

**SAND SHARK VORTEX GRIT REMOVAL SYSTEM
FIRM PRICING PACKAGE**

GEORGETOWN, SOUTH CAROLINA



ORIGINAL EQUIPMENT MANUFACTURED BY



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**SAND SHARK VORTEX GRIT REMOVAL SYSTEM
FIRM PRICING INDEX**

File Name: Georgetown, SC

- 1) Scope of Work
- 2) Recommended Technical Specifications
- 3) Grit Trap Equipment Sizing



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Represented Locally By:

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Number: (803) 606-6282

July 27, 2023

Ref: City of Georgetown, South Carolina
Water Utilities Department
Grit Trap Retrofit
Specification: Vortex Grit Removal System Technical Specifications

Hydro-Dyne Engineering Scope of Work 4285-5

Hydro-Dyne Engineering is pleased to offer this Scope of Work for the equipment detailed below in accordance to the specifications stated below and the attached Hydro-Dyne Engineering Terms and Conditions. Where clarifications to the specifications are necessary, they will be listed below.

Hydro-Dyne Specification Section	Headworks Screen Description	Quantity
2.2	Vortex Grit Trap	2
2.3	Main Control Panel	1
2.5	Accessories	2 lots

FREIGHT

F.O.B Destination with freight costs included.

NOT INCLUDED

This scope of work is limited to the specification sections and addenda referenced above. Any other documents are not included. Concrete work, installation, plumbing, wiring connections, valves, strainers, level sensor mounts, bonds, liquidated damages, engineering certifications or seals, including seismic/wind calculations and related PE stamps, and anything else not specifically detailed as included by the manufacturer in the specification above will be construed as NOT INCLUDED, whether or not inclusion is specifically acknowledged.

COMPLIANCE WITH BIPARTISAN INFRASTRUCTURE LAW (BIL Public Law 117-58) and BUILD AMERICA, BUY AMERICA ACT (BABA)

Equipment supplied in this Scope of Work will comply with the Bipartisan Infrastructure Law’s (BIL) Build America, Buy America (BABA) requirements for manufactured products. As defined in the Law, this means:

- (i) the manufactured product was manufactured in the United States, and*
- (ii) the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product.*

VORTEX GRIT REMOVAL SYSTEM TECHNICAL SPECIFICATIONS

Part 1 GENERAL

1.1 SCOPE – Supply all labor, materials, equipment and incidentals required to install and place into operation the grit trap system as shown on the Drawings and as specified herein.

1.2 REFERENCE STANDARDS – The properties of all materials, design, fabrication and performance of the equipment to be furnished under this section shall be in accordance with the latest issue of applicable standard specifications. The governing authorities of these standards are listed below.

- A. AICS, American Institute of Steel Construction
- B. AISI American Iron and Steel Institute
- C. ANSI, American National Standards Institute
- D. ASCE, American Society of Civil Engineers
- E. ASME, American Society of Mechanical Engineers
- F. ASTM, American Society of Testing and Materials
- G. AWS, American Welding Society
- H. IBC, International Building Code
- I. IEC, International Electric Code
- J. IEEE, Institute of Electrical and Electronics Engineers
- K. NEC, National Electrical Code
- L. NEMA, National Electrical Manufacturers Association
- M. Underwriters Laboratory (UL and cUL)

1.3 SUBMITTALS – Submittals shall be provided to the engineer that includes all the following information:

- A. Certified shop drawings showing all important details of construction, dimensions and anchor bolt locations.
- B. Descriptive product literature.
- C. Schematic electrical wiring diagram and electrical controls information.
- D. Complete motor and drive data.
- E. The total weight of the equipment.
- F. A complete bill of materials of all equipment.
- G. A valid certificate of registration naming manufacturer, and supplier if equipment is relabeled, as ISO 9001:2015 certified.

1.4 QUALIFICATIONS

- A. All the equipment specified under this Section shall be supplied by a single manufacturer whose Quality Management System is ISO 9001:2015 certified and applicable to the manufacture of water and wastewater treatment equipment.
- B. If equipment is not manufactured by supplier, including welding and machining, the name and contact information of manufacturing facility must be supplied. If more than one manufacturer is used all companies and facilities must be provided.
- C. If patents protecting equipment are not owned by supplier then an affidavit must be supplied stating owner of design and expiration of licensing agreement.

- D. All equipment specified under this Section shall comply Bipartisan Infrastructure Law's (BIL Public Law 117-58) Build America, Buy America (BABA) requirements for manufactured products. As defined in the Law, this requires:
- (i) the manufactured product was manufactured in the United States, and
 - (ii) the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product.
- Certifications attesting to compliance will be required prior to approval and shall be included with submittals and upon completion of manufacture.

1.5 DESIGN REQUIREMENTS – VORTEX COLLECTOR

A. System Description

1. The Grit Trap will be a “vortex” style system designed to operate continuously.
2. The internal rotating mechanism will be installed into the circular concrete chamber as shown on the contract drawings. The chamber will consist of an upper separation chamber and a lower collection hopper.
3. The wastewater flow will enter the chamber tangentially, flow around the upper separation chamber and exit via an outlet channel running parallel to the inlet.
4. The grit solids will fall through the upper separation chamber to settle in the lower collection hopper. The transfer grit pump will regularly cycle and transport the grit particles to the de-watering Grit Classifier (by others).
5. Consistent performance of the grit chamber throughout the flow ranges will be maintained by the motor driven impeller that continuously rotates within the upper separation chamber. The device will provide the ideal conditions to enhance grit settlement and maximize the ejection of light organic solids from the chamber.
6. The floor of the upper separation chamber must be sloped as shown on the contract drawings to prevent grit accumulation and allow the grit to fall by gravity into the collection hopper.
7. All stainless steel (including drive tube, impeller and hardware) mentioned below as stainless steel shall be T304 stainless steel. All hardware shall be T316 stainless steel.

B. System Performance

1. The Grit Trap will be designed to meet the following grit removal performance guarantee at all flows up to and including the peak flow. Grit is defined as silica sand; specific gravity = 2.65 g/cc:

a. Grit greater than 50 mesh	100%
b. Grit greater than 70 mesh but not less than 50 mesh	100%
c. Grit greater than 100 mesh but not less than 70 mesh	100%
2. The Grit Trap model will be selected to meet the following design parameters:

- | | |
|---|---------------|
| a. Number of chambers required | 2 |
| b. Max Peak flow per chamber | 12.0 MGD |
| c. Maximum allowable head loss at peak flow | ¼ inches |
| d. Grit fluidizing water requirements | 20gpm @ 40PSI |

Part 2 PRODUCTS

2.1 MANUFACTURER

- A. The equipment shall be the Grit Trap as provided by Hydro-Dyne Engineering, Inc., Clearwater, FL. The grit pump shall be Gorman Rupp, by others. Other than the named supplier, all manufacturers proposing equipment described herein, will provide a detailed submittal package, which will consist, at a minimum, of all information and details prescribed in section 2.2 of this specification. All pre-qualification submittals will be submitted to the Engineer at least 15 days prior to the bid date.
- B. If submitted equipment requires arrangement differing from that specified, prepare and submit for review complete structural, mechanical, and electrical drawings and equipment lists showing all necessary changes and embodying all special features of equipment proposed. Any changes are at no additional compensation and the Manufacturer will be responsible for all engineering costs of redesign by the Engineer, if necessary.

2.2 THE VORTEX GRIT TRAP

A. General

1. The internal mechanism of the Grit Trap will consist of a helical gear motor, a drive head, a drive tube and a rotating impeller.
2. The grit chamber shall be a concrete structure provided by the contractor that must have inlet and outlet channels as shown on the drawings.

B. The Drive Head Assembly

1. The drive head will be a composite unit consisting of a heavy duty steel base and cover. The base section will support a nominal 20 inch turntable bearing that has a minimum B-10 life of 20 years. The Contractor will be responsible for correctly mounting the drive head on the bridge.
2. The support bridge will consist of galvanized support beams that will span the grit chamber to provide a 36" wide walk way and support the drive head and rotating mechanism. The contractor will supply flooring and hand rails as per the drawings.
3. The drive tube will be rotated at a nominal 15 RPM by a heavy duty spur tooth bull gear wheel securely bolted to the turntable bearing. This bull gear wheel will be driven by a steel drive pinion mounted on the output shaft of the helical gear motor. The helical gear motor will be supported by a cover that will have an access port to allow the contractor to check that the gear wheel and pinion are centered correctly. The pinion and the bull gear will have a service factor of 5.0 or greater at standard operating speeds.

4. The helical gear motor will be directly shaft mounted to the bull gear wheel. Each drive head will have a single 3/4 hp, continuous duty electric motor suitable for a 460/3/60 supply and rated for a Class 1 Div.2 environment. As a minimum, the motor will be TEFC with an IP55 enclosure rating and will conform to NEMA MG-1 requirements.
5. The whole drive head assembly will be suitable for continuous operation.

C. The Rotating Mechanism

1. The drive tube will be 10.75 inch diameter pipe that will run down the center of the grit chamber. The drive tube will pass through an opening in bull gear wheel and terminate inside the drive head as an open pipe. This will allow passage for the suction pipe assembly detailed in 2.3 B1.
2. The impeller will be attached to the drive tube by means of a two piece collar. The impeller shall have four equally spaced blades fixed to a base plate. As the impeller rotates each blade will pass within 6 inches from the top of the collection hopper. The impeller blades will be set at 5 to 20 degrees to the vertical. The profile of the impeller blades will be designed to maximize grit capture and eject floating solids out of the chamber. The impeller will rotate at a nominal 15 RPM in the direction to the waste water flow.
3. The rotating mechanism will be manufactured from stainless steel.

2.3 THE CONTROL PANEL

- A. General Information - The manufacturer will supply one UL listed 508A stainless steel main control panel that shall automatically control the equipment offered in this section.
- B. The Main Control Panel – NEMA 4X – Control panel shall consist of the following components for each grit removal system:
 - 1 Enclosure, NEMA 4X, 304SS wall mount, enclosure
 - 1 Main circuit breaker with disconnect handle.
 - 1 Surge suppressor, 480VAC, 3-Phase
 - 1 Surge suppressor, 120VAC
 - 1 Control power transformer
 - 2 Schneider, IEC, non-reversing, 480VAC 5 HP starter with breaker protection.
(GRIT PUMPS)
 - 2 Schneider, IEC, non-reversing, 480VAC 1 HP starter with breaker protection.
(GRIT IMPELLERS)
 - 1 Schneider, IEC, non-reversing, 480VAC 1 HP starter with breaker protection.
(GRIT CLASSIFIER)
 - 1 Schneider, Programmable relay with required I/O's
 - 3 Hour meter
 - 1 Panel heater
 - 1 Cooling fan
 - LOT of pilot lights as required
 - LOT of control relays, terminal blocks, fuse blocks, wire duct, supplementary circuit protection, UL label

C. Sequence of operation and control:

1. The Grit Trap will run continuously.
2. The grit pump can be controlled manually but will normally operate automatically in timed on/off adjustable cycles as selected.
3. In automatic mode the grit pump cycle will be initiated by a 24 hour time clock.
4. The grit agitation cycle will start (0-5 minutes) and then stops.
5. The grit pump and screw classifier will then start immediately (0-10 minutes).
6. The signal is received to stop and the grit pump stops immediately.
7. The Screw Classifier initiates a run on cycle (0-5 minutes) and then stops.
8. End of cycle.

2.4 SURFACE PREPARATION AND PAINTING

- A. The majority of stainless steel materials, flanges and piping shall be pickled by means of a four tank system that is in accordance with ASTMs A380. This process is for quality control, removal of heat affected discoloration, surface treatment for corrosive environments and to provide a uniform finish to the stainless steel surfaces. Stainless steel components must be fully submerged in the tanks for complete coverage. Electro-chemical wanding is acceptable on weld finishes that cannot be submerged due to size. Sandblasting, pickling pastes and abrasive cleaners will not be accepted as forms of metal finishing.

Tank 1 – Detergent bath for the removal of soils, greases, oils and dirt

Tank 2 – Rinsing process to remove detergent and residual soils

Tank 3 – Two part acid solution for the removal of tightly adhere oxide films

Tank 4 – Final rinse process to remove all residual acid

- B. All ferrous surfaces (except stainless steel) shall be coated with a pre-primer, primer, and an exterior top coating, or fusion bonded polyester coating suitable for humid/wet environments for superior corrosion protection.
- C. Motor(s) and gearbox(s) shall be surface prepared to withstand humid/wet environments for superior corrosion protection.

2.5 ACCESSORIES – The manufacturer will supply the following accessories with the equipment, per grit tank system:

- A. One (1) 1” brass body solenoid valve (GT Fluidizing)
- B. Two (2) 1” manual isolation valve (GT Fluidizing)

Part 3 EXECUTIONS

- 3.1 WARRANTY** – The Manufacturer of the equipment supplied under this specification shall provide a warranty for a period of twelve months commencing on acceptance and/or beneficial occupancy by the Owner but no later than 90 days from the date of shipment by the Manufacturer. The Manufacturer shall guarantee that the equipment furnished is suitable for the purpose intended and free from defects in design, materials and workmanship. In the event that the equipment fails to perform as specified the Manufacturer shall, at his option, promptly repair, modify or replace the defective equipment.

3.2 FACTORY TESTING

- A. The grit removal system and all components shall be factory assembled and operationally tested prior to shipment. The equipment shall be shipped fully assembled and shall be capable of being set in place and field erected by the Contractor with minimal field assembly.
- B. During the factory test period the grit removal system shall be adjusted as required assuring proper operation on completion of the field installation. The Manufacturer shall supply a certification of the completion of the factory testing of the assembled system and appurtenances and shall certify as to the equipment being in satisfactory operating condition at time of shipment. The Engineer and/or Owner may, at their own option and expense, witness the factory test.

3.3 DELIVERY AND STORAGE

- A. The grit removal system shall be appropriately crated and delivered to protect against damage during shipment.
- B. An authorized representative of the Contractor shall inspect the equipment on delivery to the jobsite and shall report any damage or missing components to the Manufacturer and the Engineer within 72 hours of receipt of the shipment.

3.4 INSTALLATION – The installation of the grit removal system shall be as indicated on the drawings and in strict accordance with the Manufacturer's instructions and recommendations.

3.5 FIELD TESTS, ADJUSTMENTS AND COMMISSIONING

- A. The equipment shall be shipped completely factory assembled. Contractor shall verify all access dimensions, channel dimensions, and any interior building dimensions to ensure equipment may be installed as a factory assembled units.
- B. After completion of the installation, the equipment shall be inspected and certified by an authorized representative of the Manufacturer as being in compliance with the Manufacturer's recommendations and requirements. At such time as the Manufacturer has deemed the installation to be acceptable, the Manufacturer's authorized service representative shall make any required adjustments and shall start the equipment to assure proper operation.
- C. The Manufacturer's authorized representative shall provide instruction to the plant personnel as to the operation and maintenance of the equipment including commissioning, shut down, on-line operations, lubrication and preventative maintenance.
- D. Manufacturer shall state field service rates for a Service Engineer to Owner and Contractor. In the event that the field service time required by this section should not be sufficient to properly place the equipment into operation, and the requirement for additional time is beyond the manufacturer's responsibility, additional time shall be purchased by Contractor to correct deficiencies in installation, equipment, or material without additional cost to Owner.

- A. The Contractor shall include in his bid, the cost of the above referenced authorized service representative for a one (1) trip and two (2) eight-hour days onsite to complete the certifications and training described in this specification section.

End of Section

Sand Shark Grit Trap Equipment Sizing



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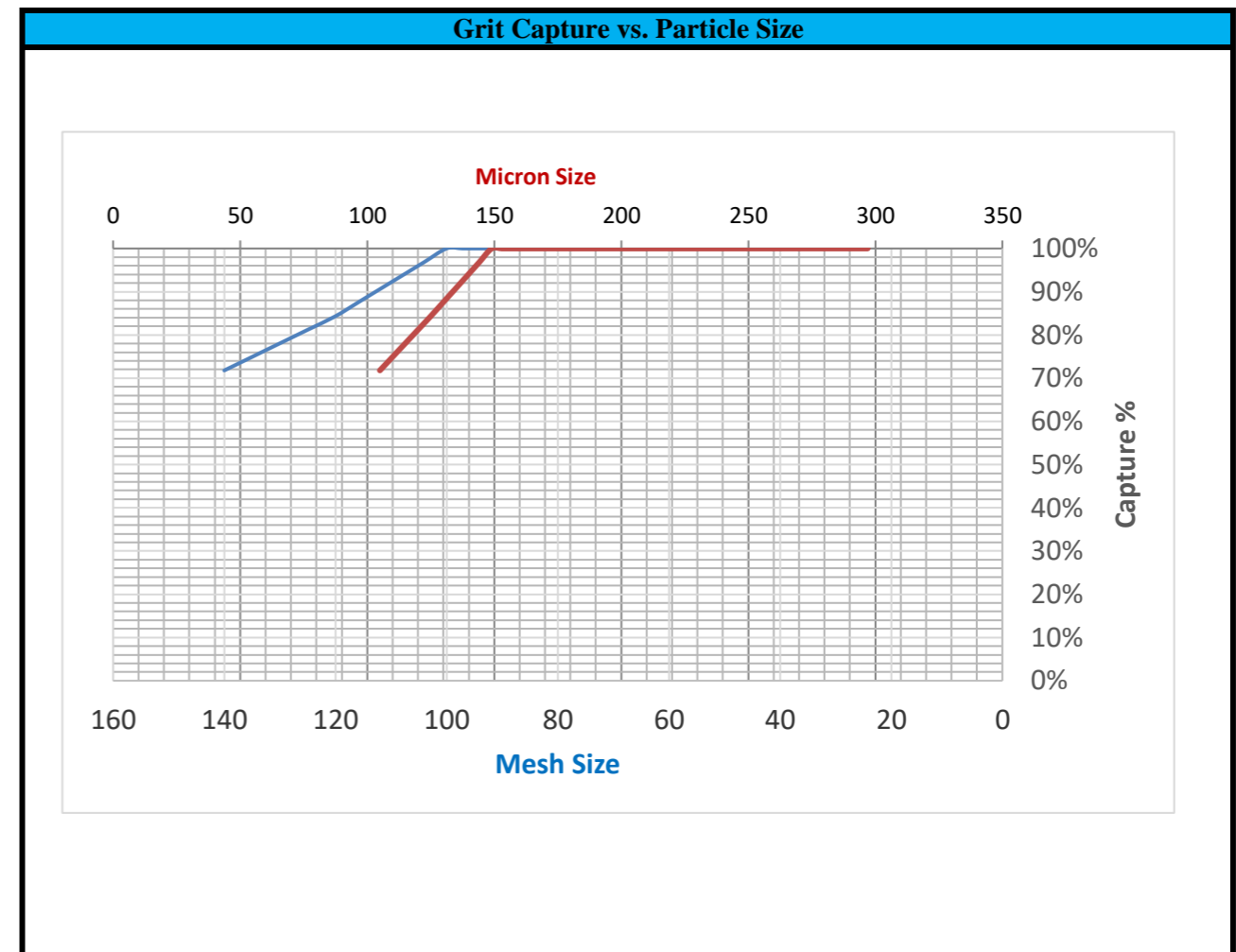
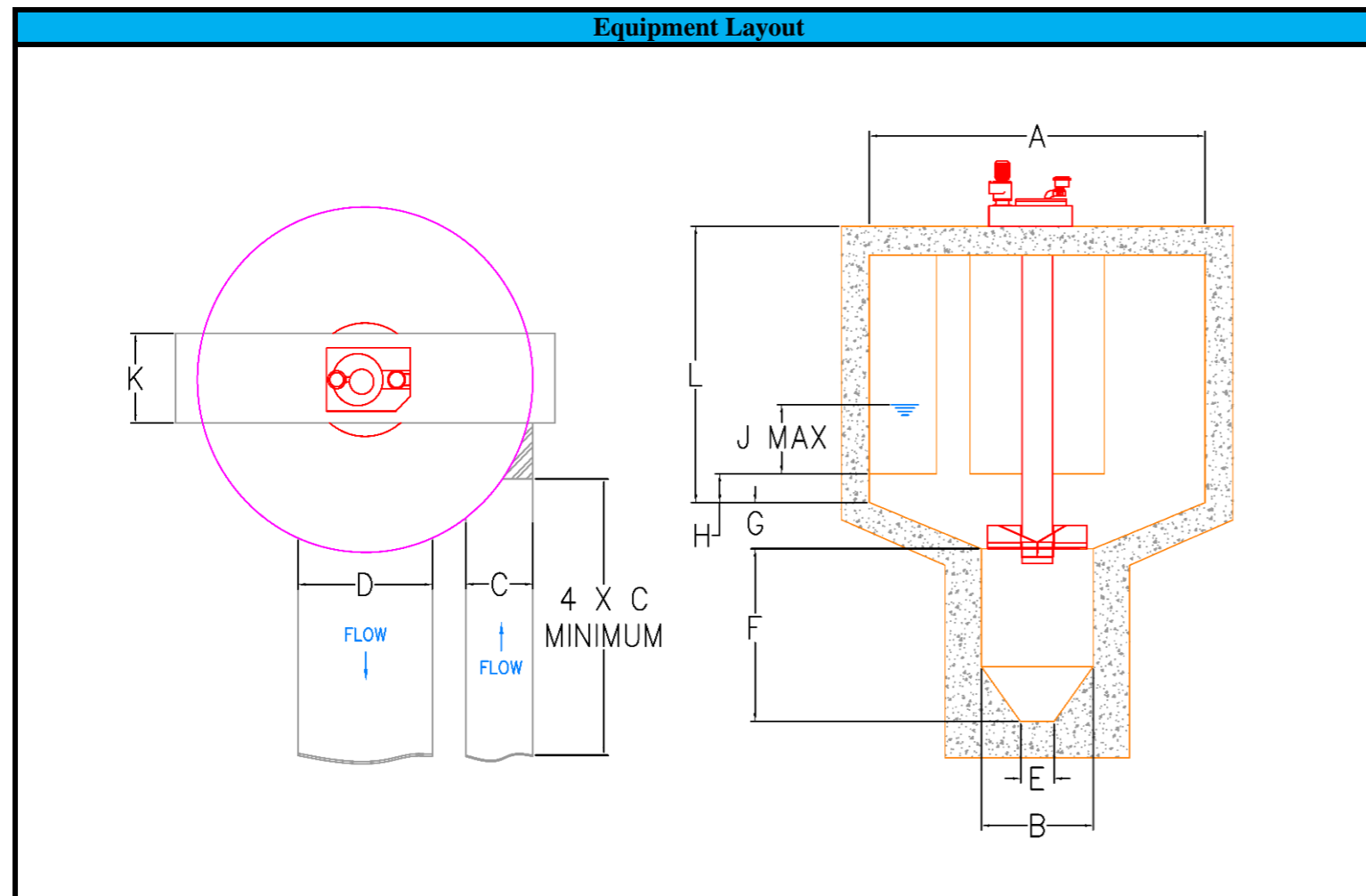
Project: Georgetown, SC - WWTP
 Date: 1/3/2023
 Rep: Tencarva
 By: RH Checked: _____

Model#	GT - T - 59 95	Upstream Channel Velocity:	2.97 ft/s	0.97 m/s
		Specific Gravity:	2.65	

		Equipment Dimensions							
		A	B	C	D	E	F	G	H
inches		144.0	59.0	30.0	60.0	16.0	67.0	24.0	22.0
mm		3658	1499	762	1524	406	1702	610	559

Channel Dimensions		
J	K	L
36.2	32.0	67.0
919	813	1702

Operating Conditions					
Weir Height	1.4 feet	17 inches	Flow Rate:	12 MGD	526 L/s
Cut Size (X₅₀)	50 mesh	297 microns	Projected Efficiency:	100%	
Cut Size (X₇₀)	70 mesh	210 microns	Projected Efficiency:	100%	
Cut Size (X₁₀₀)	100 mesh	149 microns	Projected Efficiency:	100%	



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Sand Shark Grit Trap Equipment Sizing



Tel: 813-818-0777 Fax: 813-818-0770

Project: Georgetown, SC - WWTP

Date: 1/3/2023

Rep: Tencarva

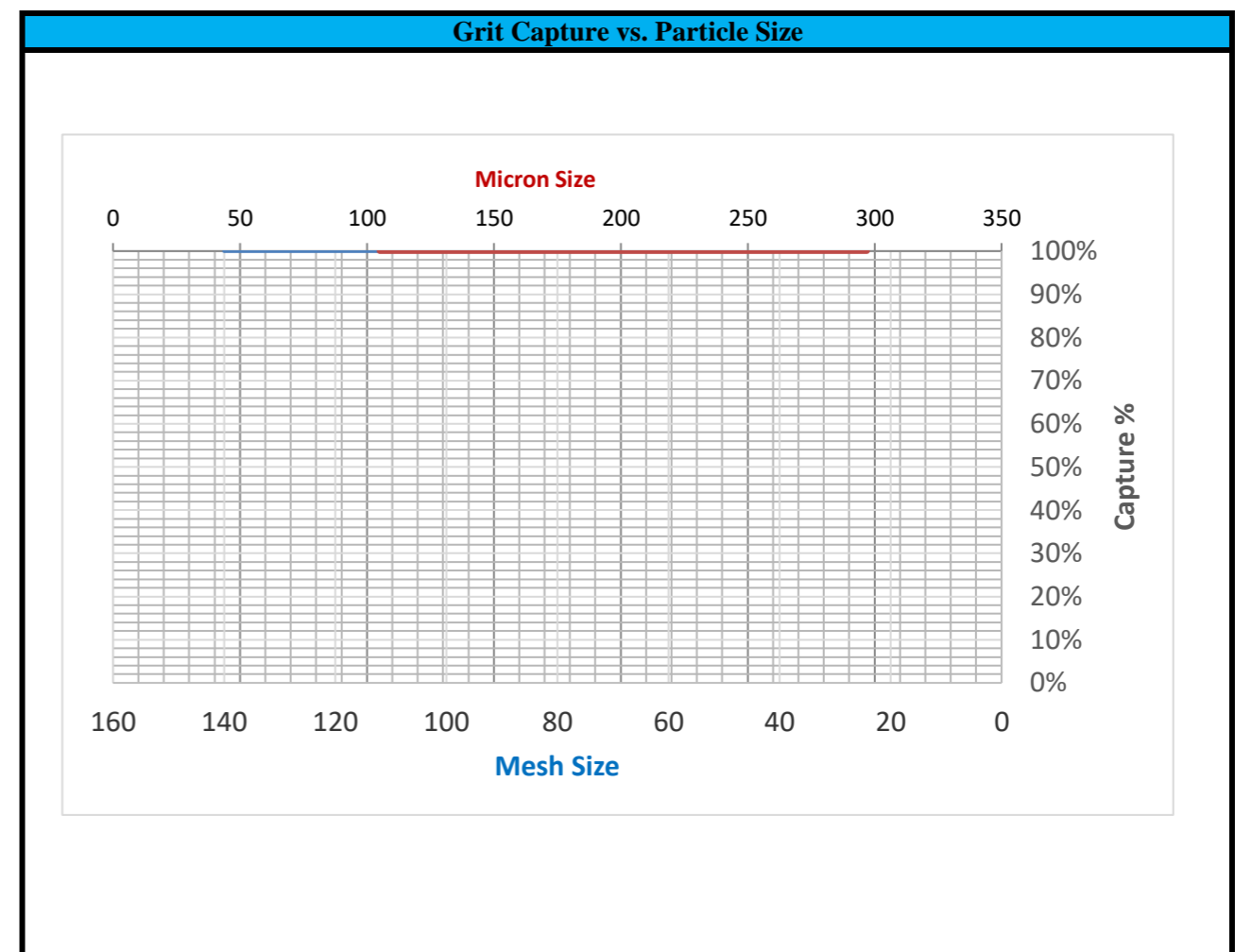
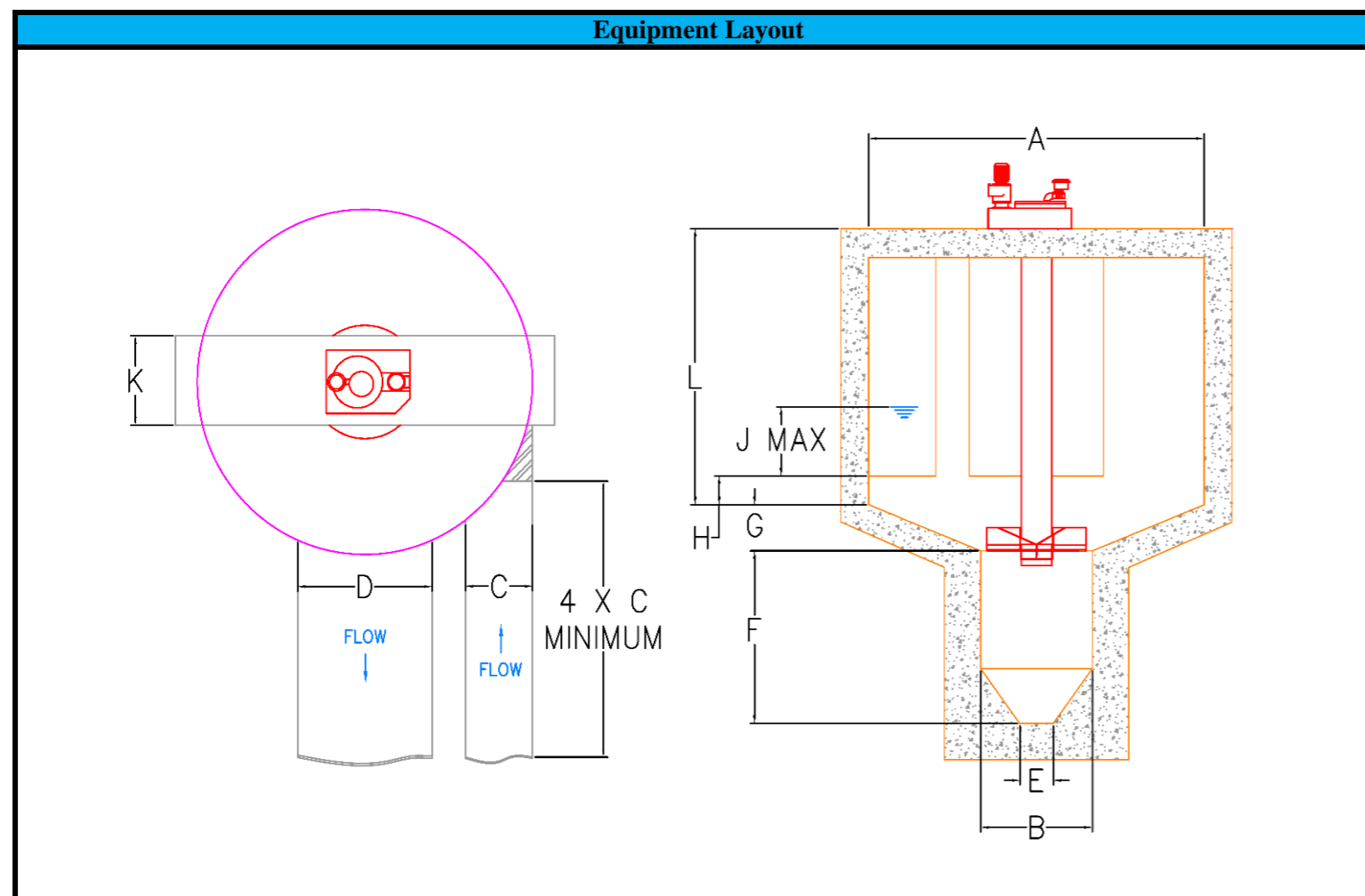
By: RH Checked: _____

Model#	GT - T - 59 95	Upstream Channel Velocity:	2.12 ft/s	0.70 m/s
		Specific Gravity:	2.65	

		Equipment Dimensions							
		A	B	C	D	E	F	G	H
inches		144.0	59.0	30.0	60.0	16.0	67.0	24.0	22.0
mm		3658	1499	762	1524	406	1702	610	559

Channel Dimensions		
J	K	L
36.2	32.0	67.0
919	813	1702

Operating Conditions				
Weir Height	0.6 feet	8 inches	Flow Rate:	4 MGD 175 L/s
Cut Size (X₅₀)	50 mesh	297 microns	Projected Efficiency:	100%
Cut Size (X₇₀)	70 mesh	210 microns	Projected Efficiency:	100%
Cut Size (X₁₀₀)	100 mesh	149 microns	Projected Efficiency:	100%



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