged by the Contractor’s equipment or operations shall be restored as nearly as possible to its original condition at the Contractor’s expense. The Engineer will decide what method of restoration shall be used.

- E. The Contractor shall protect all trees outside of the limits of construction. The Contractor shall be responsible for the replacement of damaged trees outside the limits of construction.
- F. Post-Construction Clean-up or Obliteration: The Contractor shall obliterate all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, or any other vestiges of construction, as directed by the Engineer.
- G. Timing: Schedule final cleaning as approved by the Engineer to enable the Owner to accept a completely clean project.

3.3 CLEANING DURING OWNER'S OCCUPANCY

Should the Owner occupy the work or any portion thereof prior to its completion by the Contractor and acceptance by the Owner, responsibilities for interim and final cleaning of the occupied spaces shall be as determined by the Engineer in accordance with the supplementary conditions of the contract documents.

END OF SECTION

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PART 1 - GENERAL

1.1 PROJECT MAINTENANCE AND WARRANTY

- A. Maintain and keep in good repair the work covered by these drawings and specifications until acceptance by the Owner.
- B. The Contractor shall warrant for a period of one year from the date of Owner's written acceptance of certain segments of the work and/or Owner's written final acceptance of the project, as defined in the contract documents, that the completed work is free from all defects due to faulty products or workmanship. The Contractor shall promptly make such corrections as may be necessary by reason of such defects. The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustments or other work that may be made necessary by such defects, the Owner may do so and charge the Contractor the Cost thereby incurred. The performance bond shall remain in full force and effect throughout the warranty period.
- C. The Contractor shall not be obligated to make replacements which become necessary because of ordinary wear and tear, or as a result of improper operation or maintenance, or as a result of improper work or damage by another Contractor or the Owner, or to perform any work which is normally performed by a maintenance crew during operation.
- D. In the event of multiple failures of major consequence prior to the expiration of the one year warranty described above, the affected unit shall be disassembled, inspected and modified or replaced as necessary to prevent further occurrences. All related components which may have been damaged or rendered non-serviceable as a consequence of the failure shall be replaced. A new 12-month warranty against defective or deficient design, Workmanship, and materials shall commence on the day that the item is reassembled and placed back into operation. As used herein, multiple failure shall be interpreted to mean two or more successive failures of the same kind in the same item or failures of the same kind in two or more items. Major failures may include, but are not limited to, cracked or broken housing, piping, or vessels, excessive deflections, bent or broken shafts, broken or chipped gear teeth, premature bearing failure, excessive wear or excessive leakage around seals. Failures which are directly and clearly traceable to operator abuse, such as operations in conflict with published maintenance instructions, shall be exempted from the scope of the one year warranty. Should multiple failures occur in a given item, all products of the same size and type shall be disassembled, inspected, modified or replaced as necessary and re-warranted for one year.
- E. The Contractor shall, at Contractor's own expense, furnish all labor, materials, tools and equipment required and shall make such repairs and removals and shall perform such work or reconstruction as may be made necessary by any structural or functional defect or failure resulting from neglect, faulty workmanship or faulty materials, in any part of the work performed by the Contractor. Such repair shall also include refilling of trenches, excavations or embankments which show settlement or erosion after backfilling or placement.

- F. Except as noted on the drawings or as specified, all structures such as embankments and fences shall be returned to their original condition prior to the completion of the contract. Any and all damage to any facility not designated for removal, resulting from the Contractor's operations, shall be promptly repaired by the Contractor at no cost to the Owner.
- G. The Contractor shall be responsible for all road and entrance reconstruction and repairs and maintenance of same for a period of one year from the date of final acceptance. In the event the repairs and maintenance are not made immediately and it becomes necessary for the Owner of the road to make such repairs, the Contractor shall reimburse the Owner of the road for the cost of such repairs.
- H. The Contractor shall protect existing trees and other vegetation to remain in place against unnecessary cutting, breaking, skinning of roots, skinning and bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line and excess foot or vehicular traffic, or parking of vehicles within drip line. The Contractor shall be responsible for the replacement of such damaged trees and vegetation.
- I. In the event the Contractor fails to proceed to remedy the defects upon notification within 15 days of the date of such notice, the Owner reserves the right to cause the required materials to be procured and the Work to be done, as described in the drawings and specifications, and to hold the Contractor and the sureties on Contractor's bond liable for the cost and expense thereof.
- J. Notice to Contractor for repairs and reconstruction will be made in the form of a registered letter addressed to the Contractor at Contractor's home office.
- K. Neither the foregoing paragraphs nor any provision in the contract documents, nor any special guarantee time limit implies any limitation of the Contractor's liability within the law of the place of construction.

END OF SECTION

PART 1 - GENERAL

1.1 SCOPE

- A. The work under this section includes, but is not necessarily limited to, the compiling, maintaining, recording and submitting of project record documents as herein specified.
- B. Record documents include, but are not limited to:
 - 1. Drawings
 - 2. Specifications
 - 3. Change Orders and other modifications to the Contract
 - 4. Engineer field orders or written instructions, including requests for information (RFI) and clarification memorandums
 - 5. Reviewed shop drawings, product data and samples
 - 6. Test records
- C. The Contractor shall maintain on the project site throughout the contract time an up to date set of record drawings.

1.2 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. Storage
 - 1. Store documents and samples in the Contractor's field office, apart from documents used for construction.
 - 2. Provide files and racks for storage of documents.
 - 3. Provide locked cabinet or secure storage space for storage of samples.
- B. File documents and samples in accordance with format of these Specifications.
- C. Maintenance
 - 1. Maintain documents in a clean, dry, legible condition and in good order.
 - 2. Do not use record documents for construction purposes.
 - 3. Maintain at the site for the Owner one copy of all record documents.
- D. Make documents and samples available at all times for inspection by Engineer.
- E. Failure to maintain the record documents in a satisfactory manner may be cause for withholding of a certificate for payment.

1.3 QUALITY ASSURANCE

- A. Unless noted otherwise, record drawings shall provide dimensions, distances and coordinates to the nearest 0.1 foot.
- B. Unless noted otherwise, record drawings shall provide elevations to the nearest 0.01 foot for all pertinent items constructed by the Contractor.
- C. The Contractor shall employ a currently registered surveyor to prepare the record drawings from a post-construction, field run survey. The record drawings shall provide elevations to the nearest 0.01 foot for all manhole inverts, manhole frames and other pertinent items constructed by the Contractor. The record drawings shall provide dimensions, distances, and coordinates to the nearest 0.01 foot and horizontal angles to the nearest 10 seconds.

1.4 RECORDING

- A. Label each document “project record” in neat, large printed letters.
- B. Recording
 - 1. Record information concurrently with construction progress.
 - 2. Do not conceal any work until required information is recorded.

1.5 RECORD DRAWINGS

- A. Contractor shall provide two sets of neat, clean, legible redline drawings to the Owner.
- B. Legibly mark and revise drawings to record actual construction, including:
 - 1. All Construction
 - a. Changes of dimension and detail.
 - b. Changes made by requests for information (RFI), field order, clarification memorandums or by change order.
 - c. Details not on original drawings.
 - d. Two sets of approved shop drawings.
 - 2. Site Improvements, Including Underground Utilities
 - a. Horizontal and vertical locations of all exposed and underground utilities and appurtenances, both new facilities constructed and those utilities encountered, referenced to permanent surface improvements.
 - b. Location of and dimensions of roadways and parking areas, providing dimensions to back of curb when present.

- c. The locations shall be referenced to at least two easily identifiable, permanent landmarks (e.g., power poles, valve markers, etc.) or benchmarks.
 - d. All sewer mains (type, size) and appurtenances such as manholes, laterals, cleanouts, pump stations, etc. shall be located and tied into the state plane coordinates. Also show the distance between manholes, invert and rim elevations, angles and sewer profiles.
3. Structures
- a. Depths of various elements of foundation in relation to finish first floor datum or top of wall.
 - b. Location of internal and buried utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.

1.6 SPECIFICATIONS

- A. Legibly mark each section to record:
 - 1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
 - 2. Changes made by requests for information (RFI), field order, clarification memorandums, or by change order.

1.7 SUBMITTAL

- A. At contract closeout, deliver record documents to the Owner.
- B. Accompany submittal with transmittal letter, in duplicate, containing:
 - 1. Date
 - 2. Project title and number
 - 3. Contractor's name and address
 - 4. Title and number of each record document
 - 5. Signature of Contractor or Contractor's authorized representative

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DIVISION 2
SITE CONSTRUCTION

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PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work Included: Cut, fill, excavate, backfill, compact and grade the site as necessary to bring the roads, drives, building sites, paved areas and open areas to the lines and grades shown on the drawings.
1. The work includes, but is not necessarily limited to:
 - a. Building site preparation.
 - b. Roadway, parking area, drive, and walk subgrade preparation.
 - c. Excavations and formations of embankments.
 - d. Dressing of graded areas, shoulders, and ditches.
 - e. Construction and lining of treatment basins.
 2. Classification: Material determined by the engineer to be rock as defined herein will be classified as "Rock Excavation".
 - a. Excavation of rock will be paid for at the unit price indicated on the bid form.
 - b. Quantities for rock excavation shall be as determined by the Engineer from field measurements.
 - c. Do not perform any rock excavation without prior approval of the engineer.
- B. Related Work:
1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these specifications.
 2. Section 02370 - Erosion and Sediment Control.
- C. Definitions:
1. Open areas: Open areas shall be those areas that do not include building sites, paved areas, street right-of-way, and parking areas.
 2. Maximum Density: Maximum weight in pounds per cubic foot of a specific material.
 3. Optimum moisture: Percentage of water in a specific material at maximum density.
 4. Rock Excavation: Excavation of any hard natural substance which requires the use of explosives and/or special impact tools such as jack hammers, sledges, chisels or

similar devices specifically designed for use in cutting or breaking rock, but exclusive of trench excavating machinery. To be considered as rock excavation, the material shall be continuous; individual boulders or rocks in soil will not be considered rock excavation. Any material occupying an original volume of more than 1 cubic yard which cannot be excavated with a single-tooth ripper drawn by a crawler tractor having a minimum draw bar pull rating not less than 56,000 pounds usable pull (Caterpillar D-8K), or the excavator listed in Section 02316 is considered Rock.

5. **Unsuitable Material:** Unsuitable material is defined as earth material unsatisfactory for its intended use and as classified by the soils technician. In addition to organic matter (greater than 5% organic content based on loss on ignition), sod, roots and rubbish, highly plastic clay soils of the CH and MH descriptions, and organic soils of the OL and OH descriptions, as defined in the Unified Soil Classification System shall be considered as unsuitable material.
6. **Suitable Material:** Where the term suitable material is used in specification sections pertaining to earthwork, it means earth or materials designated as being suitable for their intended use by soils technicians or the engineer. Suitable material shall be designated as meeting the requirements of the Unified Soil Classification System types SW, GW, GC, SP, SC, SM, ML, CL or as designated in these specifications.
7. **Select material:** Select material is defined as granular material to be used where indicated on the drawings or where specified herein consisting of soils conforming to the Unified Soil Classification types SW, SM, GW or GM or as otherwise approved by the engineer as select fill. Select material shall contain no stones or rubble larger than 1" in diameter.
8. **Crushed stone (gravel):** Crushed stone shall be No. 57 aggregate or equal conforming to ASTM C-33.
9. **Excavation:** Excavation is defined as unclassified excavation of every description regardless of materials encountered.

D. The contractor must determine for himself the volume of material required by the site.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.
- B. Comply with requirements of governmental agencies having jurisdiction.
- C. A testing laboratory retained by the owner will make such tests as are deemed advisable. The contractor shall schedule his work so as to permit a reasonable time for testing before placing succeeding lifts of fill material and shall keep the laboratory informed of his progress. The cost of the initial tests shall be paid for by the owner. Subsequent tests required as a result of improper compaction shall be paid for by the contractor.

1.3 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01610.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. Soil material used as fill, backfill, subgrade for structures or pavements, embankments, or site grading shall consist of suitable material as found available on site until such supply of on-site material is depleted.
 - 1. Provide suitable material free from organic matter and deleterious substances, containing no rocks or lumps over 6" in greatest dimension, and with not more than 15% of the rocks or lumps larger than 2" in their greatest dimension.
 - 2. Do not permit rocks having a dimension greater than 1" in the upper 6" of fill or embankment.
- B. Should the quantity of suitable on-site material be insufficient to complete the work, suitable borrow material as approved by the engineer shall be provided by the contractor at no additional expense to the owner.
- C. Select materials may be provided from on-site if acceptable material as approved by the engineer is available on site. Otherwise approved select material shall be provided by the contractor from an off-site source.

2.2 TOPSOIL

- A. Use topsoil consisting of material removed from the top 3" to 6" of existing on-site soils.
- B. Use topsoil containing no stones, roots, or large clods of soil.
- C. Stockpile topsoil separate from other excavated material.

2.3 SPECIAL SOIL MATERIALS

- A. Provide basin liner soils consisting of fine grained soils selected from excavated area or approved borrow sites, stockpiled and then placed and compacted in areas to receive liner.
- B. Sufficient material for the liner, as selected by the engineer, shall be stockpiled, kept separate from other excavated materials and piled free of undesirable materials.

2.4 WEED KILLER

- A. Provide a dry, free-flowing, dust free chemical compound, soluble in water, capable of inhibiting growth of vegetation and approved for use on this work by governmental agencies having jurisdiction.

2.5 EQUIPMENT

- A. Use equipment adequate in size, capacity and numbers to accomplish the work in a timely manner without undue waste or damage of material.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION

- A. Clearing and Grubbing: Clear and grub areas to be graded prior to commencement of the grading operations.
- B. Where so directed by the owner, protect and leave standing designated desirable trees.
- C. Complete any demolition and/or removal work as may be required prior to grading operations.
- D. Dispose of all clearing, grubbing and demolition debris and other deleterious material off the project site. Vegetation, roots, brush, rubbish, stumps, etc. may be burned on-site where permitted by local authorities and regulations and approved by the Engineer.
- E. Topsoil: Strip topsoil to a depth of 3" to 6" without contamination from the subsoil and stockpile topsoil separate from other excavated materials.
 - 1. Transport and deposit topsoil in storage piles convenient to areas that are to receive topsoil or in other locations as indicated or approved by the engineer.
 - 2. Deposit topsoil in areas that are already graded and will not be disturbed by on-going construction.
 - 3. Dispose of unsuitable or unusable stripped material off-site or as otherwise directed by the engineer.
- F. Sampling and Preliminary Testing:
 - 1. Prior to beginning the grading operations, the contractor shall submit to the engineer his proposed sequence of excavation operations.
 - 2. Based upon the sequence of excavation, samples of the fill materials will be obtained as excavation proceeds and tested for grain size permeability and moisture density relationship using the Standard Proctor Method (ASTM D698, Method A).
 - 3. Allow sufficient time for completion of laboratory tests before any fill operations begin, using the soils being tested.

3.3 FINISH ELEVATIONS AND LINES

- A. Construct areas outside of building or structure lines true to grades shown.

1. Where no grade is indicated, shape finish surface to drain away from buildings or structures, as approved by the engineer.
- B. Degree of finish shall be that ordinarily obtainable from blade grader, supplemented with hand raking and finishing.
- C. Finish surfaces to within 0.10' above or below the established grade or approved cross section.

3.4 GENERAL PROCEDURES

- A. Existing Utilities:
 1. Unless shown to be removed, locate and protect active utility lines shown on the drawings or otherwise made known to the contractor prior to excavating. If damaged, repair or replace at no additional cost to the owner.
 2. If active utility lines are encountered and are not shown on the drawings or otherwise made known to the contractor, promptly notify the engineer and take necessary steps to assure that service is not interrupted.
 3. If service is interrupted as a result of work under this section, immediately restore service by repairing the damaged utility at no additional cost to the owner.
 4. If existing utilities are found to interfere with the permanent facilities being constructed under this section, immediately notify the engineer and secure his instructions.
 5. Do not proceed with permanent relocation of utilities until written instructions are received from the engineer.
- B. Protection of Persons and Property:
 1. Barricade open holes and depressions occurring as part of this work, and post warning lights on property adjacent to or with public access.
 2. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
 3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout and other hazards created by operations under this section.
- C. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.
- D. Maintain access to adjacent areas at all times.
- E. Excavate and backfill in a manner and sequence that will provide proper drainage at all times

3.5 EXCAVATING (CUTS)

- A. Perform excavating of every type of material encountered within the limits of the work to the lines, grades and elevations indicated and specified herein.
- B. Suitable excavated materials:
 - 1. Use all suitable materials removed from the excavation as far as practicable in the formation of the embankments, subgrades, shoulders, building sites, and other places as directed.
 - 2. Unless otherwise indicated on the drawings or approved by the engineer, surplus suitable material shall be removed from the site and disposed of by the contractor.
- C. Unsuitable Excavated Material: Remove from the site and dispose of all unsuitable material unless otherwise approved by the engineer.
- D. Rock Excavation:
 - 1. Notify the engineer upon encountering rock or similar material which cannot be removed or excavated by conventional earth moving or ripping equipment.
 - 2. Do not use explosives without written permission from the engineer.
 - 3. When explosives are permitted, use only experienced persons who are licensed or otherwise authorized to use explosives. Store, handle, and use explosives in strict accordance with all regulatory bodies and the "Manual of Accident Prevention in Construction" of the Associated General Contractors of America, Inc.
 - 4. The contractor shall be solely responsible for any damage resulting from the use of explosives.
 - 5. The contractor is responsible for securing all permits required in performing this work.
- E. Unauthorized Excavation:
 - 1. Excavation of material to depths below the grades indicated, unless so directed by the engineer will be deemed unauthorized excavation.
 - 2. Unauthorized over-excavation shall be backfilled and compacted without any additional expense to the owner.
- F. Authorized Over-Excavation:
 - 1. In the event that it is necessary to remove unsuitable material to a depth greater than that shown on the drawings or otherwise specified, the contractor, upon receiving direction from the engineer, shall remove, replace and compact such material as directed by the engineer at the unit prices indicated in the bid form.

3.6 FILLING AND BACKFILLING

- A. Use fills formed of suitable material placed in layers of not more than 8" in depth measured loose and rolled and/or vibrated with suitable equipment until compacted.
- B. Do not place rock that will not pass through a 6" diameter ring within the top 12" of the surface of the completed fill or rock that will not pass through a 3" diameter ring within the top 6" of the completed fill.
- C. Do not use broken concrete or asphaltic pavement in fills.
- D. Selection of Borrow Material:
 - 1. Material in excess of that available on the site shall be suitable material furnished by the contractor from private sources selected by the contractor. The material shall be approved by the engineer before use. All expenses involved in securing, developing, transporting and placing the material shall be borne by the contractor.
- E. Placing and Compacting:
 - 1. Place backfill and fill materials in layers not more than 8" in loose depth.
 - 2. Before compacting, moisten or aerate each layer as necessary to provide the optimum moisture content.
 - 3. Compact each layer to required percentage of maximum density for the area.
 - 4. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
 - 5. Place backfill and fill materials evenly adjacent to structures, to required elevations.
 - 6. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around the structures to approximately the same elevation in each lift.
- F. Moisture Control:
 - 1. Do not use soil material that is either too dry or too wet to achieve proper compaction.
 - 2. Where subgrade or layer of soil material is too dry to achieve proper compaction, uniformly apply water to surface of soil material such that free water does not appear on the surface during or subsequent to compacting operations.
 - 3. Remove and replace, or scarify and air dry, soil material that is too wet to permit compacting to the specified density.
 - 4. Soil material that has been removed because it is too wet to permit compacting may

be stockpiled or spread and allowed to dry. Assist drying by dicing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value as determined by moisture-density relation tests approved by the engineer.

G. Compaction Requirements:

1. Compact soils to not less than the following percentages of maximum dry density as determined in accordance with ASTM D698, Method A (Standard Proctor).
2. Fill beneath structures and beneath an area extending 10' beyond the limits of the foundation:
 - a. Top 12" of subgrade 100%
 - b. All other fill material 98%
3. Fill beneath roadway:
 - a. Top 12" of subgrade 100%
 - b. All other fill material 95%
4. Embankments:
 - a. Top 12" of subgrade 98%
 - b. All other fill material 95%
5. Fill beneath walkways:
 - a. Top 12" of subgrade 95%
 - b. All other fill material 90%
6. Lawn and unpaved open areas:
 - a. All other fill material 90%

3.7 PLACING SPECIAL MATERIALS

A. Placing Impervious Liner Materials:

1. Place selected fine grain soils on bottom and side slopes of the basin to the indicated depth.
2. Inspect and proofroll the stripped and grubbed subgrade prior to placement of any liner material, as specified hereinafter.
3. Spread liner material in 8" maximum, loose lift thickness to provide a 6" compacted

lift thickness.

4. Adjust soil moisture content to 1 to 3 percentage points "wet" of the optimum moisture contents.
5. Compact at 98% of maximum density.
6. Maintain liner material sufficiently moist to prevent drying and cracking, until such time as the basin is filled.

3.8 FINISH GRADING

A. General:

1. Uniformly grade the areas within limits of grading under this section, including adjacent transition areas.
2. Smooth the finished surfaces within specified tolerance.
3. Grade with uniform levels or slopes between points where elevations are shown on the drawings, or between such points and existing grades.
4. Where a change of slope is indicated on the drawings, construct a rolled transition section having a minimum radius of approximately 8'0", unless adjacent construction will not permit such a transition, or if such a transition defeats positive control of drainage.

B. Grading Adjacent to Structures: Grade areas adjacent to buildings to achieve drainage away from the structures and to prevent ponding.

C. Ditches and Gutters and Swales:

1. Cut accurately to the cross sections, grades and elevations shown.
2. Maintain excavations free from detrimental quantities of leaves, sticks, trash and other debris until completion of the work.
3. Dispose of excavated materials as specified herein; do not in any case deposit materials within 3'0" of the edge of a ditch.

3.9 FIELD QUALITY CONTROL

A. Secure the engineer's inspection and approval of subgrades and fill layers before subsequent construction is permitted thereon.

B. Field density determinations will be made, at no cost to the contractor, to insure that the specified densities are being obtained. Field density tests will be performed as determined by the engineer, considering the following:

1. At areas to receive paving, at least one field density test for every 5,000 sq.ft. of subgrade area, but not less than three tests.

2. In each compacted fill layer, one field density test for every 5,000 sq.ft. of overlaying paved area, but not less than three tests.
 3. In fill beneath structures, one field density test for every 2,500 sq.ft. in each layer.
 4. Other tests as deemed necessary by the engineer.
- C. If, in the engineer's opinion based on reports of the testing laboratory, subgrade or fills which have been placed are below specified density, provide additional compacting and testing until specified requirements are met.
1. Additional testing will be provided by the owner's selected testing laboratory and all costs for the additional testing will be borne by the contractor.
- D. Proofrolling:
1. The contractor shall proofroll subgrade of areas to receive paving, structures on fill or impervious lining material.
 - a. Make not less than 3 passes of a 25 to 50 ton rubber tired roller over the full area.
 - b. Unstable, soft or otherwise unsuitable materials revealed by the proofrolling shall be removed and replaced with satisfactory materials, compacted as specified herein.

3.10 PLACING TOPSOIL

- A. Upon completion of site grading and other related site work, topsoil shall be uniformly spread over the graded or improved areas. Topsoil shall be evenly distributed to conform to final grade elevations shown on the plans.
- B. Place, level and lightly compact topsoil to a depth of not less than 3".
- C. Maintain topsoil free of roots, rocks, debris, clods of soil and any other objectionable material which might hinder subsequent grassing or mowing operations.
- D. Any surplus materials shall be disposed of in approved areas on the site.

3.11 MAINTENANCE

- A. Protection of Newly Graded Areas:
 1. Protect newly graded areas from traffic and erosion, and keep free from trash and weeds.
 2. Repair and re-establish grades in settled, eroded and rutted areas to the specified tolerances.

- B. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, reshape, and compact to the required density prior to further construction.

END OF SECTION

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PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work Included: Provide protection of the environment during the construction of this project to reduce soil erosion and siltation to the lowest reasonably achievable level. Provide protection of wetlands, lakes, stream buffers, bed and bank areas outside of work limits.

1.2 GENERAL

- A. Exercise every reasonable precaution, throughout the life of the project, to prevent the eroding of soil and the silting of rivers, streams, lakes, reservoirs, other water impoundments, ground or roadway surfaces, or other property. Erosion control practices to be used for this project are shown on the drawings and are to conform to South Carolina Department of Health and Environmental Control regulations.
- B. Contractor shall comply with the requirements of the current NPDES General Permit for Stormwater Associated with Construction Activities, and the Stormwater Pollution Prevention Plan for the project, if any.

PART 2 - PRODUCTS

2.1 CRUSHED STONE

- A. Provide 2" – 3" diameter crushed stone for project entrance and exit.
- B. Provide 9" – 12" depth crushed stone for temporary sediment barriers around inlets.

2.2 GRASSING

- A. Comply with Section 02930: Grassing.

2.3 SILT FENCE

- B. Posts: Only steel posts shall be used. Steel posts shall be self-fastener angle steel type, 5' in length.
- C. Provide not less than No. 9 wire staples, 1.5" long for fastening wire mesh.
- D. Woven wire shall conform to the requirements of ASTM A116, Class I zinc coating for wire. Each woven square shall measure 5.33" X 12". The top and bottom wires shall be 10 gauge. All other wires shall be 12 gauge.
- E. Wire mesh is not required with synthetic, extra strength filter fabric providing a puncture strength of 50 psi in accordance with ASTM D4833.
- F. Filter fabric shall be burlap or synthetic.
- G. If silt fencing is used more than 5 days, synthetic type shall be used.
- H. Burlap shall be 7.5 ounces weight and a minimum 32" wide.

- I. Filter fabric shall be Mirafi 100X as manufactured by Celanese Fibers Co., or Bidim C34 as manufactured by DuPont or equivalent.

2.4 EROSION CONTROL BLANKET

- A. Use erosion control blanket S150, from North American Green or approved equal.

PART 3 – EXECUTION

3.1 GENERAL

- A. Construct and maintain all erosion control measures until the substantial completion of the project.

3.2 CONSTRUCTION ENTRANCE

- A. Construct a gravel area or pad at points where vehicles enter and leave a construction site.
- B. Clear the entrance and exit area of all vegetation, roots, and other objectionable material and properly grade and place gravel to the grade and dimensions shown on the plans.
- C. Construct drainage channels to carry water to a sediment trap or other suitable outlet.
- D. Use geotextile fabrics to improve stability of the foundation in locations subject to seepage or high water table.
- E. Maintain the gravel pad in a condition to prevent mud or sediment from leaving the construction site by periodic top dressing with two inches of stone.
- F. After each rainfall, inspect any structure used to trap sediment and clean it out as necessary.
- G. Immediately remove objectionable materials spilled, washed, or tracked onto public roadways.

3.3 TEMPORARY GRASSING

- A. Provide a temporary cover for erosion control on disturbed areas that will remain unstabilized for a period of more than 14 days in accordance with Section 02930.
- B. This practice applies to cleared areas, diversions, dams, temporary sediment basins, temporary road banks, and topsoil stockpiles where vegetation is needed for less than 1 year.
- C. Provide grassing on slope 5% or greater within 14 days of disturbance.
 - 1. Comply with Section 02930: Grassing.

3.4 SILT FENCE

- A. Provide silt fence barrier where shown on the plans and on utility construction parallel to the disturbed trench where perpendicular sheet flow runoff occurs on disturbed areas with slopes greater than 4%.

- B. Place at the extreme limits of the area to be disturbed as shown.
- C. Construct temporary sediment barriers of filter fabric, buried at the bottom, stretched and supported by posts and install below small disturbed areas as indicated on the drawings to retain sediment by reducing the flow velocity to allow sediment deposition.
- D. Provide spacing between posts 5'0" on center, minimum.
- E. Fasten wire mesh to steel posts with wire staples.
- F. Remove sediment deposits prior to reaching one-third height of the fence.
- G. Monitor site frequently and place additional silt fencing should evidence indicate that erosion is about to occur at locations other than those shown on plan.

3.5 EROSION CONTROL BLANKET

- A. Provide on areas as shown on the plans or on all embankments with slopes equal to or steeper than 2:1.

3.6 TEMPORARY SEDIMENT TRAPS

- A. Utilize temporary sediment traps at the bottom of all disturbed slopes where runoff is parallel to the utility trench and draining into an existing ditch or stream and where slopes are 5% or greater along the trench.
- B. Provide at intervals of 75'.

3.7 MAINTENANCE

- A. Place all erosion control devices or measures prior to any land disturbing activity within the drainage area they are located.
- B. Periodically check erosion control devices and clean or otherwise remove silt build-up as necessary to maintain them in proper working order.

3.8 REMOVAL

- A. Remove temporary structures after protected areas have been stabilized.

3.9 INSPECTION

- A. ~~Contractor shall provide inspection of erosion and sediment control measures shown on the drawings and described in this section and the Stormwater Pollution Prevention Plan for the project. Inspections shall be performed by a qualified person as described in the current NPDES General Permit for Stormwater Associated with Construction Activities, and in accordance with the schedule in the Stormwater Pollution Prevention Plan.~~

END OF SECTION

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PART 1 - GENERAL

1.1 DESCRIPTION

- A. Provide a final surface coating that shall be a 100% acrylic emulsion coating specifically designed for tennis court applications.
- B. Related work: Examine contract documents for requirements that affect work of this section. Other specification sections that directly relate to work of this section include, but are not limited to:
 - Section 02310, Site Grading
 - Section 02513, Asphalt Paving

1.2 QUALITY ASSURANCE

- A. Installer Qualifications: Engage experienced installers who have completed tennis court surfacing similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Final surface must meet or exceed the the US Tennis Court and Track Builders Association (USTCTBA) applicable guidelines.

1.3 SUBMITTALS

- A. Product Data: For each product specified. Include technical data and tested physical and performance properties.
- B. Qualification Data: For firms and persons specified, demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.4 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01610.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply surface coating materials if substrate is wet or excessively damp or if the following conditions are not met:
- B. Paint: Proceed with surface coating and line marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 50 deg F for water-based materials, and not exceeding 95 deg F, unless otherwise approved by material manufacturer.
- C. Site Control: The court area will not be used by the Owner during the construction period. However, adjoining facilities will remain in use by the Owner. The Contractor shall maintain access for vehicular and pedestrian traffic as required for continued use of adjoining facilities.

PART 2 - PRODUCTS

2.1 SURFACE COATING

ASPHALT COURT SURFACE COATING

- A. Surface coating material shall be a 100 percent acrylic colored coating system. The concentrate shall be mixed on-site with water and sand at rates specified by the manufacturer. The coating shall be specifically manufactured for application on new asphalt surfaces. The surface coating system shall be “Color Concentrate” as manufactured by ThorWorks Industries, Inc., Sandusky, OH; “DecoColor” as manufactured by Deco Surfacing Systems, a division of California Products Corporation, Andover, MA; “NovaCoat” as manufactured by Nova Sports U.S.A., Milford MA; or approved equal.
 - Water: Potable
 - Silica Sand: 70-90 mesh, free from clay, silt, ferrous metals and salt.
 - Color: As selected by the Owner from available manufacturers colors.

2.2 AUXILLARY MATERIALS

Line Marking Paint: Acrylic, water-base ready-mixed, untextured. Color, White.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that subgrade is dry and in suitable condition to support paving and imposed loads.
- B. Proof-roll subgrade using heavy, pneumatic-tired rollers to locate areas that are unstable or that require further compaction.
- C. Notify Engineer in writing of any unsatisfactory conditions. Do not begin paving installation until these conditions have been satisfactorily corrected.

3.2 HOT-MIX ASPHALT

- A. Refer to Section 02513 – Asphaltic Concrete Paving

3.3 SURFACE COATING

- A. New asphalt surface must cure for 30 days prior to application.
- B. Sweep and clean surface to eliminate loose material and dust.
- C. Mix materials to smooth, uniform consistency. Coating system shall be mixed at manufacturers recommended rates for acrylic concentrate, water and sand.
- D. Apply coating with a soft rubber squeegee to a uniform coverage parallel with one of the edges of the court. Care shall be taken not to leave ridges where adjoining applications overlap. Apply a minimum of two coats at manufacturer's recommended rates, but at no less than 0.05 gallons per square yard per coat of undiluted concentrate. Allow previous coat to dry at least two hours prior to applying subsequent coat. Apply coats 90 degrees to the previous application direction.
- E. Apply coating when temperatures are above 50 degrees F. Do not apply when rain is imminent or forecast.

3.4 PAVEMENT MARKING

- A. Allow surface coating to fully cure before starting pavement marking.
- B. Sweep and clean surface to eliminate loose material and dust.

ASPHALT COURT SURFACE COATING

- C. Apply tape to both sides of the area to be striped. Apply a primer coat of final surface coating to the inside of the tape to seal the edges and keep the paint from bleeding under the tape.
- D. Apply paint to produce pavement markings of dimensions indicated with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils. Allow paint to dry a minimum of 24 hours prior to allowing foot traffic.
- E. Lines shall be 2" wide unless otherwise noted on the drawings. Lines shall be carefully laid out in accordance with ASBA and USTA guidelines. Layout of lines shall be approved by the Owner prior to painting.

END OF SECTION

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PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: Provide asphaltic concrete paving where shown on the Drawings, as specified herein, as needed for a complete and proper installation, and where damaged during the course of construction activities.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Section 02310-Site Grading.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 01340.
- B. Product data: Within fifteen (15) calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
 - 1. Materials list of items proposed to be provided under this Section.
 - 2. Certificates, signed by the materials producer and the asphalt-paving Subcontractor, stating that materials meet or exceed the specified requirements.

1.4 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01610.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All materials and products used shall comply with pertinent sections of the South Carolina Department of Transportation's (SCDOT) "Standard Specifications for Highway Construction", current edition.

2.2 ASPHALTIC CONCRETE MIXTURE

- A. Materials and composition of mixture shall comply with Division 400 of the SCDOT Standard Specifications for HMA Surface and Intermediate Courses, latest edition.

- B. Provide hot plant mixed asphaltic concrete paving materials.
 - 1. Temperature leaving the plant: 290°F minimum, 320°F maximum.
 - 2. Temperature at time of placing: 280°F minimum.

2.3 EQUIPMENT

- A. Comply with requirements of Section 400 of SCDOT's Standard Specifications, latest edition.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.
 - 1. Sweep primed surfaces if needed.
 - 2. Adjust frames and covers if needed.

3.2 WEATHER RESTRICTIONS

- A. Do not apply asphalt mixtures to a wet or frozen surface or when air temperature is below 40° F in the shade and falling, or below 35°F in the shade and rising.

3.3 SPREADING AND FINISHING

- A. On arrival at point of use, dump directly into mechanical spreader.
- B. Immediately spread and strike off true to the line, grade and cross section indicated, to such loose depth that when work is completed, the indicated thickness or weight per square yard will be secured.
- C. Correct irregularities while the mixture is still hot.
- D. At locations not readily accessible to mechanical spreaders, acceptable hand spreading methods may be used.
- E. Finished surfaces placed adjacent to curbs, gutters, manholes, etc., shall be approximately ¼ inch above the edges of these structures.

3.4 COMPACTION

- A. Perform initial rolling with 3-wheel steel roller or a steel wheel 2-axle tandem roller.
- B. Follow initial rolling with at least four complete coverages by a pneumatic tired roller.

- C. Complete rolling with steel wheel 2-axle tandem roller.
- D. Rolling shall start longitudinally at the sides and proceed gradually toward the center of the pavement, overlapping on successive trips approximately $\frac{1}{4}$ the width of the roller.
- E. Use hand or mechanical tampers in areas not accessible to powered rollers.
- F. Surface mixture after compaction shall be smooth and true to the established crown and grade.
- G. Feather and smooth the edges of fill so that the joint between fill and original surface is invisible.
- H. Finished paving smoothness tolerance:
 - 1. Free from birdbaths.
 - 2. No deviations greater than $\frac{1}{8}$ inch in 10 feet.

3.5 PROTECTION OF SURFACE

- A. Allow no traffic on surface until the mixture has hardened sufficiently to prevent distortion.

END OF SECTION

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PART 1 - GENERAL

1.1 DESCRIPTION

- A. Provide all equipment and materials, and do all work necessary to construct the court accessories, as indicated on the drawings and as specified. Work includes but is not limited to the following:
 - 1. Tennis Court Posts and Nets
 - 2. Pickleball Court Posts and Nets
 - 3. Tennis Court Practice Board

- B. Related work: Examine contract documents for requirements that affect work of this section. Other specification sections that directly relate to work of this section include, but are not limited to:
 - Section 02310, Site Grading
 - Section 02513, Asphalt Paving
 - Section 02511 Asphalt Court Surface Coating

1.2 QUALITY ASSURANCE

- A. The court accessories shall be installed in accordance with the best construction practices of the US Tennis Court and Track Builders Association (USTCTBA).

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 01340.
- B. Product Data: Submit catalog cuts and manufacturer's detail specifications for all materials and equipment to be incorporated into the work.

1.4 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01610.

PART 2 – PRODUCTS

The project is designed around the following, contractor may provide products of equal quality for approval prior to the bid:

2.1 TENNIS COURT NET POSTS

- A. Douglas Sports DTP 37, Black (Item # 63008)
- B. 24" steel ground sleeve (GS-24) (Item # 63424)
- C. Install per manufacturer's recommendations.

2.2 TENNIS COURT NETS

- A. Douglas Sports TN36DMT (Item #30038TD)
- B. Install per manufacturer's recommendations.

2.3 PICKLEBALL COURT POSTS

- A. Douglas Sports Pickleball Premier RD Posts (Item #63071), Black
- B. Ground Sleeve GS-24RD (Item #63171)
- C. Install per manufacturer's recommendations.

2.4 PICKLEBALL COURT NETS

- A. Douglas Sports Pickleball Net JTN-30 (Item #20105)
- B. Center Pipe Anchor (Item # 63428)
- C. Install per manufacturer's recommendations.

2.5 TENNIS COURT PRACTICE BOARD

- A. Bollettieri Backboard/Douglas Sports 8'x16" Slimline (w/ metal frames) Flat Backboard
- B. Install per manufacturer's recommendations.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify areas to receive accessories are completed and ready for installation.

3.2 ACCESSORIES INSTALLATION

- A. Install accessories in accordance with manufacturer's instructions.

END OF SECTION

CHAINLINK FENCES, GATES, WINDSCREEN**PART 1 - GENERAL****1.1 DESCRIPTION**

- A. Provide all equipment and materials, and do all work necessary to construct the tennis court chain link fence and gates, as indicated on the drawings and as specified. Work includes but is not limited to the following:
 - 1. PVC-coated fence framing system
 - 2. PVC-coated chain link fence fabric
 - 3. Open Mesh Poly Windscreen

- B. Related work: Examine contract documents for requirements that affect work of this section. Other specification sections that directly relate to work of this section include, but are not limited to:
 - Section 02200, Site Grading
 - Section 02510 Asphalt Paving
 - Section 02790 Acrylic Tennis Court Cushioned Surface Color Coating System and Tennis Court Equipment
 - Section 3300, Cast-In-Place Concrete

1.2 QUALITY ASSURANCE

- A. Chain link fencing manufactured in accordance with the requirements of the CLFMI Manual. Manufacturer of the fencing system must be a CLFMI member.
- B. The tennis court fence enclosure installed in accordance with the best construction practices of the US Tennis Court and Track Builders Association (USTCTBA).

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 01340.
- B. Product Data: Submit catalog cuts and manufacturer's detail specifications for all materials and equipment to be incorporated into the work.
- C. Warranty: PVC coated chain link fence systems supplied with minimum fifteen (15) year factory warranty.

1.4 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01610.

PART 2 - PRODUCTS**2.1 MANUFACTURER**

- A. Products from qualified manufacturers having a minimum of five years experience manufacturing PVC coated chain link fencing will be acceptable by the Engineer as equal, if approved in writing, ten days prior to bidding, and if they meet the following specifications for design, size gauge of metal parts and fabrication.
- B. Obtain chain link fences and gates, including accessories, fittings, and fastenings, from a single source.

CHAINLINK FENCES, GATES, WINDSCREEN**2.2 PVC COATED FENCE FABRIC**

- A. PVC coating: 6 mil (0.15mm) to 10 mil (0.25mm) thickness, thermally fused to zinc-coated steel core wire: Per ASTM F668 Class 2b. Core wire tensile strength 75,000 psi (517 MPa).
Size: Helically wound and woven to height of 10³ feet with 1 3/4" diamond mesh, 8 gauge, with a core wire diameter of 9 gauge and a break load of 1.290 lbf .
Color Black. ASTM F934.
- A. Selvage of fabric: k at top and k at bottom.

2.3 PVC COATED FENCE FRAMEWORK

- A. Pipe: Type A steel pipe (Schedule 40) per ASTM F 1083
- B. PVC-Coated finish: In accordance with ASTM F1043, apply supplemental color coating of minimum 10mils (0.254 - 0.38 mm) in Forest Green color to match fabric.
- C. Posts, Rails and Braces:
 - End and Corner Post 2 7/8" od 4.64 lbs/ft
 - Line (intermediate) Post 2 7/8" od 4.64 lbs/ft
 - Rail and Braces 1 5/8" od 1.84 lbs/ft

2.4 GATES

- A. Gate frames: Fabricate chain link swing gates in accordance with ASTM F 900 using galvanized steel tubular members, 2" O.D. (50 mm) weld connections forming rigid one-piece unit. PVC coated frames thermally fused with a minimum 10 mils (0.254 mm) per ASTM 1043.
- B. Gate Hardware: Galvanized per ASTM A 153.
 - Latch: The gate latch device independent single gate malleable iron latch installed to in the gate post. The latch device shall have matching padlock loops for a padlock.

2.5 PVC COATED ACCESSORIES

- A. Chain link fence accessories: (ASTM F 626) Provide items required to complete fence system. Galvanize each ferrous metal item and finish to match framing.
- B. Post caps: Formed steel, cast malleable iron, or aluminum alloy weather-tight closure a cap for tubular posts. For each line post provide tops to permit passage of top rail.
- C. Top rail and brace ends: Pressed steel per ASTM F626, for connection of rail and brace to terminal posts.
- D. Sleeves: Lengths of top rails to be connected using 6" (152 mm) sleeves that allow for expansion or contraction of the rail.
- E. Tie wires: 9 gauge [0.148" (3.76 mm)] galvanized steel or aluminum wire for attachment of fabric to line posts. Double wrap 13 gauge [0.092" (2.324 mm)] for rails and braces. Hog ring ties of 12-1/2 gauge [0.0985" (2.502 mm)] for attachment of fabric to tension wire.
- F. Bands: Brace and tension (stretcher bar) bands are to be pressed steel.
- G. Tension (stretcher) bars: To be made of one continuous piece of steel or aluminum, 3/16" x 3/4" (4.76 mm x 19 mm). Provide one bar per end or gate post and two bars per corner or pull post.
- H. Tension wire: Thermally fused PVC applied to metallic coated steel wire, 7 gauge, 0.177" (4.5 mm) diameter core wire with tensile strength of 75,000 psi (517 MPa).
- I. Truss rods & tightener: Steel rods with minimum diameter of 5/16" (7.9 mm). Capable of withstanding a tension of minimum 2,000 lbs.
- J. Nuts and bolts: Nuts and bolts are to be galvanized but not PVC coated. Cans of PVC touchup

CHAINLINK FENCES, GATES, WINDSCREEN

paint is available to color coat nuts and bolts if desired.

2.6 SETTING MATERIALS

- A. Concrete: Minimum 28 day compressive strength of 3,000 psi.

2.7 WINDSCREEN

- A. Open Mesh Poly with 3/8" Brass Grommets @ 24" O.C.

| Properties | Results |
|-----------------------|-----------------------|
| Material/Fiber | 100% Polypropylene |
| Weight | 200 g/m ³ |
| Grab Tensile Strength | 420x256 lbs |
| File Tear | 90 lbs |
| Shade Percentage | 89% |

- B. Windscreen to be as manufactured by Fencescreen 600 Series or approved equal, color Black.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Verify areas to receive fencing are completed to final grades and elevations.
B. Ensure property lines and legal boundaries of work are clearly established.

3.2 CHAIN LINK FENCE FRAMING INSTALLATION

- A. Install chain link fence in accordance with ASTM F 969 and manufacturer's instructions.
B. Space line posts uniformly [at 8 feet (2440 mm) or at 10' (3048 mm) on center]
C. Concrete set terminal and gate posts: Drill holes in firm, undisturbed or compacted soil. Holes should have a diameter 4 times greater than outside of post, and depths approximately 6" (150 mm) deeper than post bottom. Excavate deeper as required for adequate support in soft and loose soils, and for posts with heavy lateral loads. Set post bottom 36" (900 mm) below surface when in firm, undisturbed soil. Place concrete around posts in a continuous pour. Trowel finish around post. Slope to direct water away from posts.
D. Gate hardware: Set keepers, stops, sleeves, and other accessories into concrete.
E. Check each post for vertical and top alignment, and maintain in position during placement and finishing operations.
F. Bracing: Install horizontal pipe brace at mid-height for fences 6' (1830 mm) and over, on each side of terminal posts. Firmly attach with fittings. Install diagonal truss rods at these points. Install braces and adjust truss rod, ensuring posts remain plumb.
G. Tension wire: Provide tension wire at bottom of fabric. Install tension wire before stretching fabric and attach to each post with ties or clips. Secure tension wire to fabric with 12-1/2 gauge [.0985" (2.502 mm)] hog rings 24" on center (609.6 mm).
H. Top rail: Install lengths, 21' (6400 mm). Connect joints with sleeves for rigid connections for expansion/contraction.

CHAINLINK FENCES, GATES, WINDSCREEN

- I. Rails: Center rails are to be installed when fence fabric is 12' (3658 mm) or higher or when shown on drawings. Bottom rails (optional) are to be installed when shown on drawings.

3.3 CHAIN LINE FABRIC INSTALLATION

- A. Fabric: Install fabric on security side, and attach so that fabric remains in tension after pulling force is released. Leave approximately 2" (50 mm) between finish grade and bottom selvage. Attach fabric with wire ties to line posts at 15" (380 mm) on center and to rails, braces, and tension wire at 24" (600 mm) on center.
- B. Tension (stretcher) bars: Pull fabric taut; thread tension bar through fabric and attach to terminal posts with bands spaced maximum of 15" (380 mm) on center.

3.4 GATE INSTALLATION

- A. Install gates plumb, level, and secure for full opening without interference.
- B. Attach hardware by means which will prevent unauthorized removal.
- C. Adjust hardware for smooth operation.

3.5 ACCESSORIES

- A. Tie wires: Bend ends of wire to minimize hazard to persons and clothing.
- B. Fasteners: Install nuts on side of fence opposite fabric side for added security.

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work Included: Provide grassing of the areas specified herein, or as indicated, for a complete and proper installation.
 - 1. All areas disturbed by the construction operation.
- B. Related Work:
 - 1. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and sections in Division 1 of these specifications.
 - 2. Section 02310 – Site Grading

Section 02370 – Erosion & Sediment Control

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.
- B. Seed: Conform to all State laws and to all requirements and regulations of the South Carolina Department of Agriculture.
 - 1. Deliver to site each variety of seed individually packaged and tagged to show name, net weight, origin and lot number.
- C. Fertilizer: Conform to State fertilizer law.

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 01340.

1.4 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01610.
- B. At time of delivery, furnish the Engineer invoices of all materials received in order that application rates may be determined.
- C. Immediately remove from the site materials that do not comply with the specified requirements, and promptly replace with materials meeting the specified requirements.

PART 2 - PRODUCTS

2.1 FERTILIZER

- A. Provide a mixed fertilizer with a designation such as 10-10-10, where the first number represents the minimum percent of nitrogen required, the second number represents the minimum percent of available phosphoric acid required, and the third number represents the minimum percent of water soluble potash required in the fertilizer. For centipede grass, use only 15-0-15 or 16-4-8 fertilizer. Fertilizer shall be delivered to the site in bags labeled with the manufacturer's guaranteed analysis.

2.2 GRASS SEED

- A. Provide grass seed which is:
 - 1. Free from noxious weed seeds, and recleaned.
 - 2. Grade A recent crop seed.
 - 3. Treated with appropriate fungicide at time of mixing.
 - 4. Delivered to the site in sealed containers with dealer's guaranteed analysis.

2.3 LIME

- A. Provide agricultural grade, standard ground limestone conforming to current "Rules, Regulations and Standards of the Fertilizer Board of Control" issued at Clemson University.
- B. Bag tags or delivery slip for bulk loads shall indicate brand or trade name, calcium carbonate equivalent, and other pertinent data to identify the lime.

2.4 WOOD CELLULOSE FIBER

- A. Provide wood chip particles manufactured particularly for discharging uniformly on the ground surface when dispersed by a hydraulic water sprayer.
- B. Material to be heat processed so as to contain no germination or growth inhibiting factors.
- C. It shall be dyed (non-toxic) an appropriate color to facilitate metering.

2.5 STRAW MULCH

- A. Provide straw or hay material.
 - 1. Straw to be stalks of wheat, rye, barley or oats.
 - 2. Hay to be timothy, peavine, alfalfa, or coastal Bermuda.
- B. Material to be reasonably dry and reasonably free from mature seed bearing stalks, roots or bulblets or Johnson Grass, Nutgrass, Wild Onion, Sandburg, Wild Garlic, Wild Mustard, Crotonaria, Pigweed, Witchweed, and Cocklebur and other noxious weeds.

2.6 EXCELSIOR FIBER MULCH

- A. To consist of 4" to 6", average length, wood fibers cut from sound, green timber.
- B. Make cut in such a manner as to provide maximum strength of fiber, but at a slight angle to natural grain of the wood.

2.7 EROSION CONTROL BLANKET

- A. Provide on areas as shown on the plans.
- B. Provide Erosion Control Blanket S150, from North American Green, or approved equal.

PART 3 - EXECUTION

3.1 GENERAL

- A. Seed these areas immediately upon completion of grading or construction and clean-up operations.
 - 1. Slopes greater than four horizontal to one vertical.
 - 2. Utility rights-of-way adjacent to stream banks.

3.2 SEEDING SCHEDULES

- A. Unless otherwise provided, select the type of seeding from the tables shown below for the upper state and the lower state regions as applicable to the project. The total seed rate in pounds per acre is the sum total shown for all the varieties of seed opposite the schedule number in the seeding schedules included herein. The upper state region consists of all counties west of the counties of Aiken, Lexington, Richland, Kershaw, and Chesterfield. The lower state region consists of the above-cited counties and all counties east.

B. Adhere to the following seeding schedules:

| Seeding Schedule for Permanent Vegetation Upper State | | | | |
|--|--|---------------------------------------|---------------------------------------|-----------------------------|
| Schedule No. | Common Name of Seed | Pounds/acre Rural ¹ | Pounds/acre Urban ¹ | Planting Dates |
| 1 | Common Bermuda (hulled) ³ | 23 | 23 | March 15 to August 14 |
| | Sericea Lespedeza (scarified) ² | 50 | 50 | |
| | Kentucky 31 Fescue | 50 | 60 | |
| | Weeping Lovegrass ² | 10 | 10 | |
| 2 | Kentucky 31 Fescue | 50 | 80 | August 15 to March 14 |
| | Sericea Lespedeza (unhulled, unscarified) ² | 80 | 80 | |
| | Common Bermuda (unhulled) ³ | 30 | 30 | |
| | Weeping Lovegrass ² | 10 | 10 | |
| | Reseeding Crimson Clover ⁴ | 20 | 0 | |
| | Annual Rye Grass ⁵ | 5 | 15 | |
| | Rye Grain | 20 | 0 | |

Notes:

¹ Includes rural areas adjacent to well-developed lawns.

² Not required on shoulders, medians, etc. and on slopes under 5 feet in height.

³ Do not use Giant Bermuda seed including NK-37.

⁴ Provide an inoculant for treating reseeding crimson clover seed of a pure culture of nitrogen-fixing bacteria selected for a maximum vitality and ability to transform nitrogen from the air into soluble nitrates and deposit them into the soil. Ensure that inoculants consist of purebred cultures and are not more than one year old. Do not plant clover in medians or in rural areas adjacent to well-developed lawns.

⁵ The use of Italian Rye Grass is prohibited on all projects.

| Seeding Schedule for Permanent Vegetation Lower State | | | | |
|---|--|--------------------------------|--------------------------------|--------------------------|
| Schedule No. | Common Name of Seed | Pounds/acre Rural ¹ | Pounds/acre Urban ¹ | Planting Dates |
| 3 ⁵ | Common Bermuda (hulled) ³ | 30 | 30 | March 1 to August 14 |
| | Weeping Lovegrass ² | 10 | 10 | |
| | Sericea Lespedeza (scarified) ² | 50 | 50 | |
| | Weeping Lovegrass ² | 10 | 10 | |
| 4 ⁵ | Common Bermuda (unhulled) ³ | 40 | 40 | August 15 to February 28 |
| | Weeping Lovegrass ² | 10 | 10 | |
| | Sericea Lespedeza (unhulled, unscarified) ² | 80 | 80 | |
| | Reseeding Crimson Clover ⁴ | 20 | 0 | |
| | Annual Rye Grass ⁵ | 5 | 15 | |
| | Rye Grain | 20 | 0 | |
| 5 ⁶ | Centipede | 10 | 10 | March 1 to April 15 |

Notes:

¹ Includes rural areas adjacent to well-developed lawns.

² Not required on shoulders, medians, etc. and on slopes under 5 feet in height.

³ Do not use Giant Bermuda seed including NK-37.

⁴ Provide an inoculant for treating reseeded crimson clover seed of a pure culture of nitrogen-fixing bacteria selected for a maximum vitality and ability to transform nitrogen from the air into soluble nitrates and deposit them into the soil. Ensure that inoculants consist of purebred cultures and are not more than one year old. Do not plant clover in medians or in rural areas adjacent to well-developed lawns.

⁵ Pensacola Bahia is allowed only as shown in Seeding Schedules 3 and 4 at the rate of 50 pounds per acre only when seeding pit areas that are governed by the South Carolina Mining Act. Otherwise, do not include Bahia seed in the mix.

⁶ Apply one-half of lime rates and one-half of maintenance fertilizer rates. Fertilize centipede at the application rate of 20 pounds per acre of 16-4-8 or 15-0-15 fertilizers in May and repeat in August.

⁷ The use of Italian Rye Grass is prohibited.

- C. The Contractor may include quantities of rye grain and millet in Schedule Nos. 1 and 3 to establish quick ground cover for erosion control purposes.

| Seeding Schedule for Temporary Vegetation Upper and Lower State | | | |
|--|-------------------------------|--------------------|-----------------------------|
| Schedule No. | Common Name of Seed | Pounds/acre | Planting Dates |
| 1 | Brown Top Millet | 50 | April 1 to August 15 |
| 2 | Rye Grain | 55 | August 16 to March 31 |
| | Annual Rye Grass ¹ | 15 | |
| ¹ The use of Italian Rye Grass is prohibited. | | | |

3.3 GROUND PREPARATION

- A. Bring all areas to proper line, grade and cross section indicated on the plans.
- B. Repair erosion damage prior to commencing seeding operations.
- C. Loosen seedbed to minimum depth of 3".
- D. Remove all roots, clods, stones larger than 1" in any dimension, and other debris.
- E. Provide and prepare topsoil in accordance with Section 02310.
- F. Conduct soil test to determine pH factor.
 - 1. If pH is not in the range of 6.0 to 6.5, adjust.

3.4 APPLICATION OF FERTILIZER

- A. Spread uniformly over areas to be seeded at:
 - 1. Rate of 1000 lbs. per acre.
 - 2. Fertilize centipede at the application rate of 20 pounds per acre of 16-4-8 or 15-0-15.
 - 3. Use approved mechanical spreaders.
- B. Mix with soil to depth of approximately 3".

3.5 SOWING METHODS

- A. General:
1. Perform seeding during the periods and at the rates specified in the seeding schedules.
 2. Do not conduct seeding work when ground is frozen or excessively wet.
 3. Produce satisfactory stand of grass regardless of period of the year the work is performed.
- B. Seeding, slopes less than four horizontal to one vertical:
1. Shall conform to Methods EA, WF or WCF as specified hereinafter.
 2. Method EA (Emulsified Asphalt):
 - a. Sow seed not more than 24 hours after application of fertilizer.
 - b. Use mechanical seed drills on accessible areas, rotary hand seeders, power sprayers, etc. may be used on steep slopes or areas not accessible to seed drills.
 - c. Cover seed and lightly compact with cultipacker if seed drill does not.
 - d. Within 24 hours following compaction of seeded areas, uniformly apply 0.2 gallons per square yard of emulsified asphalt over the seeded area.
 3. Method WF
 - a. Sow seed as specified for Method EA.
 - b. Within 24 hours following covering of seeds, uniformly apply excelsior fiber at the rate of 100 lbs. per 1000 sq.ft.
 - c. Apply material hydraulically.
 - d. Seeded areas to be lightly rolled to form a tight mat of the excelsior fibers.
 4. Method WCF
 - a. Apply seed, fertilizer and wood fiber mulch using hydraulic equipment.
 - b. Equipment to have built-in agitation system with capacity to agitate, suspend and homogenously mix a slurry of the specified amount of fiber, fertilizer, seed and water.
 - c. Minimum capacity of slurry tank: 1000 gallons.
 - d. Apply fiber mulch at rate of 35 lbs. per 1000 sq.ft.

- e. Regulate slurry mixture so that amounts and rates of application will result in uniform application of all materials at not less than the specified amounts.
 - f. Apply slurry in a sweeping motion, in an arched stream, so as to fall like rain, allowing the wood fibers to build upon each other.
 - g. Use color of wood pulp as guide, spraying the prepared seedbed until a uniform visible coat is obtained.
- C.
- 1. Seeding (slopes greater than four horizontal to one vertical)
 - 2. Sow seed as specified for Method EA, unmulched.
 - 3. Cover seeded area with erosion control blanket.

3.6 SECOND APPLICATION OF FERTILIZER

- A. When plants are established and showing satisfactory growth, apply nitrogen at the rate of 1.0 lb. per 1000 sq.ft.
- B. Apply in dry form unless otherwise directed by the Engineer.
- C. Do not apply to stands of temporary grasses.

3.7 MAINTENANCE

- A. Maintain all seeded areas in satisfactory condition until final acceptance of the work.
- B. Areas not showing satisfactory evidence of germination within six weeks of the seeding date shall be immediately reseeded, fertilized and/or mulched.
- C. Repair any eroded areas.
- D. Mow as necessary to maintain healthy growth rate until final acceptance of the work.

3.8 ACCEPTANCE

- A. Permanently seeded areas will be accepted when the grass attains a height of 2".
- B. No acceptance will be made of temporary seeded areas. Rework and seed per Permanent Seeding Schedule.

3.9 MEASUREMENT AND PAYMENT

- A. Comply with the pertinent provisions of Section 01025.

END OF SECTION