

TOWN OF CARY
REQUEST FOR BIDS 12-03

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FOR
GRIT WASHING EQUIPMENT

FOR THE

SOUTH CARY WATER RECLAMATION FACILITY

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TOWN of CARY
North Carolina

RFB 12-03

REQUEST FOR BIDS

Grit Washing Equipment

To be opened 2:00 PM, August 24, 2011

Pursuant to General Statutes of North Carolina, as amended, proposals, subject to the conditions and specifications herein, are invited for furnishing the following apparatus, supplies, materials, equipment and/or repair work and services. All proposals will be received by the Utilities Analyst, at the Garmon Operations Center, 400 James Jackson Avenue, Cary, N.C., until the time stated above, at which time and place, the sealed bids and proposals will be publicly opened.

BY: John Holloway, PWUT Operations Analysis Supervisor

DATE: July 27, 2011

POSITIVELY NO BIDS CONSIDERED UNLESS SUBMITTED ON THIS DOCUMENT

QTY	DESCRIPTION	PRICE
1	Grit Washer and Conveyor as specified herein Manufacturer: _____ Model: _____ EQUIPMENT TOTAL	\$ _____ \$ _____

Note:

1. Shop Drawings due 30 days after notice of award.
2. Required delivery date: No later than 16 weeks after award.
3. FAXED OR EMAILED BIDS ARE NOT ALLOWED.
4. EXCEPTIONS/SUBSTITUTIONS DUE BY **August 10, 2011 BY 5:00 P.M.**

BIDDER: _____

CONTACT: _____

ADDRESS: _____

DATE: _____

TELEPHONE: _____

E-MAIL: _____

FAX: _____

Request For Bids

RFB 12-03

In compliance with the above request for proposals, the undersigned offers and agrees, if this proposal be accepted within _____ days from the opening, to furnish any or all of the items at the prices quoted and to commence to deliver the items and services within _____ days after receipt of order.

Name of Bidder: _____

Address: _____

Phone: _____

Signature of authorized official: _____

Name printed or typed: _____

Title: _____

Date: _____

=====

BIDDER SHALL SIGN AND RETURN FOUR (4) COPIES OF THIS FORM AND ALL OTHER REQUIRED DOCUMENTS IN A SEALED ENVELOPE MARKED AS SHOWN BELOW:

STREET DELIVERY

JOHN HOLLOWAY
PWUT OPERATIONS ANALYSIS
SUPERVISOR
TOWN OF CARY
400 JAMES JACKSON AVENUE
CARY, NC 27513

RESPONSE TO RFB 12-03

US POST OFFICE DELIVERY

JOHN HOLLOWAY
PWUT OPERATIONS ANALYSIS
SUPERVISOR
TOWN OF CARY
P.O. BOX 8005
CARY, NC 27512-8005

RESPONSE TO RFB 12-03

GENERAL INFORMATION, TERMS AND CONDITIONS

BIDDER SHOULD READ AND UNDERSTAND THE CIRCUMSTANCES AND PROCEDURES UNDER WHICH THIS BID IS LET. BIDDER'S RESPONSE TO THE REQUEST FOR BIDS (RFB) SIGNIFIES ACCEPTANCE OF THE OBLIGATIONS AND RIGHTS SPECIFIED HEREIN. THE BIDDER AND/OR BIDDERS TO WHOM THE CONTRACT IS AWARDED MUST COMPLY FULLY WITH NORTH CAROLINA GENERAL STATUTES, SECTION 143-129 AND ANY APPLICABLE STATE AND FEDERAL LAW OR REGULATION.

THE BIDDER'S ATTENTION IS CALLED TO THE SECTION EXCEPTIONS-SUBSTITUTIONS. PROPOSED EXCEPTIONS/SUBSTITUTIONS TO THE SPECIFICATIONS MUST BE SUBMITTED IN WRITING NO LATER THAN 5:00 P.M. EASTERN STANDARD TIME ON AUGUST 10, 2011 TO BE CONSIDERED FOR APPROVAL AS MEETING SPECIFICATIONS.

GENERAL: These specifications have been written by the Town of Cary for the purpose of purchasing one (1) Grit Washer and Conveyor. The specific details shown herein shall be considered minimum unless otherwise shown and the equipment is to be built to these Town of Cary specifications and not to the bidder's specification sheets. The specifications, terms and conditions included with this Request for Bids shall govern in any resulting contract(s) unless approved otherwise in writing by the Town of Cary.

Town of Cary ordinance requires all vendors, regardless of their location, to have a Town of Cary business license if they are performing services within the Town's corporate limits.

QUALIFICATIONS OF BIDDER: No bid will be considered unless the firm submitting the bid has in operation a factory adequate for and devoted to the manufacture of the equipment that it proposes to furnish, maintains an authorized service agency within a reasonable distance of the Town of Cary, NC, and has been pre-qualified to submit a bid. On a bid from an agent of the manufacturer, a certificate executed by the manufacturer may be required, stating that bidder is an authorized agent and that all the qualifications and all the requirements of this specification and the bid are complied with.

PLANS AND SPECIFICATIONS: Until the date of opening, procurement documents will be on file at the South Cary Water Reclamation Facility, during regular office hours. Technical inquiries regarding this RFB should be addressed to the Contract Administrator:

John Holloway, PWUT Operations Analysis Supervisor
Town of Cary Public Works and Utilities
400 James Jackson Avenue
Cary, NC 27513
(919)-469-4090
john.holloway@townofcary.org

PRICES: Price quoted shall be net. All bids are to be firm offers for no less than 180 days and will be regarded by the Town as the bidder's best and final offer. North Carolina State Sales Tax will be paid by the Town but is not included on the Bid Form. When invoiced, the tax must be shown as a separate item. Prices submitted by the vendor shall include all equipment, transport to the site, warranty, startup support, training, etc. as specified in this RFB.

EQUIPMENT GUARANTEE WITH BID: The bidder must guarantee that the material and workmanship of the equipment is of the highest standards of the current state of the art, and in keeping with the design incorporating the specifications under each item, and that equipment offered is new and, except for testing, calibrations and transportation, is unused equipment; also, that no attachment or part has been substituted or applied contrary to the manufacturer's recommendation and standard practice.

The bidder must further guarantee that the equipment complies with all applicable State and Federal statutes and regulations.

EXCEPTIONS - SUBSTITUTIONS: The use of a certain brand, model or make, is not intended to restrict bidders to that specific brand make or model names. It is to more clearly convey to the prospective bidder the general style, type, character, and quality of the article desired. Any substitution(s) offered as being "equal" to the items(s) as specified or any exceptions to or substitutions for any of the other requirements or specifications must be submitted in writing to the Contract Administrator or to a responsible person he delegates, **no later than August 10, 2011 at 5:00 p.m.**, to be considered. Such submission must reference the item number and the proposed substitution or exception, item by item. Where appropriate, manufacturer's literature describing the proposed change should be included with the submission to assist the Contract Administrator. The right is reserved to determine whether such substitutions or exceptions are within the intent of the specifications and will reasonably meet the service requirements of the using department and unless approved by the Administrator or Delegate in writing, the item(s), as originally specified, must be provided. Any deviations from these specifications, not approved in writing prior to the bid opening, will be cause for rejection of the bid. A summary of all approved substitutions and exceptions will be returned to each prospective bidder prior to bid opening.

BID SUBMISSION: **Four (4) copies** of the bid must be submitted on the forms included in this document, and must be properly signed in the spaces indicated. Bids submitted otherwise maynot be acceptable. Bids are to be enclosed in a sealed envelope and clearly identified as described on page 2 of this document. No responsibility will be attached to an official of the Town of Cary for premature opening of a bid not properly addressed and identified.

BID DEPOSITS/BID BONDS: Not required.

BID OPENINGS: **Bids will be opened at the date and hour as stated in the Request for Bids and no bid received after the date and hour as set forth herein will be accepted or considered.** It shall be the specific responsibility of the bidder to deliver his or her bid to the designated Town official prior to the announced time of the bid opening. Late delivery of a bidfor any reason, including delivery by the U.S. Postal Service or any other carrier, shall disqualify the bid.

BID AWARD: The Town reserves the right to reject any or all bids, waive technicalities, and to be the sole judge of suitability of the equipment or services for its intended use and further specifically reserves the right to make the award in the best interests of the Town. All equipment or services listed is intended for a particular use by the Town division(s) in which it is to be utilized and must meet the requirements of that particular division(s). Facts contained in the attached questionnaires will be used in evaluating all bids. The right is reserved to require the bidders to furnish acceptable proof in the form of certifications that the equipment, as bid, equals or exceeds the requirements of the specifications. Since time is of the essence, the guaranteed date of delivery as shown in the bid will be taken into consideration in the award or in the cancellation of the award for breach of contract. Special consideration will be given to accessibility of the various units which require periodic maintenance operations, ease of operations, and symmetrical proportions. Other factors that will be considered in awarding the bid will be price, quality, and the availability of repair parts and service on equipment offered.

Failure to respond to any requirements outlined in this RFB, or failure to enclose copies of the required documents, may be cause for disqualification of the bid. The contract will be awarded after an evaluation of all bids have been made, and in the interest of suitability to the Town's needs and/or economy, equipment, furnishings or service other than the lowest in price may be selected.

APPROVAL DRAWINGS: Preliminary drawings must be submitted by the successful bidder within 30 days of Notice of Award for review and approval by the Engineer and Contract Administrator. These drawings must show, but are not limited to, mechanical and structural plans and sections, component cut sheets, etc. and will be a visual interpretation of the unit as it is to be supplied. If changes are requested by the Contract Administrator after review, drawings are to be revised accordingly and resubmitted for additional review. When approved, the Contract Administrator, the equipment manufacturer and their agent shall each be furnished with copies of the approved final drawings, which shall then become a part of the total contract.

INSPECTIONS: The Town of Cary reserves the right to send Town representatives to inspect the manufacturing facility or any referenced previous installation. The successful bidder will be responsible for attendance to address any technical concerns that arise for the inspections. The Town will be responsible for the travel expenses of its representatives.

DELIVERY AND ACCEPTANCE: All supplied equipment will be received, unloaded, installed and field tested by Town of Cary staff. Upon notice, the successful bidder shall promptly deliver the equipment to the Town of Cary's South Cary Water Reclamation Facility, 4911 West Lake Road, Apex, NC. The successful bidder will be responsible for all costs of delivery and remedy of any damages or failures of equipment that are incurred during delivery. The equipment will be received and unloaded by the Owner. The Owner will be responsible for determining if the equipment and its appurtenances have been provided as specified. The Owner will inform the successful bidder of any deficiencies and the successful bidder will be responsible for all replacements or additions required to meet the specifications.

PAYMENT SCHEDULE: Terms of payment are 10% upon shop drawings approval, 70% upon receipt of equipment at site and 20% due at substantial completion. Substantial completion is defined as Town acceptance of performance tests and the placement in service of the complete system.

SHIPPING COSTS: The entire cost associated with the shipment of any equipment proposed by the bidder must be included in the bid price. This includes any associated delivery, freight charges, and modifications to equipment. All transportation and delivery charges are to be prepaid by the successful bidder to the point of delivery indicated in the bid.

ADVERTISING: In submitting a proposal, bidder agrees not to use the results therefrom as a part of any commercial promotion or advertising without prior written approval of the Town of Cary.

INDEMNIFICATION:

- a. **General Indemnity.** To the fullest extent permitted by Laws and Regulations, Vendor shall indemnify and hold harmless the Town, its officers and employees, from and against all claims, costs, civil penalties, fines, losses, and damages (including but not limited to professionals' fees and charges and all court or other dispute resolution costs), by whomsoever brought or alleged, arising out of, resulting from, or in connection with (a) any breach by Vendor of any term or condition of Contract, (b) any breach or violation by Vendor of any applicable Law or Regulation, or (c) any other cause resulting from any act or failure to act by Vendor under this Contract, but only to the extent cause by any negligence or omission of Vendor.
- b. **Intellectual Property Indemnity.** To the fullest extent permitted by Laws and Regulations, Vendor shall indemnify and hold harmless the Town, its officers and employees, from and against all claims,

costs, civil penalties, fines, losses, and damages (including but not limited to all professionals' fees and charges and all court or arbitration or other dispute resolution costs), by whomsoever brought or alleged, arising out of or related to infringement of patent rights, copyrights, or other intellectual property rights, except with respect to designs, processes or products of a particular manufacturer expressly required by Town in writing ('Town required design'). If Vendor has reason to believe the use of a Town required design is an infringement of an intellectual property right, Vendor shall be responsible for such loss unless such information is given to the Town immediately upon becoming aware of such possible infringement.

PROHIBITED CONTRACT TERMS: In no event shall there be any of the following without Town's express prior written agreement: (i) any limitation on, or disclaimer of, implied or express warranties or the liability of Vendor; (ii) any limitation on damages, including a limitation on consequential damages; (iii) any requirement for arbitration or for mandatory mediation; (iv) any requirement that Town officials or employees keep information confidential or any requirement that records be kept confidential by the Town, unless the requirement for confidentiality meets the requirements of the Public Records Law (N.C.G.S. §132-1 *et seq.*).

INDEPENDENT VENDOR: Vendor is an independent Vendor and is solely responsible for its Services and the supervision of its employees and permitted sub-vendors.

PUBLIC RECORDS: Vendor acknowledges that that records in the custody of Town are public records and subject to public records requests. Town may provide copies of such records, including copyrighted records, in response to public record requests.

AMENDMENTS TO CONTRACT: Contract may only be amended in a writing signed by the parties.

DISSEMINATION OF INFORMATION: The Town takes efforts to assure that accurate information about the Town is disseminated such that neither the public trust nor the public's perception of Town impartiality is compromised. Vendor, mindful of those efforts, agrees that it shall not publicly disseminate any information concerning the Services without prior approval from Town. Any approval given by the Town may be given with certain stipulations, such as Town participation in the creation of the public product or Town review and the option to refuse ultimate release of the final product should it fail to meet the Town's standards and goals. Publicly disseminate means but is not limited to electronic, video, audio, photographic or hard copy materials serving as, in whole or part, advertising, sales promotion, *professional papers or presentations, news releases, articles, or other media products*, and/or Vendor's business collateral pieces. Notwithstanding the foregoing, the parties agree that Vendor may list Town as a reference in response to requests for Bid and may identify the Town as a customer in presentations to potential customers.

LIMITED ASSIGNMENT/DELEGATION: Vendor shall not assign or transfer its interest in, nor delegate its duties under, Contract without the Town's written consent. The Town's consent shall not release Vendor of an obligation under Contract. If Vendor utilizes approved subVendors, Vendor shall be responsible for the scheduling, completeness, quality, accuracy and timeliness of all their work. Town has the right to request that any subVendor be replaced due to unsatisfactory performance.

GOVERNING LAW: Contract and the Services shall be governed by the laws of the State of North Carolina. Any and all suits or actions related to Contract shall be brought in Wake County N.C.

SEVERABILITY: If any provision of Contract is held as a matter of law to be unenforceable, the remainder of Contract shall be enforceable without such provision.

NON-EXCLUSIVE REMEDIES/NO WAIVER: The selection of one or more remedies for breach shall not limit a party's right to invoke any other remedy available under Contract or by law. No delay, omission or forbearance to exercise any right, power or remedy accruing to a party shall impair any such right, power or remedy or shall be construed to be a waiver of any breach hereof or default. Every right, power or remedy may be exercised from time-to-time and as often as deemed expedient.

SURVIVAL: All representations, indemnifications and other terms and conditions of Contract which by their nature should survive Contract termination shall survive its expiration or termination.

CONDUCT: Town has adopted a Mission Statement and Statement of Values. To support these values, Town has published Working with the Town of Cary—A Guide for Temporary Employees, Vendors, Consultants, and Volunteers. To the extent consistent with the terms and conditions of Contract, Vendor agrees to support and abide by the policies and elements contained in the chapters titled 'Our Culture' and 'Working with the Media' in such publication.

NOTICE: All notices shall be in writing and delivered to the other party by personal delivery, commercially recognized overnight courier service, or prepaid U.S. certified mail, return receipt requested, addressed as follows:

To Vendor: To the Vendor's address provided in Contract, or as otherwise specified in writing to Town by Vendor.

To Town: John Holloway, PWUT Operations Analysis Supervisor, Town of Cary, 400 James Jackson Avenue, PO Box 8005, Cary, NC 27512-8005. Name of Project must be included.

Notice shall be effective upon the earlier of: (a) actual receipt; or (b) 3 days after deposit in the U.S. mail or other service. Each party is responsible for notifying the other of any change of address.

GIFTS AND FAVORS: Vendor shall become aware of and comply with laws related to gifts and favors, conflicts of interest and the like, including G.S. §14-234, G.S. §133-1, and G.S. §133-32.

NONDISCRIMINATION: Neither party shall discriminate on any prohibited basis.

WARRANTY QUESTIONNAIRE

Responses to the following questions will be considered in the award of this bid. The RFB documents require the dealer and manufacturer to provide a **THREE YEAR** warranty minimum, parts and service included, for machines and attachments supplied. All warranty coverage is to be F.O.B. Destination. Cary, NC.

1. What is covered under the "warranty" offer on this equipment?

2. What time period is covered on this warranty(ies)?

3. Where is the service center located that will do the warranty/repair work?

4. Are transportation costs to your service center for repair of this equipment covered ?

5. Does your company make service calls during warranty? After warranty?

6. If yes, what is your usual response time for service calls during warranty? After warranty?

7. What do you feel is a reasonable time period to expect usual repairs to be made?

8. Do you offer comparable replacement equipment during extended repair periods? If so, is there a fee involved?

9. Is a service/maintenance agreement on equipment offered after warranty? If so, what is the annual cost of the agreement?

10. What is covered under this service/maintenance agreement?

11. Are replacement parts for this equipment stocked at your service center? If so, what is the approximate inventory value of these particular parts?

12. If repair parts are not in stock, will they be promptly ordered? From where?

13. What is the approximate delivery time for those repair items which must be ordered?

14. Will you absorb the cost of freight on these ordered parts?

Part 1 General

1.01 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, instructions, 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 dimensions that 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 drawings to be used in connection with the work without appropriate final "Action" markings by the Engineer.
 - 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:
 - i. Assembly Drawings Sheet, Scale: 1-inch = 30 feet.
 - ii. Detail Sheet, Scale: 1/4-inch = 1 foot.
 - 2. Product Data
 - a. Product data includes 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.

- 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 Supplier.
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.

1.02 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. Submittals shall contain:
 1. The date of submittal and the dates of any previous submittals.
 2. The Project title.
 3. Numerical submittal numbers, starting with 1.0, 2.0, etc. Revisions to be numbered 1.1, 1.2, etc.

4. The Names of:
 - a. Supplier
 - b. Manufacturer
5. Identification of the product, with the Specification Section number, permanent equipment tag numbers and applicable Drawing No.
6. Field dimensions, clearly identified as such.
7. Relation to adjacent or critical features of the work or materials.
8. Applicable standards, such as ASTM or Federal Specification numbers.
9. Notification to the Engineer in writing, at time of submissions, of any deviations on the submittals from requirements of the Contract Documents.
10. Identification of revisions on resubmittals.
11. An 8 x 3-inch blank space for Engineer stamps.
12. 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.

1.03 Routing of Submittals

- A. Submittals and routine correspondence shall be routed as follows:
 1. Supplier to Engineer (through Owner's representative if applicable)
 2. Engineer to Supplier and Owner

Part 2 Products

2.01 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. Submit all shop assembly drawings, larger than 11 x 17-inches, in the form of one reproducible transparency with two opaque prints or bluelines. Drawings in Autocad 2007 shall also be submitted.
- C. Submit all shop drawings, 11 x 17-inches and smaller, in the form of six opaque prints or bluelines. Drawings in Autocad 2007 shall also be submitted.

- D. 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.

2.02 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.

2.03 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.

2.04 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.

Part 3 Execution

3.01 Contractor's Coordination of Submittals

- A. Prior to submittal for the Engineer's review, the Supplier 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. The Owner may backcharge the Supplier 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.
 - C. Grouping of Submittals
 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 Supplier'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 Supplier's comments as to compliance, non-compliance or features requiring special attention.
 - D. Schedule of Submittals: Within 15 days of Contract award and prior to any shop drawing submittal, the Supplier 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 Supplier's responsibility and some time allowance for resubmittal shall be provided. The schedule shall provide for submittal of items which relate to one another to be submitted concurrently.

3.02 Timing of Submittals

- A. Make all submittals far enough in advance of scheduled dates for installation to provide all required time for reviews, for securing necessary approvals, for possible revision and resubmittal, and for placing orders and securing delivery.
- B. In scheduling, allow sufficient time for the Engineer's review following the receipt of the submittal.

3.03 Reviewed Shop Drawings

- 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 Supplier 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.

Shop Drawings, Product Data, and Samples

2. Acceptable submittals will be marked "No Exceptions Taken". A minimum of three copies will be retained by the Engineer for Engineer's and the Owner's use and the remaining copies will be returned to the Supplier.
 3. Submittals requiring minor corrections before the product is acceptable will be marked "Make Corrections Noted". The Supplier 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 "Amend and Resubmit" must be revised to reflect required changes and the initial review procedure repeated.
 5. The "Rejected - See Remarks" notation is used to indicate products which are not acceptable. Upon return of a submittal so marked, the Supplier shall repeat the initial review procedure utilizing acceptable products.
 6. Only two copies of items marked "Amend and Resubmit" and "Rejected - See Remarks" will be reviewed and marked. One copy will be retained by the Engineer and the other copy with all remaining unmarked copies will be returned to the Supplier for resubmittal.
- B. No work or products shall be installed without a drawing or submittal bearing the "No Exceptions Taken" notation. The Supplier shall maintain at the job site a complete set of shop drawings bearing the Engineer's stamp.
- C. Substitutions: In the event the Supplier obtains the Engineer's approval for the use of products other than those which are listed first in the Contract Documents, the Supplier 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 Supplier 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 Supplier 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 Supplier is responsible for dimensions to be confirmed and correlated at the job site. The Supplier 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.

3.04 Resubmission Requirements

- A. Shop Drawings
1. Revise initial Drawings as required and resubmit as specified for initial submittal, with the resubmittal 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 the resubmittal number shown.

END OF SECTION

Part 1 General

1.01 Scope

These general equipment stipulations apply, in general, to all equipment and piping. They supplement the detailed equipment Specifications, but in case of conflict, the detailed equipment Specifications shall govern.

1.02 System Responsibility

Equipment manufacturer is assigned system responsibility for headworks screening, conveying, and compacting components and shall be responsible for furnishing a complete system in accordance with the requirements of these Specifications. The manufacturer shall be responsible for all coordination between components and shall provide all submittals, installation and start-up services and certifications on the system as a unit.

1.03 Equipment Warranty

The Supplier shall warrant all equipment against faulty or inadequate design, improper assembly or erection, defective materials, breakage or other failure. The warranty period shall be defined in Section 01740 of these Specifications.

1.04 Workmanship and Materials

- A. All equipment shall be designed, fabricated and assembled in accordance with the most modern engineering and shop practice. Individual parts shall be manufactured to standard sizes and gauges so that repair parts, furnished at any time, can be installed in the field. Like parts of duplicate units shall be interchangeable. Equipment shall be new and shall not have been in service at any time prior to delivery, except as required by tests.
- B. Materials shall be suitable for service conditions. Iron castings shall be tough, close grained, gray iron free from blowholes, flaws or excessive shrinkage and shall conform to ASTM A 48, Class 30 minimum. Plugging of defective castings shall not be permitted. Castings shall be annealed to remove internal stresses prior to machining and shall have the mark number and heat number cast on them.
- C. Except where otherwise specified, structural and miscellaneous fabricated steel used in items of equipment shall conform to the Standards of the American Institute of Steel Construction. All structural members shall be considered as subject to shock or vibratory loads.
- D. All replaceable or expendable elements such as filters, screens, drive belts, fuses and lamps shall be easily accessible and replaceable without need of dismantling equipment or piping. All such items shall be of a standard type that is readily available from multiple suppliers.

General Equipment Stipulations

- E. Threaded openings for drains or vents in pump volutes, compressor or fan scrolls, air receivers, and heat exchangers which are plugged during normal operation shall be provided with stainless steel plugs.
- F. All equipment delivered to the Project site shall include detailed installation instructions and a parts list.

1.05 Equipment Specifications

The use of singular or plural terminology in the Specifications is not intended to define the number of units required to fulfill Contract requirements. Bidders must consult the Drawings and Specifications to determine how many units of a particular piece of equipment are required. This does not relieve the Supplier of the responsibility to provide all equipment specified when multiple units are specifically required in the Specifications.

1.06 Seal Water Requirements

Where seal water is provided for flushing of mechanical shaft sleeves or sealing of shaft seal packing, provide equipment with drip pans fitted with drains to contain the leakage and convey it to the nearest suitable floor drain. Route drain piping to minimize obstructions to the movement of personnel.

1.07 Operating Fluids and Gases

All operating fluids and gases recommended by the manufacturer and required for operation of the equipment shall be provided in sufficient quantity by the Contractor to fill all equipment and to replace all fluids and gases consumed during testing and start-up.

1.08 Lubrication and Lubrication Fittings

- A. Equipment shall be adequately lubricated by systems which require attention no more frequently than weekly during continuous operation. Lubrication systems shall not require attention during start-up or shutdown and shall not waste lubricants.
- B. Lubricants of the type recommended by the equipment manufacturer shall be provided in sufficient quantity by the Contractor to fill all lubricant reservoirs and to replace all lubricants consumed during testing, start-up and initial operation. The Contractor shall provide sufficient quantities of manufacturer-approved lubricants to lubricate all equipment for one year of normal service before final acceptance of the equipment will be made by the Owner.
- C. Where special run-in oil or storage lubricants are used, they shall be flushed out and replaced with the required service lubricant by the Contractor.
- D. Tag each piece of equipment with a cloth tag showing proper type lubricant, period between lubrications, date of lubrication and worker's initials. Have space for 10 lubrication notations.

- E. Except for rotating shaft couplings, all lubrication fittings shall be brought to the outside of all equipment so that they are readily accessible from the outside without the necessity of removing covers, plates, housings or guards. Fittings shall be accessible from safe, permanent platforms or walk areas. Fittings shall be of the bull-neck, check type for use with a portable high pressure grease gun. Connection from a remote fitting to the point of use shall be with minimum 3/16-inch stainless steel tubing, securely mounted parallel to equipment lines and protected where exposed to damage.

1.09 Safety Guards

All belt or chain drives, fan blades, couplings and other moving or rotating parts shall be covered on all sides by a safety guard. Safety guards shall be fabricated from 16 USS gauge or heavier galvanized or aluminum-clad sheet steel or 1/2-inch mesh galvanized expanded metal. Expanded metal safety guards shall be banded to eliminate sharp edges. Each guard shall be designed for easy installation and removal. All necessary supports and accessories shall be provided for each guard. Supports and accessories, including bolts, shall be galvanized. All safety guards in outdoor locations shall be designed to prevent the entrance of rain and dripping water. All safety guards shall comply with OSHA General Industry Standards, Part 1910, Subpart O, Machinery and Machine Guarding. Provide tachometer access on shaft ends.

1.10 Alignment of Motors and Equipment

- A. In every case where a drive motor is connected to a driven piece of equipment by a flexible coupling, the coupling halves shall be disconnected and the alignment between the motor and the equipment checked and corrected. Machinery shall first be properly aligned and leveled by means of steel wedges and shims or jacking screws near anchor bolts. Anchor bolts shall be tightened against the shims on wedges or jacking screws and the equipment shall again be checked for level and alignment before placing grout. Wedges shall not be placed between machined surfaces.
- B. In general, checking and correcting the alignment shall follow the procedures published in the manufacturer's Operation and Maintenance Manual. In addition, pumps shall be set up in accordance with the Standards of the Hydraulic Institute, Instructions for Installation, Operation, and Maintenance of Centrifugal Pumps, unless manufacturer's direction is contradictory. Equipment shall be properly leveled and brought into angular and parallel alignment.
- C. Equipment shall be installed in such a way that no strain is transmitted to the equipment by piping systems or adjacent equipment.

1.11 Welding and Brazing

- A. All welds shall be sound and free from embedded scale and slag. All butt welds shall be continuous, and where exposed to view, shall be ground smooth. All continuous welds shall be gas and liquid-tight. Welds in piping shall have full penetration and shall be smooth on the inside of the pipe. Intermittent welds shall have an effective length of at least 2-inches and shall be spaced not more than 6-inches apart.

General Equipment Stipulations

- B. All welding of steel and aluminum, including materials, welding techniques, general safety practices, appearance and quality of welds, and methods of correcting defective work, shall conform to the latest requirements of AWS Specifications. Structural steel welding shall conform to the requirements of the AWS Structural Welding Code. The general recommendations and requirements of the AWS Structural Welding Code shall also apply to welded aluminum structures. The welding process and welding operators shall meet qualification tests and welding performance tests in accordance with the latest provisions of ASME Boiler and Pressure Vessel Code, Section IX, Welding and Brazing Qualifications. Welding process and qualification procedures for welding of pipe shall conform to the latest requirements of ANSI B31.1, Section 327, Welding, and Section 328, Brazing and Soldering. All welding qualification tests shall be witnessed by the Engineer, except as provided herein. All costs associated with the qualification or testing of welders and welding operators shall be borne by the Contractor.
- C. Welding of stainless steels shall be performed by the MIG or TIG process, in accordance with ASME and AWS recommendations. After welding is completed, the welds shall be ground smooth, where required, and all welds shall be pickled and passivated such that the weld will be no less corrosion resistant than the base metal welded.
- D. Reports certifying that the welding procedures, welders and welding operators that the Contractor intends to use meet the requirements specified above. These reports shall be submitted to the Engineer prior to beginning the work. In the case of welder qualifications for shop welding and for carbon steel field welding, welders presenting certified qualification papers validated within the preceding 6-month period will not be required to take the qualification tests. In the case of field welding of stainless steel or aluminum, all welders shall be required to take the qualification tests regardless of past experience or availability of certified qualification papers.
- E. Field welding practices shall conform to OSHA construction standards, Part 1926, Subpart J, Welding and Cutting. Shop welding practices shall conform to OSHA General Industry Standards, Part 1910, Subpart Q, Welding, Cutting, and Brazing.
- F. Welding electrodes for structural steel shall conform to the standard recommendations of the AISC. Welding electrodes for stainless steel shall conform to applicable AWS Specifications and shall be as recommended by "Welded Austenitic Chromium-Nickel Stainless Steels, Techniques and Properties", published by the International Nickel Company, New York, New York. Welding electrodes for aluminum shall conform to applicable AWS Specifications.
- G. Each welder and welding operator must identify all welds with welder's assigned symbol.
- H. Welders performing unsatisfactory work shall be removed from the welding process.
- I. The Owner may inspect any weld by radiographic or other means. Welds not in accordance with the requirements specified herein shall be repaired or replaced at the Contractor's expense. Excessive porosity, nonmetallic inclusions, lack of fusion, incomplete penetration and cracking shall constitute grounds for rejection of welds.

1.12 Erection and Setting

- A. All equipment shall be furnished with suitable eyebolt lifting lugs or lifting angles to facilitate handling.
- B. All flanged piping connections shall be "Two-Holed" such that the two uppermost flange bolt holes are horizontal.

1.13 Special Tools and Accessories

Equipment requiring periodic repair and adjustment shall be furnished complete with all special tools, instruments and accessories required for proper maintenance. Special tools and accessories shall include those tools and accessories not normally available in an industrial hardware or mill supply house. Equipment requiring special devices for lifting or handling shall be furnished complete with those devices.

1.14 Galvanizing

- A. All galvanizing shall be done by the hot-dip process after fabrication in conformity with requirements of ASTM A 123, Grade 100; ASTM A 153, ASTM A 384 and ASTM A 385. Articles to be galvanized shall be pickled before galvanizing. Articles to be painted shall not be quenched.
- B. Where galvanized bolts are specified or required by the Drawings, zinc plated bolts will be acceptable provided zinc plating conforms to ASTM B 633, Type II.
- C. Areas of galvanizing damaged at the factory by welding or burning or otherwise damaged shall be thoroughly stripped and cleaned and recoated with zinc to the required thickness by the hot dip process. Areas of galvanizing damaged in the field during transportation, handling or installation shall be stripped, cleaned, and recoated with zinc to the required thickness in accordance with ASTM A 780, Annex A3.
- D. Galvanized articles shall be free from uncoated spots, blisters, flux, black spots, dross, projections and other defects not consistent with acceptable galvanizing practice.
- E. Zinc and cadmium plating shall be subject to visual examination to determine uniformity of coating. The Engineer may require that the coating uniformity be tested in accordance with ASTM A 239 or ASTM E 376.

1.15 Vibration Testing

- A. Unless specified otherwise in the Specifications, each pump or blower having a rated power of 50 HP, or greater, shall be tested in the field for acceptable vibration levels. Vibration testing shall be performed by an experienced, factory-trained and authorized vibration analysis expert (not a sales representative) retained by the Contractor for this work. Each unit shall be tested separately without duplicate equipment running. All field testing shall be done in the presence of the Engineer. The Engineer shall be furnished with four certified copies of vibration test data for each test performed.

General Equipment Stipulations

- B. Where specified in the Specifications, equipment which is assembled and tested on the manufacturer's floor shall also be checked triaxially for vibration by the manufacturer. The results of these tests, along with location of vibration check points, shall be submitted to the Engineer. All readings shall be made on an X-Y recorder with appropriate scales indicated and an explanation thereon of any recordings exceeding specified limits. The field tests shall include substantiation of the manufacturer's test data.
- C. For systems with variable speed drives, tests shall be conducted at various speeds between maximum and minimum. For systems with two-speed drives, tests shall be conducted at both speeds. For systems with constant-speed drives, tests shall be conducted under various loading conditions as determined by the Engineer.
- D. Rotating equipment shall be tested for vibration in the field after installation by the following method. Equipment, complete with drive systems, in place at the job site, shall not vibrate more than the values allowed herein, unless otherwise specified in the detailed equipment specifications. All field tests shall be running tests with the equipment operating on the product for which it is intended or a substitute acceptable to the Engineer. The term displacement, as used herein, shall mean total peak-to-peak movement of vibrating equipment, in mils; velocity shall mean the peak velocity or speed of the vibrating equipment, in inches per second; acceleration shall mean the maximum acceleration which occurs during the vibration cycle, measured in Gs. Displacement and velocity shall be measured by a meter equal to IRD Balancing Vibration Analyzer Model 258, or Bently-Nevada Model TK-8. Acceleration shall be measured by suitable equipment equal to IRD Mechanalysis, Bently-Nevada, subject to approval of the Engineer. Frequency of vibration, in cycles per minute (cpm), shall be determined when vibration exceeds specified levels or as otherwise necessary. Vibration shall be measured on the bearing housing, unless other locations are deemed necessary by the vibration analysis expert and Engineer.
- E. For all equipment tested, vibration shall be checked in the radial and axial directions. For pumps, vibration shall not exceed that permitted by the Hydraulic Institute.
- F. Critical speeds of all rotating equipment shall meet the following:
 - 1. For stiff shaft designs, the first critical speed of the rotating equipment shall be at least 25 percent above the maximum design operating speed.
 - 2. For flexible shaft designs, critical speeds shall be at least 2 percent above or below normal design operating speeds.
- G. The Contractor shall be responsible for unit and system assembly vibration testing and their results, which shall be within the specified limits. Copies of test results shall be submitted to the Engineer for review. Should the vibration field test results exceed shop test results or the limits specified herein, the Contractor shall correct the deficiencies within 30 days. After corrections have been completed, the vibration testing shall be rerun and the results resubmitted to the Engineer for review.

1.16 Hydraulic Systems

- A. All pipes, tubes and hoses for hydraulic fluid shall be securely restrained against movement. All tubing and hoses shall be routed, shielded and supported such that rubbing or abrasion of the jacket shall not occur.
- B. All hydraulic fluid reservoirs for hydraulic power packs shall be equipped with a low level shut-off mechanism which shall stop operation of the power pack when the level of fluid in the reservoir reaches a predetermined low level. Reservoirs shall have a sight glass or tube allowing visual inspection of level and lubricant appearance.
- C. All hydraulic systems shall be equipped with an alarm to notify the operator of system malfunction.

1.17 Noise Criteria

- A. Unless otherwise specified, noise levels for all operating equipment shall not exceed 60 dB at 10 feet from the equipment when measured on the A scale of a calibrated sound level meter at slow response.
- B. Noise criteria shall be met without the use of special external barriers or enclosures.

1.18 Identification of Piping and Equipment

- A. Equipment: All major items of equipment shall have an identification nameplate and dataplate.
 - 1. Nameplates: The Supplier shall submit a suitable list of all items of major equipment to the Engineer, who will furnish the Contractor with an identification numbering system. The nameplates shall be of Type 304 stainless steel, No. 6 finish, and not less than No. 16 gauge with indented stamped lettering. Nameplates shall be attached to equipment bases in easily visible and accessible locations. Nameplates shall be fastened in a permanent manner, arranged not to damage the equipment, with not less than four stainless steel fasteners.
 - 2. Dataplates: Each item of mechanical equipment shall be provided with a stainless steel dataplate. Separate dataplates shall be provided for motors, engines and driven equipment. Dataplates shall include the following minimum information:
 - a. Name of equipment (from equipment specifications)
 - b. Manufacturer
 - c. Model designation
 - d. Serial number

General Equipment Stipulations

- e. Rated horsepower
 - f. Service factor
 - g. Electrical and insulation data
 - h. Speed (rpm)
 - i. Capacity and head (discharge pressure)
 - j. Net weight
 - k. Lettering shall be upper case, block style in size and spacing to suit the nameplate. The identification nameplates shall not be painted.
- B. Valves: All valves shall be identified with a round stainless steel disc, approximately 1-1/2-inches in diameter and not less than No. 14 gauge, coated with a clear lacquer. Discs shall be fastened to valves in a permanent manner; attachment by chain to handwheels or other operators shall not be acceptable. Discs shall be stamped using indented numerals and/or letters with a valve number corresponding to its identification number in the valve schedule to be included in the operation and maintenance manual.
- C. All pushbutton stations, switches, motor controllers, transmitters and other control equipment shall have identification nameplates of the engraved, laminated plastic type affixed to or adjacent to the switch, pushbutton station, etc.
- D. All manufacturer's nameplates, identification nameplates and ASME code plates located on areas of equipment to be insulated shall be removed and reattached on uninsulated areas in a manner acceptable to the Engineer.

1.19 Safety Signs

- A. Permanent safety signs shall be furnished and installed on all mechanical and electrical equipment where a hazard may exist. Signs shall be made in accordance with current OSHA requirements and shall be suitable for exterior use. Mounting details shall be in accordance with manufacturer's recommendations; location in accordance with governing agency regulations. Fasteners shall be stainless steel.
- B. Safety signs shall be approximately 10-inches high by 14-inches wide, colored yellow and black on minimum 0.080-inch aluminum stock.
- C. Safety signs shall be furnished and will include, but not be limited to, the following:
1. The following sign shall be affixed to all equipment which may be started automatically from a remote location:

CAUTION
THIS EQUIPMENT MAY START AUTOMATICALLY BY REMOTE CONTROL

2. The following sign shall be affixed to all electrical equipment or instrument panels, as applicable:

CAUTION - SHOCK HAZARD
THIS EQUIPMENT IS POWERED BY MULTIPLE SOURCES
CONTACTS MAY BE ENERGIZED AFTER LOCAL POWER IS DISCONNECTED

3. The following sign shall be provided at all areas where oxygen or flammable materials are stored or used (colored red, white and black):

DANGER
NO SMOKING, MATCHES, OR OPEN FLAMES

4. The following sign shall be affixed to all entrance hatches or access manways on covered tanks and vessels:

CAUTION
OXYGEN DEFICIENT OR TOXIC CONDITIONS MAY EXIST
FOLLOW PRESCRIBED PROCEDURES BEFORE ENTRY

5. The following sign shall be provided at all compressor vents and equipment blowoffs:

CAUTION
LOUD BLOWDOWN MAY OCCUR WITHOUT WARNING

6. The following signs shall be applied to all chemical storage tanks, or tanks storing hazardous materials, including flammable, toxic, reactive and otherwise unstable materials or materials representing a personnel safety hazard. Comply with NFPA 704 signage requirements on the tank exterior at all 4 architectural elevations (N, S, E & W) as well as the filling station. The NFPA signs have the color coded diamonds and can be obtained with the actual chemical name and emergency response info.

END OF SECTION

Part 1 General

1.01 Scope

- A. The work under this Section defines the minimum scope of services to be provided by the Supplier during installation, start-up, and operator training using factory representatives of the manufacturers of the equipment provided.
- B. Perform additional instruction of the Owner's personnel for any and all items of work that are incomplete at the time initial instruction sessions are scheduled.
- C. Provide instruction for all equipment and systems for which operating and maintenance data is required.
- D. Instruction sessions may be combined to some extent between several pieces of similar equipment within the same training session, but only if that combination is defined in the Supplier's instruction program submittal and approved by the Engineer.
- E. One instruction session for each major type of equipment will be required. The Supplier shall anticipate that up to ten of the Owner's employees will participate in any particular instruction session, and shall be prepared to provide the required number of handouts, manuals, and tools for each session.

1.02 Qualification

- A. Qualification of the manufacturer's representatives for installation, start-up, and operator training purposes shall be appropriate for the equipment being installed. Manufacturer's representatives shall be subject to the approval of the Engineer. Where equipment has significant process complexity, furnish the services of engineering personnel knowledgeable in the process involved and the function of the equipment.
- B. References in various equipment sections of the terms "factory representative" or "field representative" shall mean an employee of the equipment manufacturer who is completely knowledgeable of the manufacturing, installation, operation and maintenance of the equipment. A sales representative does not qualify. Any field or factory representative not an active employee of the manufacturer must provide documentation from the manufacturer stating that the individual, by name, has been formally trained in the installation, operation and maintenance of the equipment and is authorized to make the required certification to perform the required services.

1.03 Submittals

- A. No later than ninety days prior to scheduled Substantial Completion of the work, the Supplier shall submit a list of proposed instruction sessions for the entire Project. This list shall be organized by Specification Section and its contents will be subject to the approval of the Engineer and Owner.

Manufacturer Services

- B. After approval of the list of the proposed instruction sessions and no later than sixty days prior to the scheduled Substantial Completion of the work, submit course outlines and training material for each of the approved instruction sessions. Outlines shall be organized by Specification Section, and their contents shall be subject to the approval of the Engineer.
- C. After approval of the program content, the Supplier shall submit a proposed schedule for each of the approved instruction sessions which are to be organized by Specification Section, and the scheduled dates will be subject to the approval of the Engineer.
- D. Submit a separate instruction request/report (form attached) for each system or type of equipment, subject to the Owner's approval of availability of personnel.
 - 1. Submit request/report with preliminary information indicated, to the Engineer at least two weeks prior to first instruction period.
 - 2. After each instruction session, submit three copies of the completed report to the Engineer.

1.04 Coordination

- A. Do not begin instructions until component assembly or system has been tested as specified in Section 01655 and is in satisfactory operating condition.
- B. Prior to instruction sessions, assemble instructional aids, tools, test equipment, and any necessary copies of Operations and Maintenance Manuals.
- C. All instruction sessions shall be planned and scheduled such that the Owner's participants will utilize copies of the Project Operations and Maintenance Manuals which will have been previously provided. These copies are in addition to the quantities which have to be provided to the Owner under Section 01730. The use of draft copies of these manuals will be acceptable.
- D. The Supplier shall schedule and coordinate the visits of factory representatives during installation, start-up and operator training in accordance with the requirements of Section 01655 of these Specifications.
- E. The Supplier shall notify the Engineer 72 hours prior to any impending visit by factory representatives so that the Engineer can be present.

1.05 Installation, Start-Up, and Testing Services

The Supplier shall furnish the services of a factory representative to provide the Pre-Start-Up Maintenance, Installation, Inspection, Functional Testing, and Operational Testing in accordance with Section 01655 and the equipment sections of these Specifications.

1.06 Operator Training Services

- A. Provide all instruction as required to ensure understanding of all operating and maintenance procedures by the Owner designated personnel.
- B. Instruct Owner's personnel in operation and maintenance of equipment and systems. Provide all necessary instruction to satisfaction of the Owner.
- C. Explain use of Operating and Maintenance Manuals.
- D. Tour building areas involved and identify:
 - 1. Maintenance and access points.
 - 2. Control locations and control equipment.
- E. Explain operating sequences:
 - 1. Identify location and show operation of switches, valves, etc., used to start, stop, and adjust systems.
 - 2. Explain use of flow diagrams, operating sequences, diagrams, etc.
 - 3. Demonstrate operation through complete cycle(s) and full range of operation in all modes, including testing and adjusting relevant to operation
- F. Explain use of control equipment, including temperature settings, switch modes, available adjustments, reading of gauges, and functions that must be serviced only by authorized factory representative.
- G. Explain trouble shooting procedures:
 - 1. Demonstrate commonly occurring problems.
 - 2. Note procedures which must be performed by factory personnel.
- H. Explain maintenance procedures and requirements:
 - 1. Point out items requiring periodic maintenance.
 - 2. Demonstrate typical preventive maintenance procedures and recommend typical maintenance intervals.
 - 3. Demonstrate other commonly occurring maintenance procedures not part of preventive maintenance program.
 - 4. Identify maintenance materials to be used.

Manufacturer Services

- I. Furnish all tools and/or test equipment required for proper instruction of the Owner's personnel. Tools and/or test equipment shall be distributed in "sets" with each two participants having a "set" to work with and retain upon completion of the instruction. Each participant shall sign for their tools at the start of the instruction session, and copies of the assignment documents shall be provided to the Construction Manager by the Supplier.
- J. **Thirty-day Operating Period After Start-Up:** The manufacturers' representative for each piece of equipment shall return to the Project site 30 days after successful completion of the operating test to review the equipment performance, correct any equipment problems, and conduct follow-up operation and maintenance classes as required by the Owner. This follow-up trip is required in addition to the specified services of manufacturer's representative prior to and during equipment start-up. At this time, if there are no equipment problems, each manufacturer shall certify to the Owner in writing that his equipment is fully operational and capable of meeting operating requirements. If the certification is accepted by the Engineer and Owner, the warranty period for that piece of equipment shall be considered to have begun as of the start-up date. If the equipment is operating incorrectly, the factory representative will make no certification to the Owner until the problems are corrected and the equipment demonstrates a successful 30 days operating period. At the conclusion of that period, the warranty start date will be decided upon by the Owner.
- K. **Six Month Operating Period After Start-Up:** The manufacturers' representative for each piece of equipment shall return to the Project site six months after the successful completion of the operating test to review the equipment performance, correct any equipment problems, and conduct follow-up operation and maintenance classes as required by the Owner. This follow-up trip is required in addition to the specified services of manufacturer's representative prior to and during equipment start-up. At the time of this trip, if there are no equipment problems, each manufacturer shall certify to the Owner in writing that his equipment is fully operational and capable of meeting operating requirements. If the equipment is operating incorrectly, the service representative will make no certification to the Owner until the problems are corrected and the equipment demonstrates a successful 30-day operating period after problems are corrected.

1.07 Documentation

- A. The Supplier shall provide for the services of an experienced professional audio-visual firm to record all operators instruction(s), training sessions, and seminar(s), both initial and follow-up sessions. To the greatest extent possible, the training sessions and corresponding videos shall be conducted and documented individually by equipment type.
- B. Supplier shall submit a draft copy of the DVD and log to the Engineer for review prior to making copies of the training sessions. DVD will be reviewed for sound, lighting, and tape quality.

- C. Once approved, Supplier shall provide the Owner six DVD format copies of the video for each occasion and/or each piece of equipment. The discs shall be properly labeled and logged as per its contents.
- D. Compact disk copies shall be in the DVD(-R) format.

END OF SECTION

EQUIPMENT AND SYSTEMS INSTRUCTION REPORT

PROJECT: _____

SYSTEM OR EQUIPMENT: _____

SUPPLIER NAME: _____ CONTRACT NO. _____

SPECIFICATION SECTION

NOTE: The Supplier's Representative must maintain and complete this report during instruction.

PRELIMINARY INFORMATION

1. To be completed by the Supplier:

A. Proposed dates for instruction period: From _____ To _____

B. Name of Representative Instructor: _____

C. Approximate number of hours of training required: _____

2. To be completed by the Owner:

A. Owner's Designated Personnel to receive instruction: (Identify supervisor, if required).

- | | |
|----------|-----------|
| 1) _____ | 6) _____ |
| 2) _____ | 7) _____ |
| 3) _____ | 8) _____ |
| 4) _____ | 9) _____ |
| 5) _____ | 10) _____ |

B. Training Session Location: _____

RECORD INFORMATION (To be Completed after Instruction Session)

Instructor's Signature: _____ Date Instruction Completed: _____

Construction Managers Signature: _____

Owners Signature: _____

SPECIAL CONSIDERATIONS/NOTES:

Part 1 General

1.01 Scope

- A. The work under this Section includes, but is not necessarily limited to, the provision of all labor and material required to perform installation inspection and start-up of all equipment and mechanical systems installed under this Contract.
- B. The work defined under this Section includes providing the services of a trained factory representative in accordance with the requirements of Section 01645 of these Specifications.
- C. Certification of start-up and full testing shall be performed by the manufacturer using the services of a factory representative trained in this type service.
- D. Unless otherwise specified, the Supplier shall furnish all labor, materials, water, air, oil, power, fuel, chemicals, test equipment and other items required to conduct the field tests, including any retests.
- E. The cost of all field testing shall be included in the Contract Price and no separate payment will be made.

1.02 Coordination

The Supplier shall not proceed with any functional test or operating test until the operation and maintenance manuals for the equipment have been submitted and been designated "No Exceptions Taken". The Supplier shall coordinate all activities required for starting of systems including the visits by the factory representatives, particularly where an equipment item's operation is dependent on the operation of other equipment. Prior to calling the factory representative, the Supplier shall ensure that all necessary related equipment, structures, piping and electrical work is complete. Any required revisits to the site by the factory representative shall be provided by the Supplier.

1.03 Pre Start-Up Maintenance

After installation and prior to start-up, all grease-lubricated joints, shaft couplings and bearings shall be flushed out and re-greased. All oil reservoirs and sumps shall be completely drained and flushed and refilled with the proper lubricant. All operating fluid and gas reservoirs shall be filled with the proper fluid and gases. Screens and filters shall be checked for contamination and replaced if necessary. Belt drives shall be checked and tension adjusted, as needed. The equipment shall then be tagged, signed and dated, indicating that the equipment has been properly lubricated and prepared for start-up.

1.04 Installation Inspection

- A. Prior to energizing any piece of equipment or performing a functional test, a factory representative of the equipment manufacturer shall inspect the installation of the

Starting of Systems

equipment. The factory representative shall determine if the equipment has been installed in accordance with the manufacturer's recommendations, pre-start-up maintenance has been performed, and is ready for start-up and the initiation of the functional test.

- B. Should the installation inspection indicate that the equipment has been improperly installed or prepared for start-up, the Supplier shall provide such modifications or adjustments as required for the equipment to operate properly.
- C. The factory representative shall certify that the equipment has been installed in accordance with the Drawings, Specifications, and the manufacturer's recommendations and that the equipment is ready for start-up and functional testing to be performed.

1.05 Functional Test

- A. Following the installation inspection by factory representative, perform a functional test on each piece of equipment. The functional test shall consist of operation of the equipment on a normal duty cycle for a sufficient period of time to determine satisfactory operation. Time required for functional testing shall be as specified in the equipment specifications or a minimum one continuous eight-hour period, whichever is longer. To the maximum extent practical, exercise the full capabilities of all equipment including remote operation, instrumented control schemes, alternate modes of operation and emergency operation. Equipment shall be checked for any abnormal noise or vibration as part of the functional test, and any observed abnormal conditions corrected prior to certification.
- B. Should the results of the functional test indicate that the equipment has failed to perform in accordance with the Specifications, the Supplier shall make, at no additional cost to the Owner, all modifications or adjustments as required for satisfactory operation, including replacement of any or all components, if necessary. Following the modifications or adjustments, the Supplier shall repeat the functional test. This procedure shall be repeated until the results of the test indicate that the equipment has satisfied the requirements of the applicable Specification Section.
- C. After the functional test is completed, each manufacturer shall certify, in writing, that tests were made in accordance with the Specifications and the manufacturer's recommendations, that the functional tests and start-up operation have been satisfactory and that the equipment is fully operational and capable of meeting operating requirements.

1.06 Certification

Upon completion of start up, the Supplier shall provide written certification from all equipment manufacturers' factory representatives. Written certification shall indicate that tests were made in accordance with the manufacturer's recommendations, that the test and start-up operation has been satisfactory completed and that the equipment is fully operational under design requirements. Written certification shall be filed with the Engineer on the manufacturers stationary.

END OF SECTION

Part 1 General

1.01 Scope

- A. The Supplier shall provide four copies (2 electronic copies and 2 hard copies) of a complete and comprehensive reference manual (Operating and Maintenance Manual) containing operating and maintenance data to enable operators and plant engineers to correctly operate, service and maintain all equipment and accessories covered by the Specifications and Drawings. The data contained in the manual shall explain and illustrate clearly and simply all principles and theory of operation, operating instructions, maintenance procedures, calibration procedures and safety precautions and procedures for the equipment involved.
- B. No separate payment will be made for the Operating and Maintenance Manuals and the cost of said manual shall be included in the Contract Price.

1.02 Submittal Schedule

- A. The Supplier shall submit, for the Engineer's approval, two preliminary drafts of proposed formats and outlines of contents of manuals within 60 calendar days after the Notice to Proceed. The Engineer will notify the Supplier, in writing, of any deficiencies in the manual and will return one copy of the manual for completion and/or correction.
- B. Submit two preliminary copies of manuals before the work covered by the Contract Documents is 35 percent complete. The Engineer will notify the Supplier, in writing, of any deficiencies in the manuals and will return one copy of the manual for completion and/or correction.
- C. Before the work covered by the Contract Documents is 50 percent complete, the Supplier must submit two copies of the revised and completed manual, complete in detail as specified below. The Supplier shall also submit two copies of the manual in digital format as specified below.

1.03 Submittal Format

- A. Each hard copy of the manual shall be assembled in one or more loose leaf binders, each with title page, typed table of contents, typed list of tables, typed list of figures, and heavy section dividers with reinforced holes and numbered plastic index tabs. Binders shall be uniform for all manuals and shall be 3-ring, hardback type, with transparent vinyl pocket front cover suitable for inserting identifying cover and with a transparent vinyl pocket on the spine for label. All data shall be punched for binding. Composition and printing shall be arranged so that punching does not obliterate any data. The cover and binding edge of each manual shall have the Project title, Specification Section number and title, and manual title printed thereon, all as approved by the Engineer.
- B. All copies of shop drawings, figures and diagrams shall be reduced to either 8-1/2 x 11-inches or to 11-inches in the vertical dimension and as near as practical to 17-inches in the horizontal dimensions. Such sheets shall be folded to 8-1/2 x

Operating and Maintenance Data

11-inches. The manual and other data shall be printed on first quality paper, 8-1/2 x 11-inch size with standard 3-hole punching. Binders shall be labeled Vol. 1, Vol. 2, etc., where more than one is required. The table of contents for the entire set, identified by volume number, shall appear in each binder. Text, figures and Drawings shall be clearly legible and suitable for dry process reproductions.

- C. Each submittal shall have a cover sheet that includes the following information:
1. The date of submittal and the dates of any previous submittals.
 2. The Project title.
 3. Submittal numbering shall be in accordance with Section 01350 of these Specifications.
 4. The names of:
 - a. Supplier
 - b. Manufacturer
 5. Identification of the product, with the Specification Section number, permanent equipment tag numbers and applicable Drawing No.
- D. The Engineer will not recommend final acceptance of the work until the Operating and Maintenance Manual is complete and satisfactory to Engineer.
- E. Digital Copies of Manuals: Operations and Maintenance Manuals shall be provided by the Supplier in digital format. Materials available in digital format shall be furnished in accordance with the following:
1. All textual data shall be provided as an electronic file in searchable Adobe Acrobat Portable Document Format (PDF). The PDF file(s) shall be fully indexed using the Table of Contents, searchable with thumbnails generated. File(s) shall be identified by utilization of an "eight dot three" convention (XXXXX.YY.pdf) where X is the five digit number corresponding to the Specification Section, and YY is an identification number. All documents shall be scanned at 300 dpi or greater utilizing optical character recognition (OCR) software. All text in the document must be text selectable with the exception of pages which are in their entirety Drawings or diagrams. Word searches of the PDF document must function successfully. PDF files that fail to comply with the indexing and searchable features described above will not be acceptable. All Drawing data shall be provided in digital format compatible with AutoCAD Version 14.
 2. Materials not available in original digital format (available only in paper format) shall be scanned as noted above into a PDF format and cleaned to remove smudges, fingerprints, artifacts, and other extraneous marks. All notes, version stamps, etc. shall be preserved. Color maps shall be scanned in not less than the number of colors of the document or 16 colors, whichever is greater. Color photographs shall be saved in not less than 256 colors. Black

and white or monochrome scans (non-text) shall not be less than 16 gray scale levels. Color maps, color photographs, and black and white and gray scale photograph files shall be saved as GIF or JPG files, compatible with Adobe Photoshop Version 4.0. Documents shall be scanned in the existing color format of the document, i.e. color documents shall be scanned in color, and black and white or monochrome in gray scale.

3. After the documents are in correct digital format, they shall be furnished to the Engineer as a 120 mm, 680mb, 74-minute CD ROM. All media transmittals shall be accompanied by a detailed paper printout of the files on the media. This printout shall consist of a file name, file size, date of creation, submittal number, and a brief but accurate description of the file. Files shall not be transmitted by modem. Two copies of the CD for each Operation and Maintenance Manual shall be provided to the Engineer.

1.04 Contents of Operating and Maintenance Manual

- A. Each manual shall include a title page which includes all information specified in Article 1.03, Paragraph C of this Section. In addition, the title page shall include manufacturer's address, phone number, facsimile number, and contact; manufacturer's equipment name and model number; supplier's address, phone number, facsimile number, and contact.
- B. Each manual shall include a table of contents identifying the location of each item listed below, for each component supplied. For items not applicable to a component, the table of contents shall list N/A for the page number.
- C. For all equipment, the supplier shall furnish a complete, detailed listing of all equipment, components and accessories showing component name, manufacturer, model number and quantity information shall be furnished for each component as outlined below:
 1. A summary page shall be provided for each piece of equipment detailing the following information:
 - a. Equipment Number
 - b. Equipment Description
 - c. Serial Number
 - d. Model Number
 - e. Manufacturer
 - i. Address
 - ii. Phone
 - iii. Representative

Operating and Maintenance Data

- f. Supplier
 - i. Address
 - ii. Phone
 - iii. Representative
 - g. Local Service Provider
 - i. Address
 - ii. Phone
 - iii. Representative
 - h. Location of Equipment
 - i. Equipment Design Criteria
 - i. HP
 - ii. Flow Rate, etc.
 - j. Performance Data
 - k. Normal Operating Characteristics
 - l. Limiting Conditions
2. Detailed disassembly, overhaul and reassembly, installation, alignment, adjustment and checking instructions.
 3. Detailed operating instructions for start-up, calibration, routine and normal operation, regulation and control, safety, shutdown and emergency conditions. Detailed list of settings for relays, pressure switches, temperature switches, level switches, thermostats, alarms, relief valves, rupture discs, etc.
 4. Detailed preventative maintenance procedures and schedules, including detailed lubrication instructions and schedules, identification of required lubricants and operating fluids (description, specification and trade name of at least two manufacturers), and diagrams illustrating lubrication points.
 5. Detailed guide to equipment and/or process “troubleshooting”.
 6. Detailed parts lists identified by title, materials of construction, manufacturer's part number, list of recommended spare parts identified as specified above, current cost list for recommended spare parts, predicted life of parts subject to wear, and an exploded or concise cut-away view of each equipment assembly.

7. Electrical and instrumentation schematics, including motor control centers, control panels, wiring diagrams, instrument panels and analyzer panels.
8. List of all special tools supplied and description of their use. Special tools include any tool not normally available in an industrial hardware or mill supply house.
9. List of names and addresses of nearest service centers for parts, overhaul and service.
10. Procedures for storing, handling and disposing of any chemicals or products used with the equipment or system.
11. For equipment and systems, also provide the following:
 - a. Control and wiring diagrams provided by the controls manufacturer.
 - b. Sequence of operations by the controls manufacturer.
 - c. Charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
12. The supplier's operation and maintenance information will address the particular equipment furnished, with specific details on operation and maintenance practices. General data is not acceptable. Information contained in the manual which is not appropriate to the Project shall be marked out and noted as "N/A".

END OF SECTION

Part 1 General

1.01 Equipment Warranty

- A. The Supplier shall warrant, for a period of three years from the date of Owner's written acceptance of the, that the installed equipments free from all defects due to faulty products or workmanship.
- B. The Supplier shall, at Supplier's own expense, furnish all labor, materials, tools and equipment and shall perform all work required to repair or replace equipment found to be defective or damaged as a result of defective work during the warranty period.
- C. The warranty shall not cover the repair, replacement, or maintenance of items that become defective due to ordinary wear, improper operation or maintenance, or damage caused by another Contractor or by the Owner.
- D. Equipment
 - 1. In the event of multiple equipment failures prior to the expiration of the warranty, the affected unit shall be disassembled, inspected and modified or replaced as necessary to prevent further occurrences. Multiple equipment 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. The Supplier shall provide the Owner with a 12 month warranty from the manufacturer against defective design, workmanship, materials, that shall commence on the day the equipment is placed back into service.
 - 2. The Owner shall notify the Supplier of defective work by registered letter. The Supplier shall have 15 days from the date of notification to proceed with corrective action. Should the Supplier fail to proceed within 15 days of notification, the Owner reserves the right to cause the required materials to be procured and the work to be performed. The Supplier shall be held liable for the cost and expense of the work performed by the Owner covered by the warranty.

END OF SECTION

Part 1 General

1.01 Scope

Work described in this Section includes furnishing all labor, equipment, materials, tools and incidentals required for a complete and operable installation of one grit washer and conveyor as shown on the Drawings and specified herein.

1.02 Design and Performance Requirements

- A. Minimum classifier hydraulic capacity shall be 250 gpm.
- B. Grit leaving the classifier unit shall contain organic material not to exceed 5 percent by volume.

1.03 Submittals

- A. Submit shop drawings and engineering data in accordance with the requirements of Section 01340 of these Specifications.
- B. Operation and Maintenance manuals shall be furnished in accordance with the requirements of Section 01730 of these Specifications.

1.04 Storage and Protection

Equipment and accessories shall be stored and protected in accordance with the manufacturer's recommendations.

1.05 Quality Assurance

The manufacturer shall furnish a written certification to the Engineer that all equipment furnished complies with all applicable requirements of these Specifications.

Part 2 Products

2.01 Acceptable Manufacturers

Grit washer and conveyor shall be Huber Coanda, John Meunier GFW, or preapproved equal.

2.02 Equipment Description

General: The grit washer and conveyor shall consist of a conical shaped grit washer tank using a vortex principal to induce grit settling. The settled grit shall be agitated and washed to remove organic matter to allow it to be returned to the wastewater treatment process. A grit conveying and dewatering screw will convey the washed grit

Grit Washer and Conveyor

from the bottom of the hopper/washer tank to an elevated outlet point. All controls and appurtenances shall be supplied for a complete operating installation.

2.03 Materials

- A. Unless otherwise specified in these specifications, the entire equipment shall be manufactured from AISI 304L austenitic stainless steel shapes (rods, angles, and channels), pipes, and sheets. All mechanical parts shall be designed to handle the forces that may be exerted on the unit during fabrication, shipping, erection, and proper operation according to the O&M manual.
- B. The equipment, after its fabrication, shall undergo a passivation (pickling) process to ensure maximum resistance to corrosion. All stainless steel components and structures shall be submersed in a chemical bath of nitric acid and hydrofluoric acid to remove any residues that may be present on the material as a result of forming, manufacture, or handling. After removal from the pickling bath, the equipment must be washed with a high-pressure wash of cold water to remove any remaining surface debris and promote the formation of an oxidized passive layer which is critical to the long life of the stainless steel. Submergence insures complete coverage. Spray on chemical treatments and glass bead blasting are specifically not acceptable due to their inability to provide complete and uniform corrosion protection.

2.04 Grit Washer and Conveyor:

- A. Grit Washer Tank
 - 1. Water containing grit from a grit chamber shall be introduced through a 6 inch inlet into the vortex chamber, creating a rotating flow pattern, and into the grit washer tank.
 - 2. The classified water shall pass over the overflow weir and discharge out of a single 8 inch clean water outlet.
 - 3. Effective stratification of particles, depending on their specific density, but not depending on their particle size and weight, shall be achieved within the conical portion of the grit washer tank.
 - 4. A 4 inch connection with an automatically operated one quarter-turn ball valve shall be provided for removal of organic material out of the conical section of the tank. The ball valve shall have a PVC body and ball to prevent binding when in contact with abrasive materials. Metallic ball valves which can bind in highly abrasive applications shall not be acceptable.
 - 5. A 6 inch connection with blind flange shall be provided on the top of the unit for future connection to the plant odor control system.
 - 6. A 110VAC, single phase, electrically operated actuator shall be provided to provide automatic control of the ball valve. The actuator shall be suitable for operation in a Class 1, Division 2 hazardous location. The stirrer shall move

organic matter toward this connection.

7. A 110VAC, single phase, pressure probe or switch shall be mounted in the bottom of the grit settling area to monitor the grit level within the tank and to control the operation of the grit stirrer and grit removal screw. The pressure probe shall be suitable for installation in a Class 1, Division 2 hazardous location.

B. Fluidized Grit Bed

1. A fluidized grit bed shall be maintained in the bottom portion of the grit washer tank. Within this fluidized bed, the grit is intensively washed and organic material is effectively removed from mineral particles.
2. Wash water shall be introduced into the bottom of the grit washer and dispersed through a perforated diaphragm to generate the fluidized bed in the bottom portion of the grit washer. This wash water shall also effectively flush the organic components out of the fluidized bed towards the overflow weir.
3. Casing to allow visual inspection of the internal float for manual flow rate confirmation.
4. Wash water control shall be provided via a 1.25 inch 110V, 60Hz, Class 1, Division 2 solenoid valve.

C. Grit Screw

1. Washed grit shall be removed through a central tube at the bottom of the grit washer. The stirrer shall move washed grit to the central tube. The grit to be removed shall drop into an inclined auger. This auger shall dewater and convey the grit above the level of the overflow weir. The washed and dewatered grit is discharged at the upper end of the auger.
2. Its inlet hopper shall be flange-connected to the grit discharge tube. The auger shall have a minimum discharge height of 95 inches above the floor. Its inlet hopper shall be provided with a 3" diameter (DN 80) drain connection that is provided with a ball valve. The drain connection shall also be provided with a 1" flush connection with ball valve.
3. The screw conveyor trough shall be made of minimum 10/64 inch (4 mm) thick stainless steel.
4. The screw shall be either shaftless or shafted. Shafted screws shall be stainless steel, and shaftless screws shall be abrasion resistant carbon steel.
5. A screw drive shall be provided at the upper end of the auger. The motor shall be continuous duty rated and shall be selected to match the duty of the particular grit conveying screw. The drive unit shall be directly coupled to the grit conveying screw drive shaft.

Grit Washer and Conveyor

D. Motors

1. Maximum Motor Speed: 1,680 rpm.
2. Service Factor: 1.15
3. Torque must be sufficient to start and operate grit washer without exceeding nameplate ratings for current and power.
4. Rating: 230/460V, 3-phase, 60 Hz.

E. Anchor Bolts

1. Equipment manufacturer shall furnish all anchor bolts of ample size and strength required to securely anchor each item of equipment. Anchor bolts, hex nuts, and washers shall be stainless steel. Anchor bolts shall be wedge or epoxy type.
2. Anchor bolts shall be set by the contractor. Equipment shall be placed on the foundations, leveled, shimmed, bolted down, and grouted with a non-shrinking grout

F. Control System

1. All controls necessary for the fully automatic operation of the grit washer shall be provided, including a NEMA 4X main control panel, and a NEMA 4X local control station.
2. The electrical control system shall provide for automatic control of the grit washer via a signal from the feed pump control panel.
3. When the selector switch is set in AUTO or MANUAL, a current metering system shall protect the dewatering screw against jamming. A continuous current reading (CMT) shall be monitored by an adjustable relay (CMR). The motor starting current being higher than the setting of the CMR, the jamming protection shall be put out of service by a time delay (TCM), for a predetermined adjustable motor start period, long enough to allow the current to fall below the CMR setting when it reaches its normal full load level. Activation of this system will energize the Grit Screw overload light. This system shall be reset manually by a push button. The system shall also be provided with Off-Reverse switches to allow the operator to disengage the debris causing the blockage of the system.
4. Main control panel shall be suitable for outdoor, wall-mounting. Enclosure shall be NEMA 4X Stainless Steel with front cover, full window, lockable door latch, and shall include the following:
 - a. Door-interlocked and fused disconnect

- b. 600 VAC terminal block
- c. NEMA motor starter and MCP type circuit breaker for grit screw motor
- d. NEMA motor starter and MCP type circuit breaker for grit stirrer motor
- e. Panel heater with thermostat
- f. Control power transformer with 120 VAC transient voltage surge compressor (TVSC) and fused primary and secondary
- g. Programmable logic controller (PLC), Allen Bradley Micrologix 1000
- h. Hand-Off-Auto selector switches for the following
 - i. Grit Washer drive
 - ii. Stirrer drive
- i. Grit Washer forward-off-reverse:
 - i. Grit Washer drive
 - ii. Grit Screw drive
- j. Spray wash pushbuttons (push-to-test): Solenoid valve
- k. Pilot lights for:
 - i. Control power on (white)
 - ii. Grit Screw running (green)
 - iii. Grit Stirrer (green)
 - iv. Organic Valve open (green)
 - v. Grit Screw overload (red)
 - vi. Grit Stirrer overload (red)
 - vii. Organic valve overload (red)
- l. E-stop push button (red)
- m. Grit Washer reset push button (black)
- n. Door mounted elapsed time meters for the following:
 - i. Screw drive

Grit Washer and Conveyor

- ii. Stirrer drive
- o. Remote dry contact input for the following:
 - i. Machine start
 - ii. Four spare inputs
- p. Remote dry contact outputs for the following:
 - i. Grit washer running
 - ii. Grit Washer overload
 - iii. Grit Washer E-stop
 - iv. Four spare outputs
- q. Flashing alarm light and alarm horn with silencer-reset button
- r. Plastic Nameplates

2.05 Spare Parts

- A. The following Spare Parts shall be included and supplied by Contractor:
 - 1. One perforated diaphragm (membrane)
 - 2. One complete solenoid valve assembly
- B. One set of all special tools, if required, shall be included and supplied by the Contractor.

Part 3 Execution

3.01 Installation

Grit washer and conveyor and accessories shall be installed in strict accordance with the manufacturer's recommendations and shop drawings, as reviewed by the Engineer.

3.02 Inspection and Testing

Following installation, operating tests will be performed to demonstrate to the Engineer that the equipment will function in a satisfactory manner. The Contractor shall make, at Contractor's expense, all necessary changes, modifications and/or adjustments required to ensure satisfactory operation.

3.03 Manufacturer Service

- A. Furnish the services of a factory representative, having full knowledge and experience in the installation of the type of equipment being installed, for two, eight hour days during the installation phase of the equipment.
- B. Furnish the services of a factory representative, having complete knowledge of proper operation start-up procedure and maintenance requirements, for one, eight hour day, to inspect the final installation and supervise a functional test of the equipment.
- C. Furnish the services of a factory representative, having complete knowledge of the operational and maintenance requirements of the system, for one, eight hour day. The factory representative shall instruct the Owner's personnel in the proper operation of the equipment in accordance with a schedule approved by the Owner.

3.04 Field Painting

All shop primed surfaces shall be cleaned and painted as specified in Section 09900 of these Specifications.

3.05 Cleaning

Prior to acceptance of the work of this Section, thoroughly clean all installed equipment, materials and related areas in accordance with the requirements of Section 01710 of these Specifications.

END OF SECTION

Part 1 General

1.01 Scope

Squirrel cage induction motors.

1.02 Related Work

All motor driven equipment sections.

1.03 Work Specified Elsewhere

Except as noted, equipment specified in this Section is provided under other Divisions. Include, under this Section, receiving, storage, handling and wiring.

1.04 Quality Assurance

- A. Equipment Standards: NEMA MG-1.
- B. Efficiency: Premium design; guaranteed minimum values determined in accordance with IEEE Standard 112, Test Method B including stray load loss as follows:

HP	Synchronous RPM			
	3,600	1,800	1,200	900 and Less
20 - 49	91%	92.4%	92.4%	90.2%
50 - 99	92.4%	93.6%	93%	93%
100 and Above	94.1%	95%	94.1%	93%

- C. For motors rated 1 to 19 HP, provide efficiency in accordance with ASHRAE Standard 90.1 - 1989, Table 5-1.

1.05 Submittals

- A. Submit shop drawings showing certified dimensions and nameplate data.
- B. Submit expected and guaranteed minimum efficiency values for operation at 100, 75, 50 and 25 percent load.

Part 2 Products

2.01 Acceptable Manufacturers

Motors shall be manufactured by General Electric, Reliance, Toshiba, Siemens, or Baldor.

2.02 Ratings

- A. Horsepower (HP): As noted. Where no value is noted, match the requirements of the driven equipment.
- B. Phase
 - 1. Less than 1/2 HP: Single phase.
 - 2. 1/2 HP and Larger: Three phase.
- C. Voltage
 - 1. Single Phase Motors: 115/200/230 volt reconnectable. Exception: Single voltage motors will be permitted if the voltage matches the supply characteristics shown on the Electrical Drawings.
 - 2. Three-Phase Motors less than 500 HP: 200/230/460 volt reconnectable. Exception: Single voltage motors will be permitted if the voltage matches the supply characteristics shown on the Electrical Drawings.
- D. Speed, Revolutions Per Minute (RPM): As noted. Where no value is noted, match the requirements of the driven equipment.
- E. Torque and Starting Current: NEMA design B unless otherwise noted. Exceptions: Provide NEMA design C or D where required by the driven equipment. Unless specifically noted NEMA design A motors are not acceptable.
- F. Service Factor: 1.15.
- G. Insulation and Temperature Rise: Except as noted, Class B or Class F insulation with temperature rise, measured by resistance, corresponding to the insulation class in accordance with NEMA standards for operation in a 40 degree C ambient.

2.03 Construction

- A. Enclosure: Totally enclosed fan cooled (TEFC) unless otherwise noted.

- B. Windings: Copper. Exception: Aluminum windings are acceptable where the aluminum to copper transition is done by the manufacturer with copper leads brought out to the motor conduit box.
- C. Bearings: Minimum 100,000 hours for direct coupled and 40,000 hours for belted applications B-10 life rating per AFBMA standards.
- D. Multispeed Motors: Two-winding type.
- E. Starting: Suitable for full voltage starting.

2.04 Accessories

- A. Provide lifting eyes for 182 and larger frame size. Provide oversized conduit box for 250 and larger frame size.
- B. Where noted provide normally closed thermostat for winding protection.
- C. Where noted provide 120 volt, single phase space heater. Size heater to increase motor temperature approximately 10 degrees C above ambient.
- D. Nameplate: Permanently affixed and stamped so as to permit recovery of the nameplate data in the event the nameplate is painted over.

Part 3 Execution

3.01 Installation

- A. Verify clearances and alignment prior to operation.
- B. Lubricate in accordance with the manufacturer's instructions.
- C. Check rotation and correct as necessary. Make correction to preserve conductor color coding.

END OF SECTION

Part 1 General

1.01 Scope

Control panels.

1.02 Submittals

- A. The Contractor shall furnish the following items from the system manufacturer for approval prior to fabrication:
 - 1. Layout drawings of the front of the panel showing mounting dimensions for all instruments and associated hardware.
 - 2. Assembly drawings shall include:
 - a. Details of panel fabrication including outline dimensions and locations of rear of panel mounted equipment.
 - b. Wiring layout.
 - c. Wiring and tubing interconnection diagrams.
 - 3. Electrical wiring and termination drawings.
 - 4. Complete bill of materials describing all panel components, including manufacturer and complete model number for all components.
 - 5. Catalog cut sheets for all panel components.

1.03 Record Drawings

Submit shop drawings as listed under Article 1.02 above plus operation and maintenance information.

1.04 Delivery, Storage and Handling

- A. Wrap the completed panel in polyethylene plastic and crate in a wooden shipping crate with sufficient packing to avoid damage in shipment.
- B. Support the base of the shipping crate with the cross members of sufficient strength and clearance to allow movement of the entire crated panel by forklift truck.

Part 2 Products

2.01 Enclosure

- A. Provide wall mounted, stanchion mounted, free-standing, or walk-in enclosures as scheduled.
- B. Provide NEMA 4X stainless steel for outdoor locations, .
- C. In all NEMA 4X enclosures, provide a thermostatically controlled space heater and corrosion inhibitor blocks. Provide NEMA 4X rated devices on the front of the enclosure.
- D. Free-standing enclosures shall be at least 20-inches deep.
- E. General Purpose enclosures shall be fabricated from a minimum 14 gauge steel, unless noted otherwise, with all seams ground smooth, all corners rounded, and all flat surfaces smooth with no ripples, dimples, or surface imperfections and no screws, bolts, or nuts visible from outside. Provide panel stiffeners as required to provide a rigid, non-bowing surface. Thoroughly clean and degrease the steel shell before painting. Apply one coat of a rust inhibiting primer and two coats of air dry enamel or acrylic with flattening agent to produce a smooth semi-gloss finish. Colors are to be chosen by the Engineer.
- F. Install a continuous hinged-front access door. For freestanding enclosures, furnish a three point latch. A single point latch is acceptable for wall-mounted enclosures. Wire door-mounted instruments and controls to stationary components with suitable flexible connections and protection where wiring crosses the hinge. Provide double or multiple doors as required for stability and smooth mechanical operation.
- G. Terminate all tubing and electrical connections at the bottom of the panel to bulkhead fittings and terminal strips, with all external connections properly identified for field connections. Space shall be provided at the bottom of the panel for excess wiring to be laid out before landing on the associated field terminal strip. Space shall also be provided at the top and sides of the panel for routing cables entering from the top of the panel.
- H. For panels with 120 VAC power supply, provide appropriately sized circuit breaker, single pole, 22,000 AIC, mounted in the rear of the panel to disconnect power. Mount an engraved nameplate (white letters, red background) to read "WARNING – This panel energized by foreign control power sources. Equipment will be live with panel disconnect in either on or off position".
- I. Internal panel sub-feeds of 120 VAC power shall be divided into separate circuits protected by properly sized circuit breakers or fuses. The following separate circuit divisions shall be provided:
 - 1. Panel light(s) and panel fans (where used).

2. Each receptacle.
 3. Power to the panel UPS (where supplied).
 4. Thermostatically controlled heaters (where supplied).
 5. Each power supply (including 24-volt power supplies, power supplies for PLCs, power supplies for fiber optic transceivers, etc.)
 6. 120-volt power to field mounted instruments (each instrument shall be provided with a separate circuit).
- J. Provide copper ground bus bars in the rear of the panel. All bus bars shall be bonded together. Ground bus shall be capable of accepting System Ground Grid connection and Power System Ground connection.
- K. Provide 20 percent spare, contiguous panel/sub-panel mounting area to accommodate future panel expansion.
- L. The system manufacturer shall investigate the space allocated for control panels on the accompanying Drawings and inform the Engineer of any potential problems.
- M. If indicated in the control panel schedule, control panels shall be provided with a drip shield or heat shield.
1. A 304 stainless steel drip shield shall be provided to prevent ice buildup on the panel door, door hinges, and front of panel-mounted devices. Minimum overhang shall be one inch on the front and side of the panel.
 2. 304 stainless steel heat shields shall be provided to prevent excess heat inside the panel. Shields shall be provided for the top, back, and both sides of the panel. Shields shall be mounted to provide one-inch air space between the shield and the panel. Each shield shall have the same height and width as the panel side being protected.
- N. All indicator lights shall be push-to-test. In cases where it is not practical to use push-to-test indicator lights (Engineer's approval required), a lamp test circuit with a lamp test pushbutton mounted on the front-of-panel shall be provided. Pressing the lamp test pushbutton shall illuminate all indicator lights without interrupting control circuits.
- | | | |
|--------------|-------|----------------------|
| Lamp Colors: | Red | Running, Open |
| | Green | Stopped, Off, Closed |
| | Amber | Alarm |
- O. Provide one 120 VAC duplex receptacle and fluorescent lights as scheduled. Incandescent lights may be used where panel size prohibits the use of fluorescent lights. Provide one standard on/off light switch for the lights. Receptacles and lights shall be provided with a separate circuit breaker and shall be fed from the 120 VAC

power supply to the panel. Receptacles and lights shall be fed from uninterruptible power supplies.

- P. All PLC discrete outputs shall have interposing relays installed in the control panel.
- Q. Where Intrinsic Safety (IS) barriers have been supplied as a means of providing electrical hazardous area protection for the associated field device, all IS barriers and associated IS wiring shall be separated by at least two inches of air space from all regular non-hazardous wiring inside the control panel. Per NEC Article 504-30, grounded metal or other insulated partitions with lesser distance requirements shall be permitted. IS wiring entering the control panel shall be located in dedicated conduits, which also shall be separated from any non-hazardous wiring. IS Barriers shall be located in electrical non-hazardous areas.
- R. Conduits containing IS wiring where entering enclosures containing regular, non-IS wiring shall be externally sealed to prevent transmission of gases from hazardous areas. Conduit installation and sealing is to be provided under Division 16.
- S. All control panels shall be with lockable with either a padlock or a lock installed in the door handle. All padlocks will be furnished by the Owner.
- T. Front of panel devices, such as analog controllers or annunciators, that have rear mounted terminal strips shall be accessible without standing inside the control panel (i.e., they shall be mounted on the panel door or on swing-out panels).

2.02 Wiring

- A. Install a minimum of #16 AWG copper stranded, 600 volt, extra flexible type for all control wiring 50 volts and above, and a minimum of #18 AWG twisted, shielded pair for analog signal conductors. Color code wires as follows:
 - 1. Ground: Green.
 - 2. Neutral: White.
 - 3. Line Conductor (150 volts or less to ground): Black.
 - 4. Control (150 volts AC or less): Red.
 - 5. Control (150 volts DC or less): Blue.
 - 6. Interlock control circuits supplied from external power source: Yellow or pink.
 - 7. Intrinsic Safety Conductors: Light blue.
 - 8. Signal, Shielded and Special Cables: Identify with wire markers.
- B. Mark all wires with approved wire markers at all terminations, per Section 16195. Clearly mark all terminal blocks. Label all devices mounted on the steel sub-panel. All instrument and control devices located inside control panels shall have an

- engraved lamacoid nametag affixed on or near the device and shall bear the tag number and service description. Label all devices mounted on the panel front with engraved lamacoid nameplates. Nameplates shall be three-layer laminated plastic; black letters on a white background. Letter height to be 1/8-inch for individual devices and 1/4-inch for panel designation.
- C. Neatly bundle and secure all wiring with plastic ties. Route back-of-panel wiring in slotted plastic wireways with snap-on covers.
- D. Terminal blocks shall be provided for all field wiring connections to the panel, including shield terminals for shielded cables. Terminal blocks may be mounted horizontally or vertically and shall be easily accessible. Terminal blocks shall be DIN rail mounted, screw clamp, feed-through type with 600 volt minimum rating. A minimum of 20 percent extra terminals shall be provided on the terminal blocks. Each terminal shall be clearly and permanently marked. Provide fused terminal blocks for all 120 VAC discrete inputs and outputs. All terminal blocks shall be suitably sized for #12 AWG stranded wire. All terminal blocks shall be grouped apart, depending upon type of signal per Paragraph E below.
- E. AC or DC power wiring shall not run in any raceway with any type of instrument wiring. Wiring is to be divided into categories and shall be carried in separate raceways. The minimum acceptable groupings are:
1. 120 VAC, 60 Hz AC power wiring and chart drive power wiring.
 2. DC power to electronic instruments (not including loop powered instruments), contact closure input and output wiring.
 3. All wiring carrying pulsed information.
 4. Standard range analog DC signals, thermocouple and up to 200 mV DC signals.
 5. All intrinsic safety (IS) wiring.
- F. It is the responsibility of the system manufacturer to provide appropriate protection against transients and surges for all field wiring, interfacing with the control panels. This protection equipment shall reside in the appropriate control panel. All instrument analog signal wiring, data transmission wiring, and 120 VAC power supply wiring shall be protected against lightning strikes, and other transient surges at all control panel termination points. All control power wiring, AC control power wiring, I/O cabinet discrete input wiring and discrete output wiring which is routed outside of buildings shall be protected against lightning strikes, and other transient surges at all control panel termination points. Lightning and surge devices shall protect the system from induced surges in analog, discrete and control circuitry and power supply lines. The protective devices shall not interfere with the normal operation of the panel hardware and shall be designed not to have a maximum clamping voltage in excess of what the protected device is capable of withstanding. Protection devices for all internally mounted power supplies shall be installed on individual 120 VAC supply wiring. Each surge/lighting protector shall be independently grounded to the panel ground bus. Protector mounting rail shall not be used to ground the protector.

Control Panels

- G. The system manufacturer shall provide required hardware and labor for termination of new signals in existing termination cabinets where required. This hardware and workmanship shall match existing work with respect to method, materials, and workmanship.
- H. Certification: All control panels furnished under this Section shall carry a UL label which certifies the control panel meets the requirements of UL-508A. Panels containing any Intrinsic Safety circuits shall meet the requirements of UL-698A.

2.03 Drawings

A. Panel Construction Drawings

1. Shop Drawings and Catalog Cuts: Provide detailed shop drawings and catalog cuts for all panels, instrument racks, and enclosures. Drawings shall show the location of all front panel and internal sub-panel mounted devices to scale and shall include a panel legend and bill of materials. Layout drawings shall show all major dimensions as well as elevations, in inches from the base up, of all rows of components.
2. The panel legend shall list and identify all front of panel devices by their assigned tag numbers, all nameplate inscriptions, service legends, and annunciator inscriptions. Tag number shall be as listed in the Specifications and Drawings.
3. The bill of materials shall include all devices, including those mounted within the panel that are not listed in the panel legend, and shall include the assigned tag number, description, manufacturer, and complete model number.

B. Panel Wiring Diagram

1. Provide complete terminal identification of all external primary elements, panels, and junction boxes that interface directly to the panel wiring being shown. Polarity of analog signals shall be shown at each terminal.
2. All external wiring that the electrical contractor must provide and install shall be shown as a dashed line. Special cables that are provided with the instrument shall be clearly identified.
3. Panel wiring diagrams shall identify wire numbers and types, terminal numbers, and tag numbers. Wiring diagrams shall show all circuits individually; no common diagrams will be allowed.
4. Provide panel power wiring diagrams for all panels. The diagrams shall include the grounding requirements.

- C. Interconnecting Wiring Diagrams: Diagrams shall show all component and termination cabinet identification numbers and external wire, fiber, and cable numbers. This diagram shall be coordinated with the electrical supplier and shall bear its mark showing that this has been done.

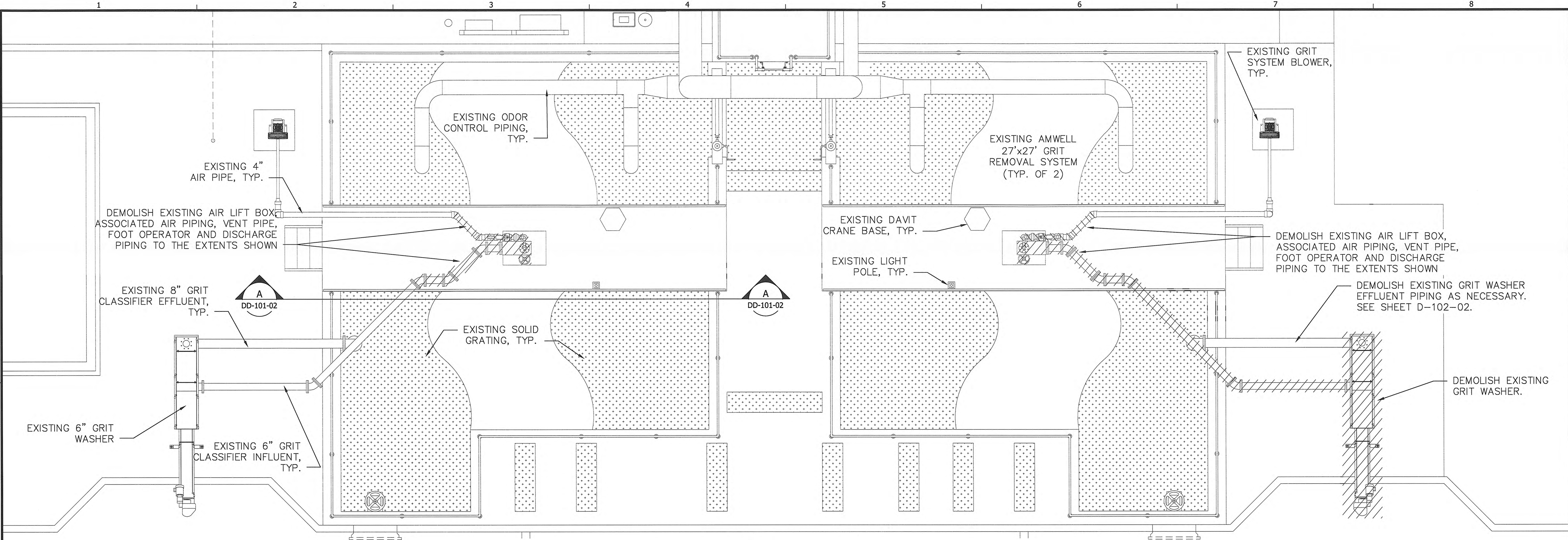
Part 3 Execution

3.01 Testing and Calibration

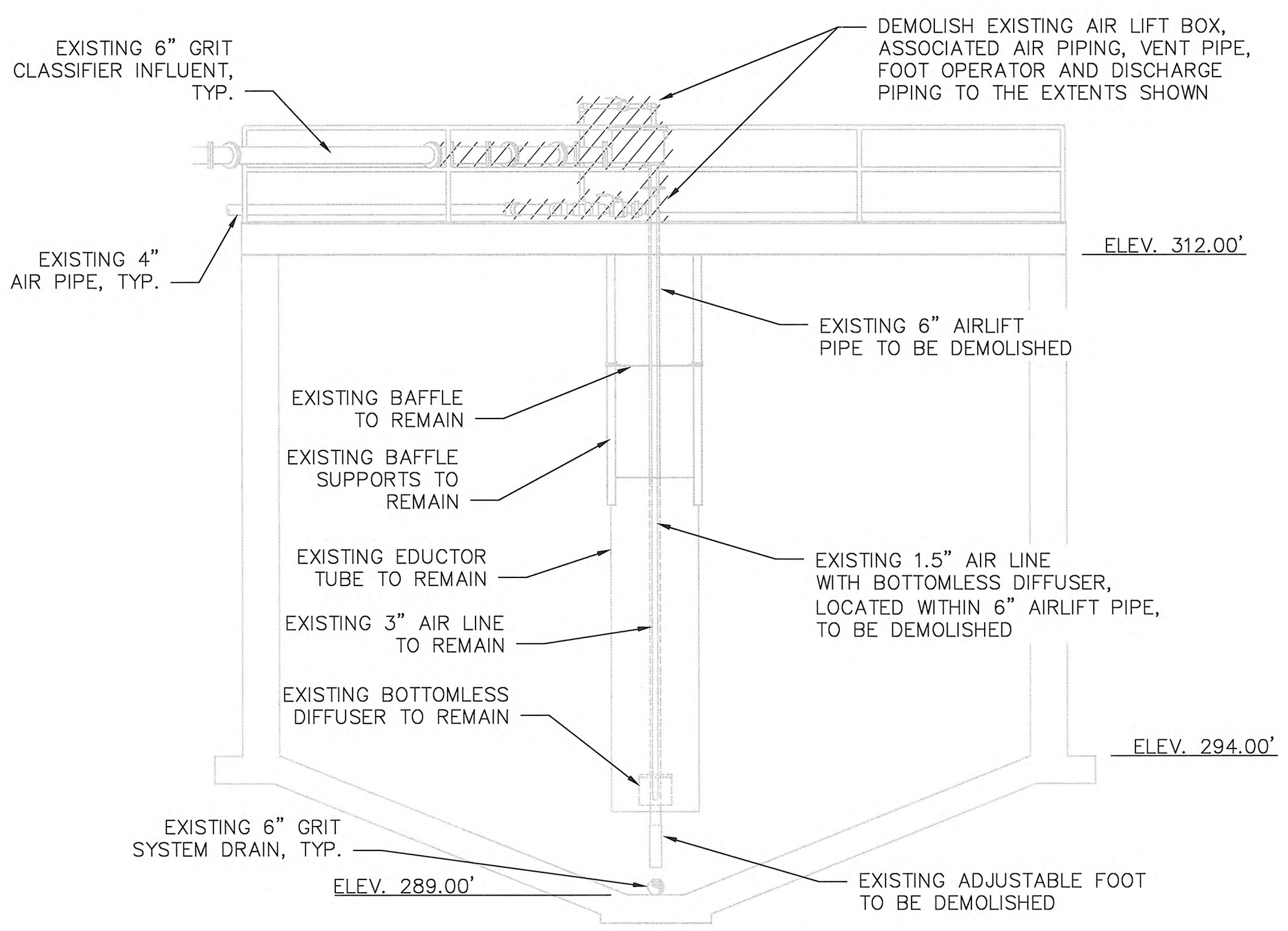
- A. Thoroughly shop test the completed panel. Confirm that all lamps burn. Remove, box, and label all parts that may come loose or detached in shipment, so that after installation they may be easily replaced.
- B. Perform preliminary calibrations in the fabricator's shop, and final calibrations at start-up by qualified personnel.

END OF SECTION

CREATED: 7/15/2011 LAST SAVED: 7/25/2011 BY: DAN WILLIAMS PLOT DATE: 7/25/2011

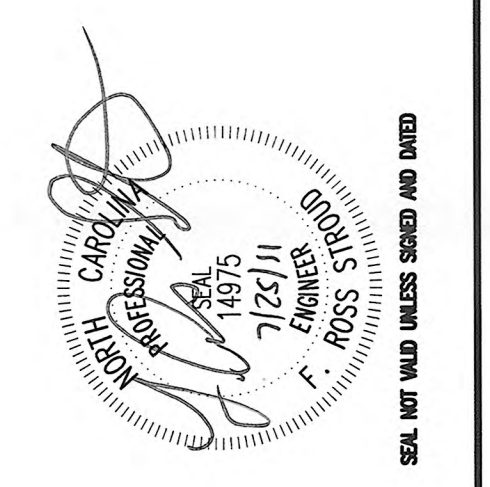


PLAN
Scale: 1/4" = 1'-0"



A SECTION, TYP.
Scale: 1/4" = 1'-0"

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**SOUTH CARY WATER RECLAMATION FACILITY
HEADWORKS UPGRADES
TOC PROJECT NUMBER 1217**

**TOWN OF CARY
NORTH CAROLINA**

REV	DATE	REVISION DESCRIPTION
0	07-25-2011	ISSUED FOR CONSTRUCTION
A	08-27-2011	ISSUED FOR OWNERS REVIEW

THIS LINE IS ONE INCH LONG WHEN PLOTTED FULL SCALE
THIS DRAWING MUST BE USED IN CONJUNCTION WITH THE APPLICABLE OR GOVERNING TECHNICAL SPECIFICATIONS AND OTHER CONTRACT DOCUMENTS.

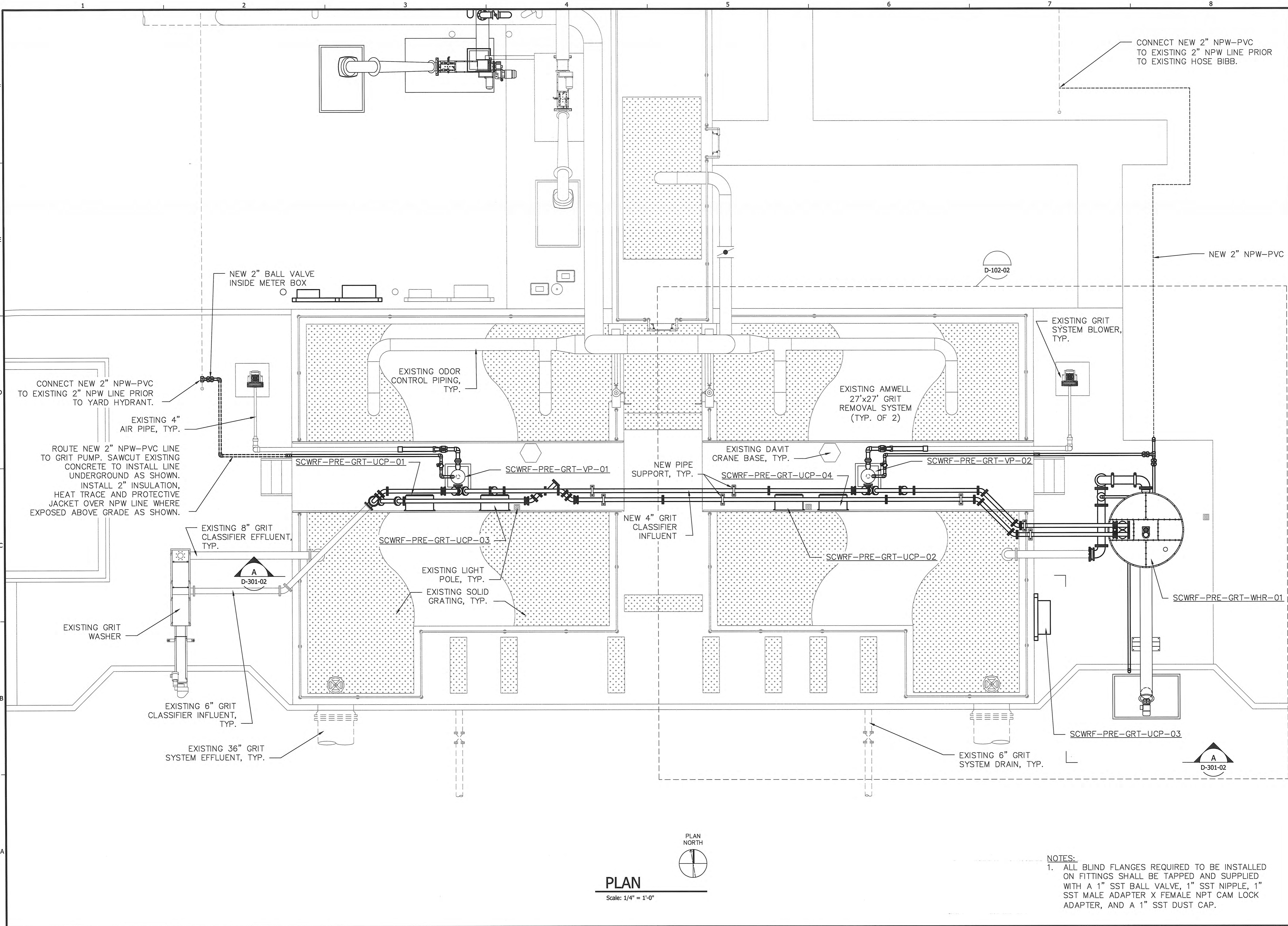
PROJECT NO: E3X1000
DATE: JUNE 2011
DISC. LEAD: FRS DESIGNER: DCW CHECKER:

SHEET TITLE
PROCESS

**HEADWORKS - GRIT SYSTEM
DEMOLITION PLAN & SECTION**

SHEET DD-101-02

CREATED: 7/15/2011 LAST SAVED: 7/25/2011 BY: DAN WILLIAMS PLOT DATE: 7/25/2011



PLAN
Scale: 1/4" = 1'-0"



- NOTES:**
- ALL BLIND FLANGES REQUIRED TO BE INSTALLED ON FITTINGS SHALL BE TAPPED AND SUPPLIED WITH A 1" SST BALL VALVE, 1" SST NIPPLE, 1" SST MALE ADAPTER X FEMALE NPT CAM LOCK ADAPTER, AND A 1" SST DUST CAP.

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Cary, NC 27518 | 919.689.5000

Professional Engineer Seal for Dan Williams, License No. 72715, State of North Carolina. Includes the text 'SEAL NOT VALID UNLESS SIGNED AND DATED'.

**SOUTH CARY WATER RECLAMATION FACILITY
HEADWORKS UPGRADES
TOC PROJECT NUMBER 1217**

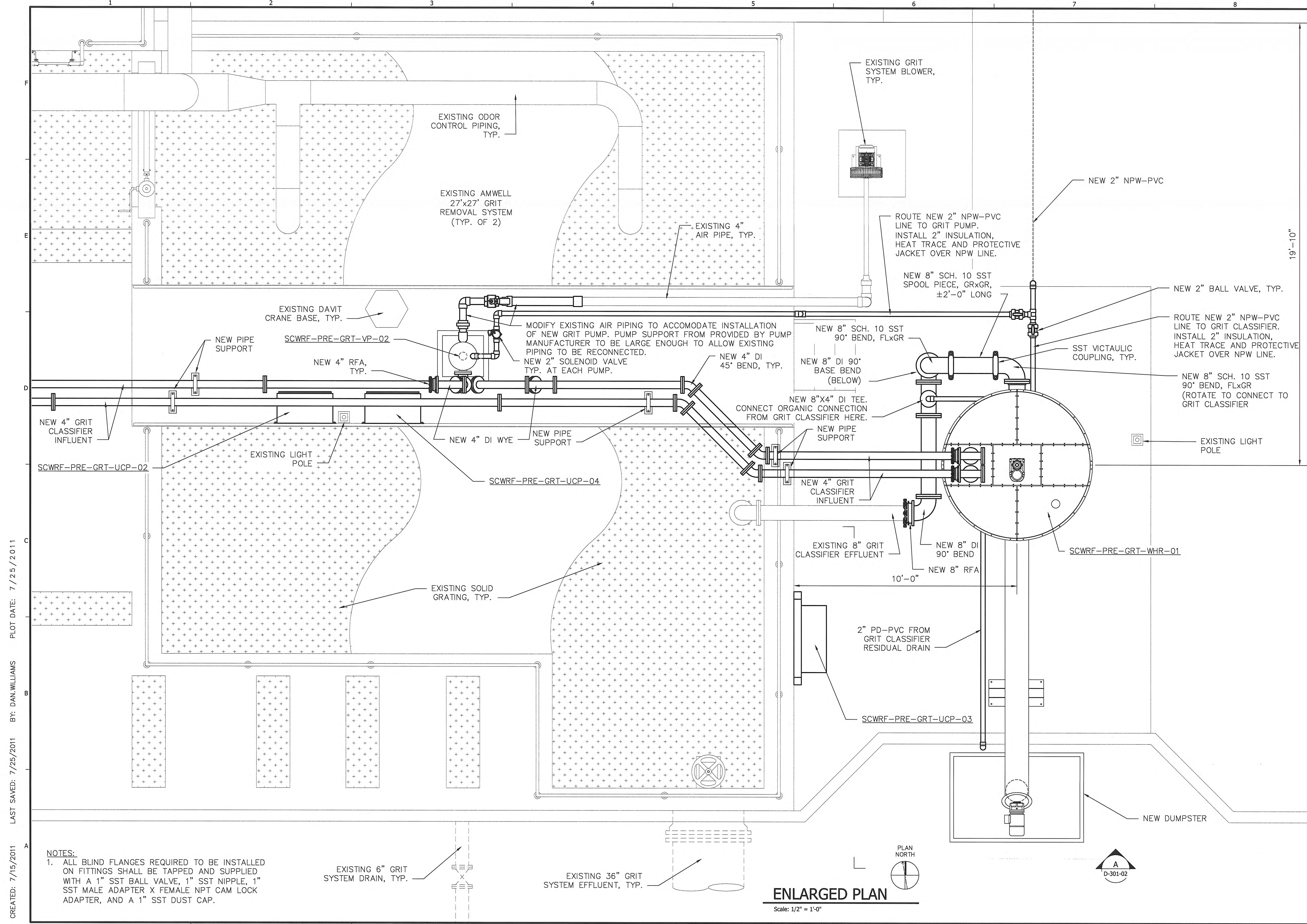
TOWN OF CARY
NORTH CAROLINA

REV	DATE	REVISION DESCRIPTION
0	07-25-2011	ISSUED FOR CONSTRUCTION
A	06-27-2011	ISSUED FOR OWNERS REVIEW

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PROJECT NO: E1XJ1000
DATE: JUNE 2011
DISC. LEAD: FRG DESIGNER: DCW CHECKER:

SHEET TITLE
PROCESS
HEADWORKS - GRIT SYSTEM PLAN

SHEET **D-101-02**

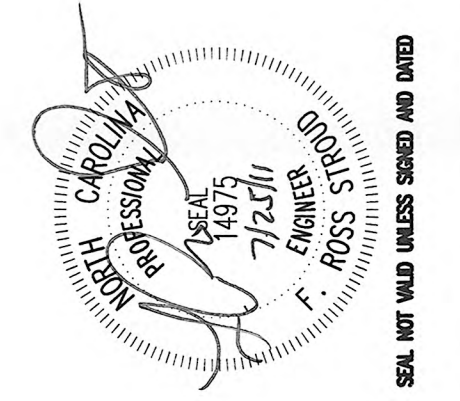


NOTES:
 1. ALL BLIND FLANGES REQUIRED TO BE INSTALLED ON FITTINGS SHALL BE TAPPED AND SUPPLIED WITH A 1" SST BALL VALVE, 1" SST NIPPLE, 1" SST MALE ADAPTER X FEMALE NPT CAM LOCK ADAPTER, AND A 1" SST DUST CAP.

EXISTING 6" GRIT SYSTEM DRAIN, TYP.
 EXISTING 36" GRIT SYSTEM EFFLUENT, TYP.

ENLARGED PLAN
 Scale: 1/2" = 1'-0"

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**SOUTH CARY WATER RECLAMATION FACILITY
 HEADWORKS UPGRADES
 TOC PROJECT NUMBER 1217**

**TOWN OF CAROLINA
 NORTH CAROLINA**

REV	DATE	REVISION DESCRIPTION
0	07-25-2011	ISSUED FOR CONSTRUCTION
A	06-27-2011	ISSUED FOR OWNER'S REVIEW

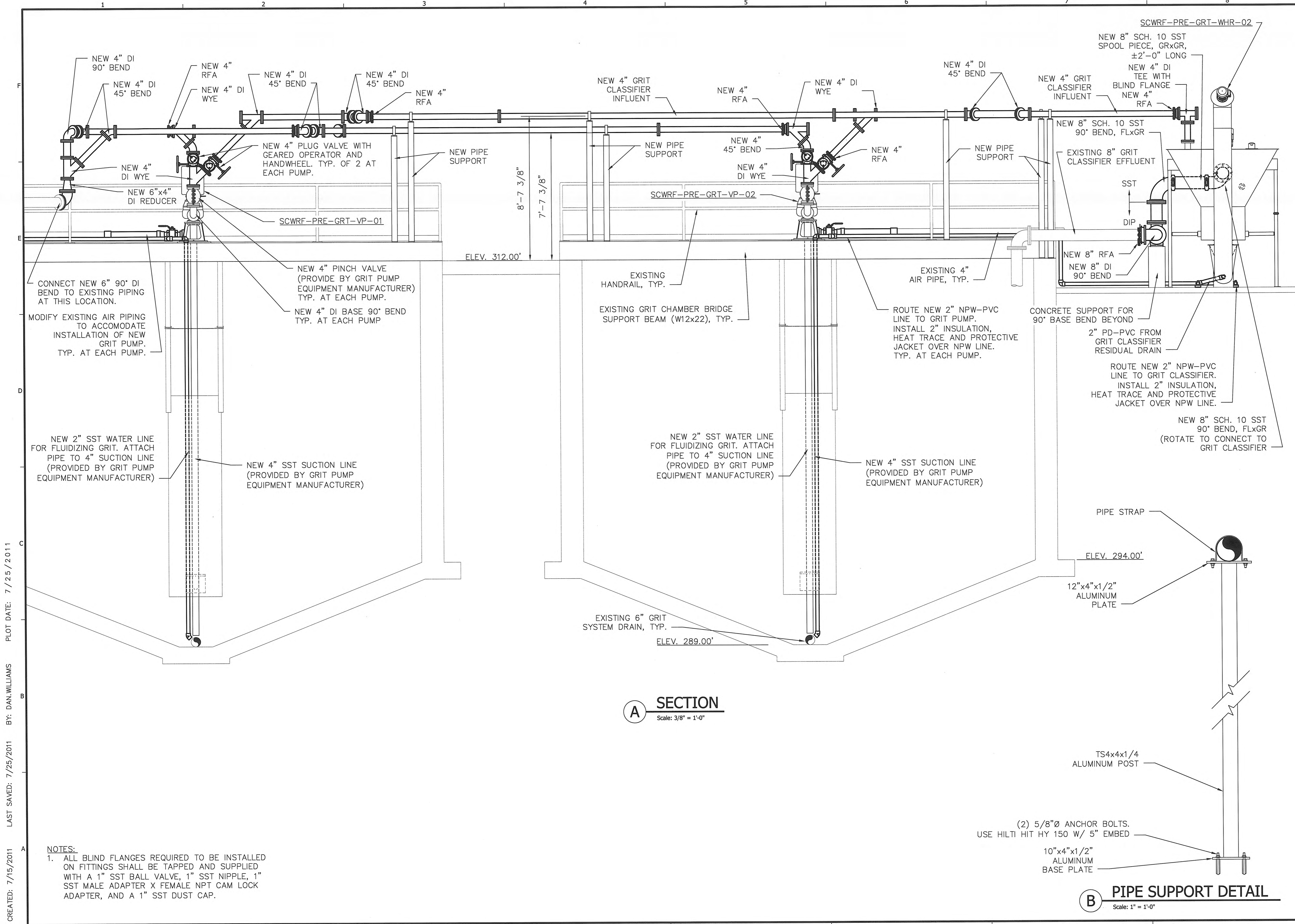
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 THIS DRAWING MUST BE USED IN CONJUNCTION WITH THE APPLICABLE OR GOVERNING TECHNICAL SPECIFICATIONS AND OTHER CONTRACT DOCUMENTS.

PROJECT NO: EJK1000
 DATE: JUNE 2011
 DISC. LEAD: FRS DESIGNER: DCW CHECKER:

SHEET TITLE: **PROCESS**

**HEADWORKS - GRIT SYSTEM
 ENLARGED PLAN**

SHEET: **D-102-02**



A SECTION
Scale: 3/8" = 1'-0"

B PIPE SUPPORT DETAIL
Scale: 1" = 1'-0"

NOTES:
1. ALL BLIND FLANGES REQUIRED TO BE INSTALLED ON FITTINGS SHALL BE TAPPED AND SUPPLIED WITH A 1" SST BALL VALVE, 1" SST NIPPLE, 1" SST MALE ADAPTER X FEMALE NPT CAM LOCK ADAPTER, AND A 1" SST DUST CAP.

(2) 5/8"Ø ANCHOR BOLTS.
USE HILTI HIT HY 150 W/ 5" EMBED
10"x4"x1/2"
ALUMINUM
BASE PLATE



**SOUTH CARY WATER RECLAMATION FACILITY
HEADWORKS UPGRADES
TOC PROJECT NUMBER 1217**

**TOWN OF CARY
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A	06-27-2011	ISSUED FOR OWNERS REVIEW

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PROJECT NO: EJX1000
DATE: JUNE 2011
DISC. LEAD: FRS
DESIGNER: DCW
CHECKER:
SHEET TITLE: PROCESS

HEADWORKS - GRIT SYSTEM SECTIONS

SHEET: D-301-02

CREATED: 7/15/2011
LAST SAVED: 7/25/2011
BY: DAN WILLIAMS
PLOT DATE: 7/25/2011