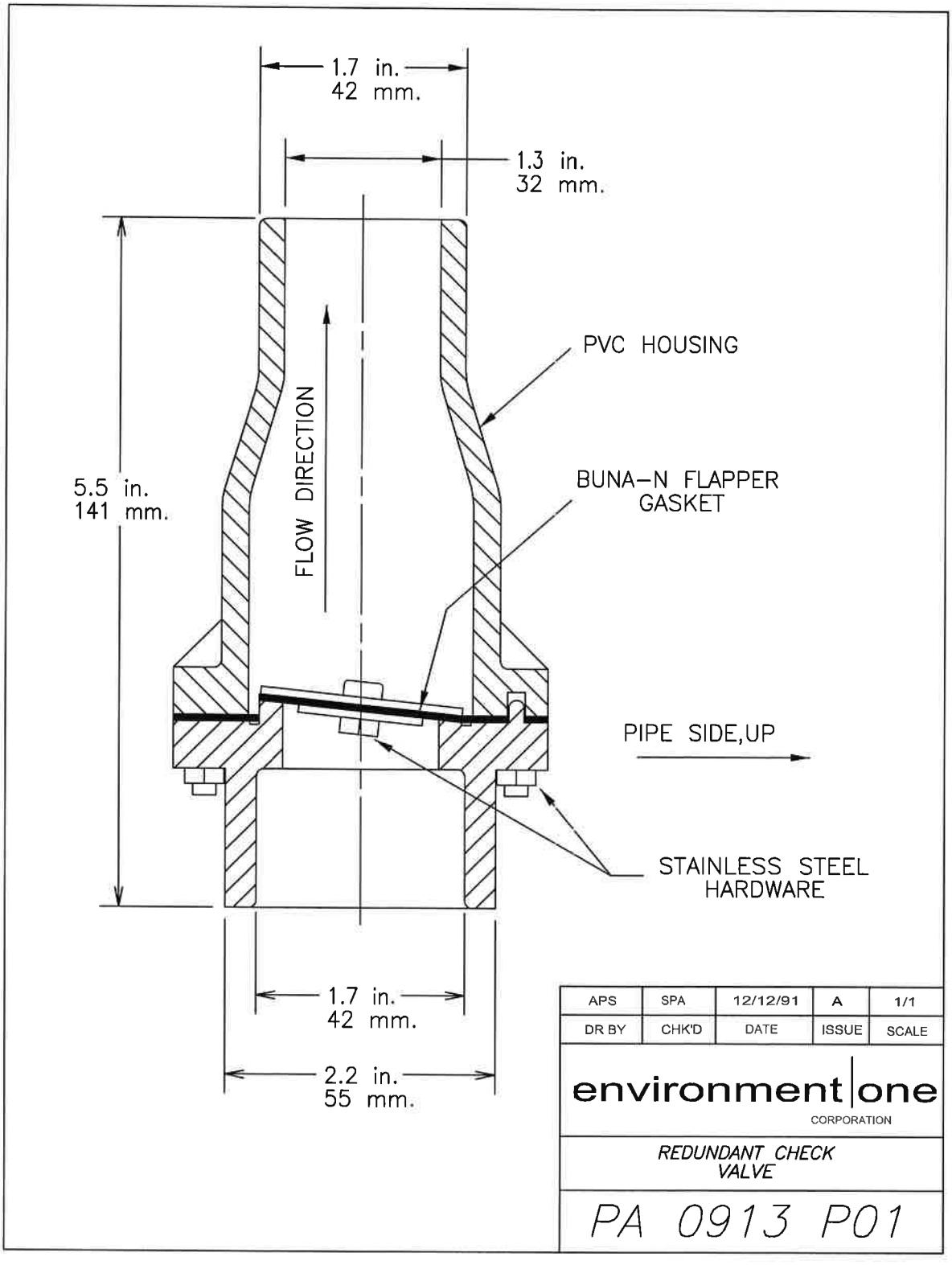
Sanitary Sewer Service
PRICES SUBDIVISION
AVON, INDIANA



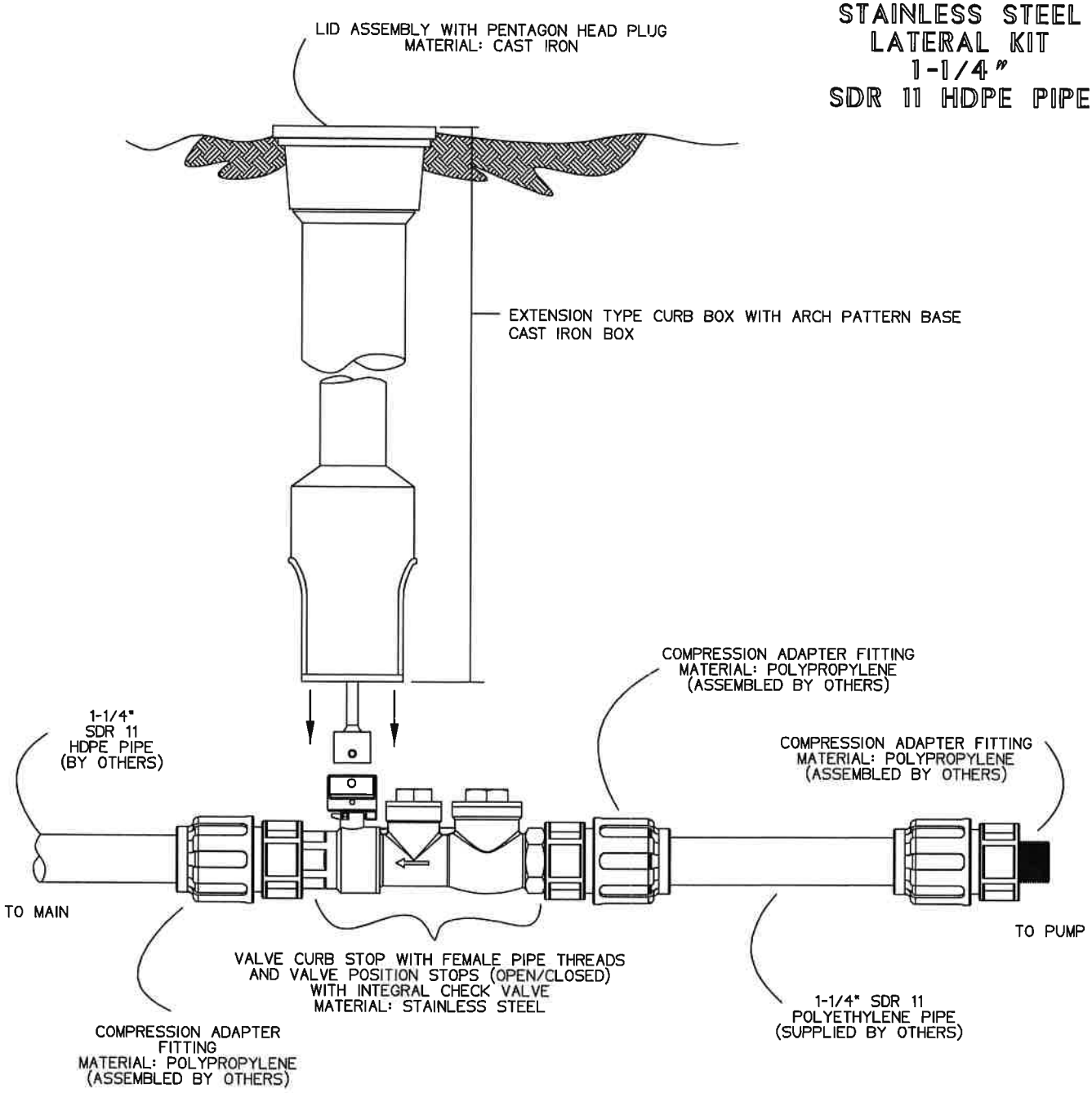
APS	SPA	12/12/91	A	1/1
DR BY	CHK'D	DATE	ISSUE	SCALE

environment one
CORPORATION

REDUNDANT CHECK VALVE

PA 0913 P01

STAINLESS STEEL LATERAL KIT 1-1/4" SDR 11 HDPE PIPE



KIT PARTS ARE NOT ASSEMBLED

NOTES:

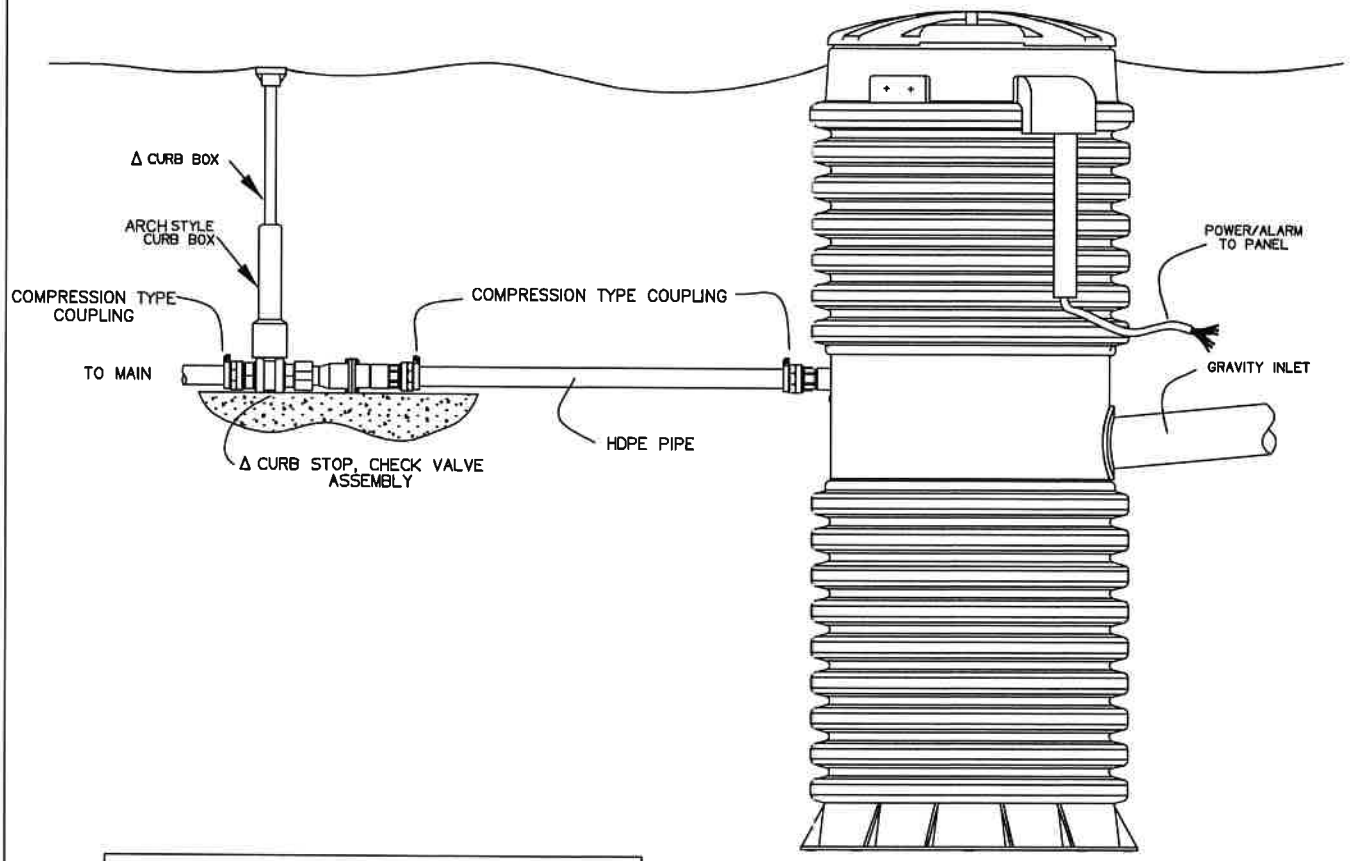
1. SS CURB STOP/CHECK VALVE AND FITTINGS ARE PROVIDED SEPARATELY, TO BE ASSEMBLED BY OTHERS
2. TO ASSEMBLE, APPLY A DOUBLE LAYER OF TEFLON TAPE, AND A LAYER OF PIPE DOPE (SUPPLIED BY OTHERS) TO THE THREADS ON THE PLASTIC FITTINGS AND INSTALL PER THE MANUFACTURER'S INSTRUCTIONS
3. ASSEMBLY IS TO BE PRESSURE TESTED (BY OTHERS)
4. ASSEMBLY IS TO BE USED WITH SDR11 HDPE PIPE
5. TO ORDER SS LATERAL KIT, USE PART NUMBER NC0193G01
6. CURB BOX IS TO BE ORDERED SEPARATELY, SEE ABOVE

SGS	DN	11/02/11	A	3/16
DR BY	CHK'D	DATE	ISSUE	SCALE

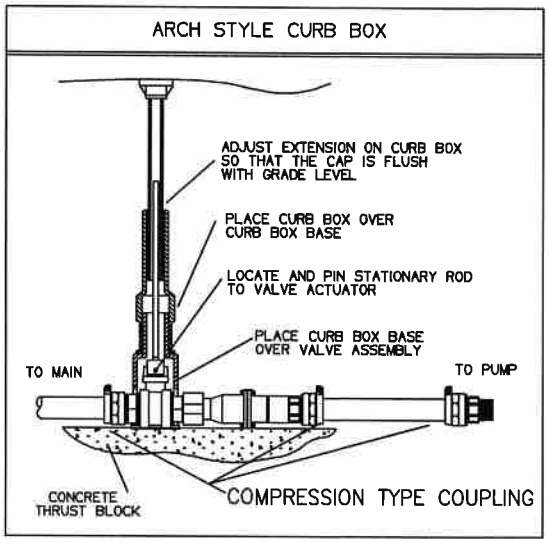
e|one
SEWER SYSTEMS

STAINLESS STEEL LATERAL KIT
1-1/4" SDR 11 HDPE PIPE

TYPICAL STAINLESS STEEL LATERAL INSTALLATION, SIDR 11 HDPE PIPE



MODEL 1010-92
(NOTE: BALLAST NOT SHOWN)



INSTALL ALL UNDER GROUND PIPING PER ASTM D 2321-89

INSTALL GRINDER PUMP STATION PER GRINDER PUMP INSTALLATION INSTRUCTIONS

Δ - INCLUDED IN LATERAL KIT

APS	CAH	09/12/01	B	1/16
DR BY	CHK'D	DATE	ISSUE	SCALE

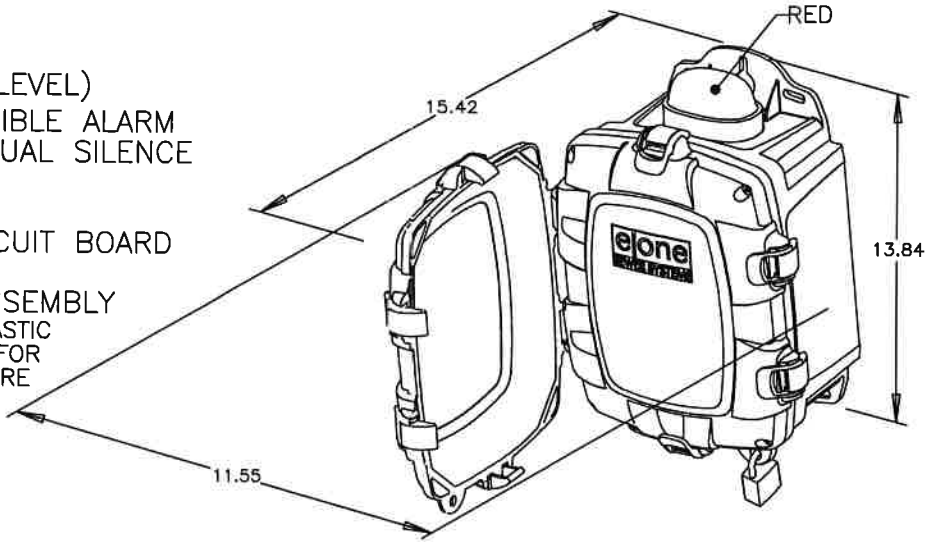
SEWER SYSTEMS

TYPICAL STAINLESS STEEL LATERAL INSTALLATION
SIDR 11 HDPE PIPE ARCH PATTERN

*FOR ORDERING INFORMATION SEE NC0193G01 LATERAL ORDER CODE

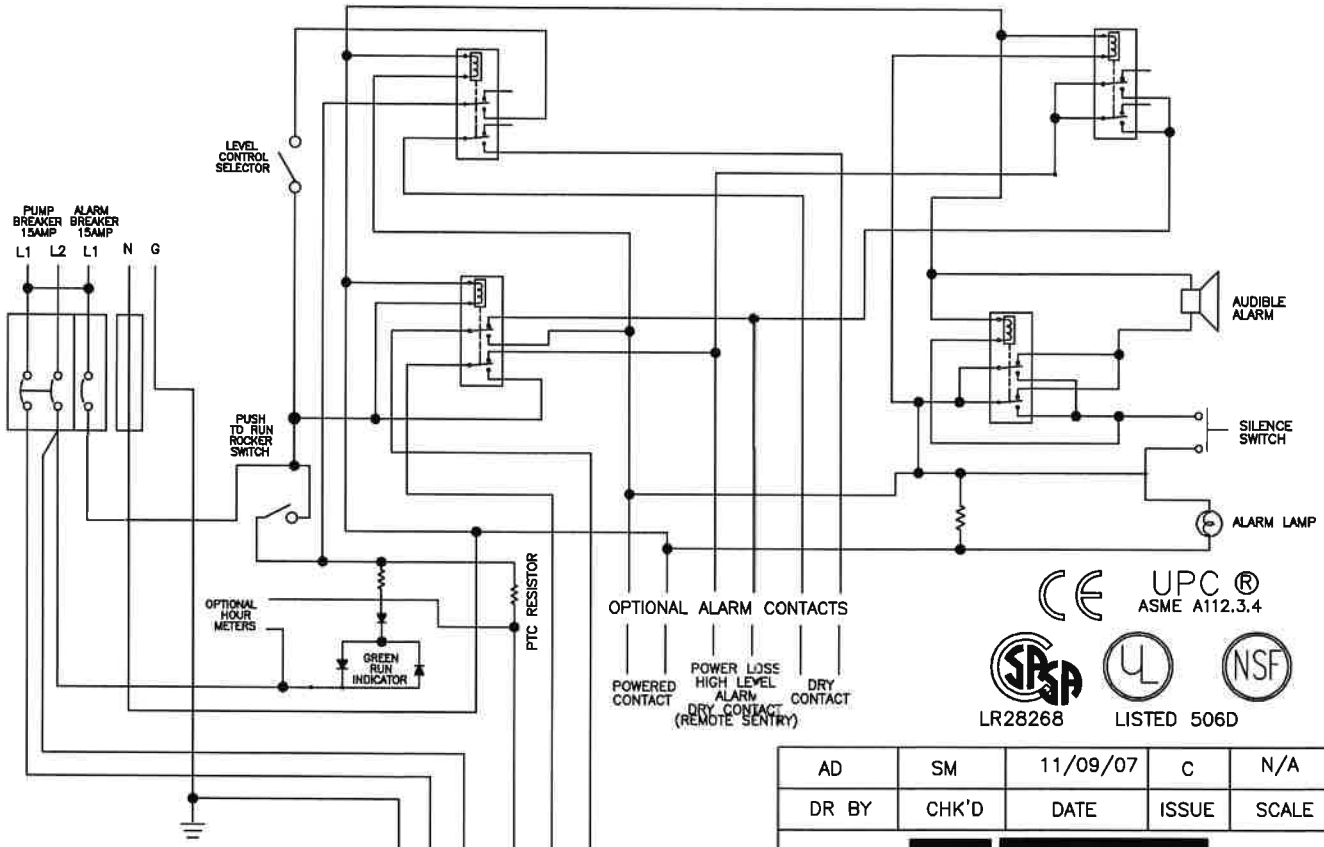
SIMPLEX SENTRY

REDUNDANT RUN (HIGH LEVEL)
EXTERNAL VISUAL & AUDIBLE ALARM
EXTERNAL LATCHING MANUAL SILENCE
MANUAL RUN
PUMP RUN INDICATOR
CONFORMAL COATED CIRCUIT BOARD
PADLOCK
NEMA 4X ENCLOSURE ASSEMBLY
CORROSION PROOF THERMOPLASTIC POLYESTER APPROVED BY UL FOR ELECTRICAL CONTROL ENCLOSURE



OPTIONS:

- ☐ ALARM CONTACTS
- ☐ HOUR METER



PIN	FUNCTION	2000S	EXTREME
1	MANUAL RUN	RED	BROWN
2	L1	BLACK	RED
3	L2	WHITE	BLACK
4	GND	GREEN	GRN/YEL
5	ALARM FEED	ORANGE	YELLOW
6	ALARM RETURN	BLUE	BLUE

CONTROL CABLE:
TYPE TC: DIRECT BURIAL, 12AWG, SIX CONDUCTOR

CE UPC ® ASME A112.3.4

LR28268 LISTED 506D

AD	SM	11/09/07	C	N/A
DR BY	CHK'D	DATE	ISSUE	SCALE

e/one SEWER SYSTEMS

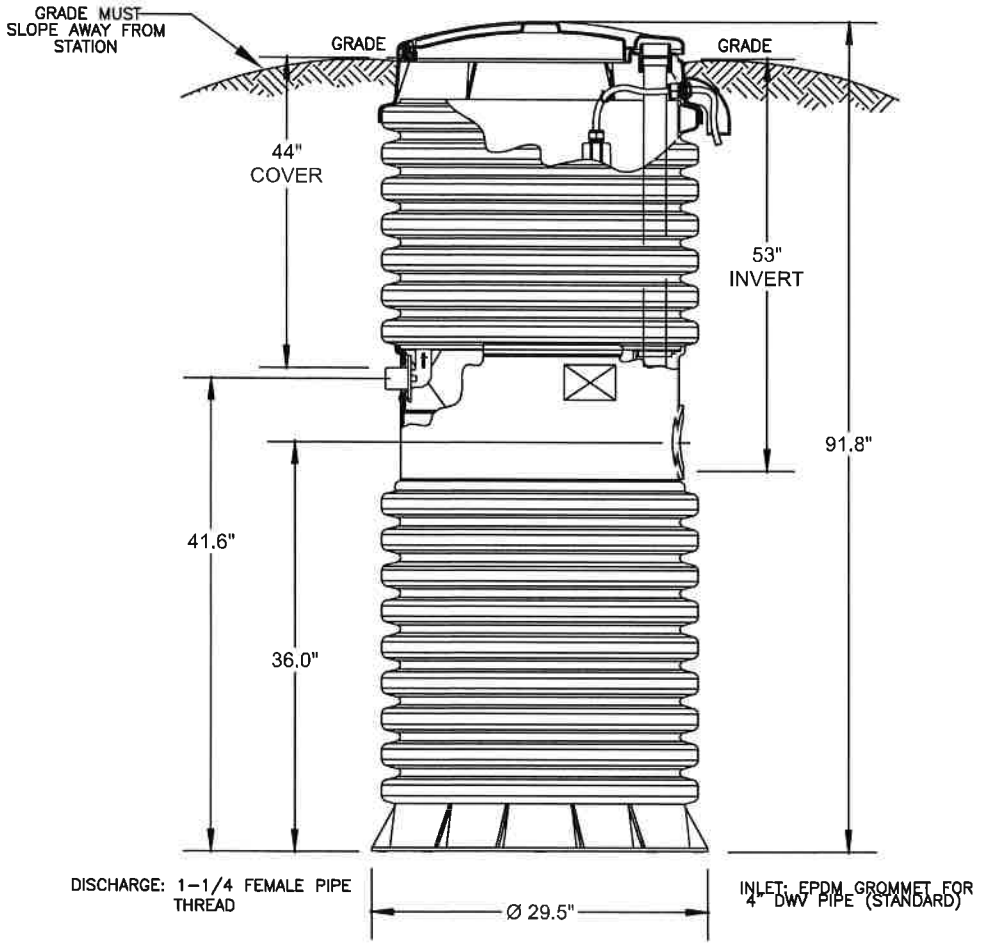
SIMPLEX SENTRY, 240V 60Hz.
DOUBLE POLE POWER

LM000326

PANEL DETAILS

OPTIONS: ☒ DH071-93 (HARD WIRED LEVEL CONTROLS)

☐ DR071-93 (WIRELESS LEVEL CONTROLS)



CONCRETE BALLAST MAY BE REQUIRED
SEE INSTALLATION INSTRUCTIONS
FOR DETAILS

AD	CAH	07/12/07	A	1/16
DR BY	CHK'D	DATE	ISSUE	SCALE

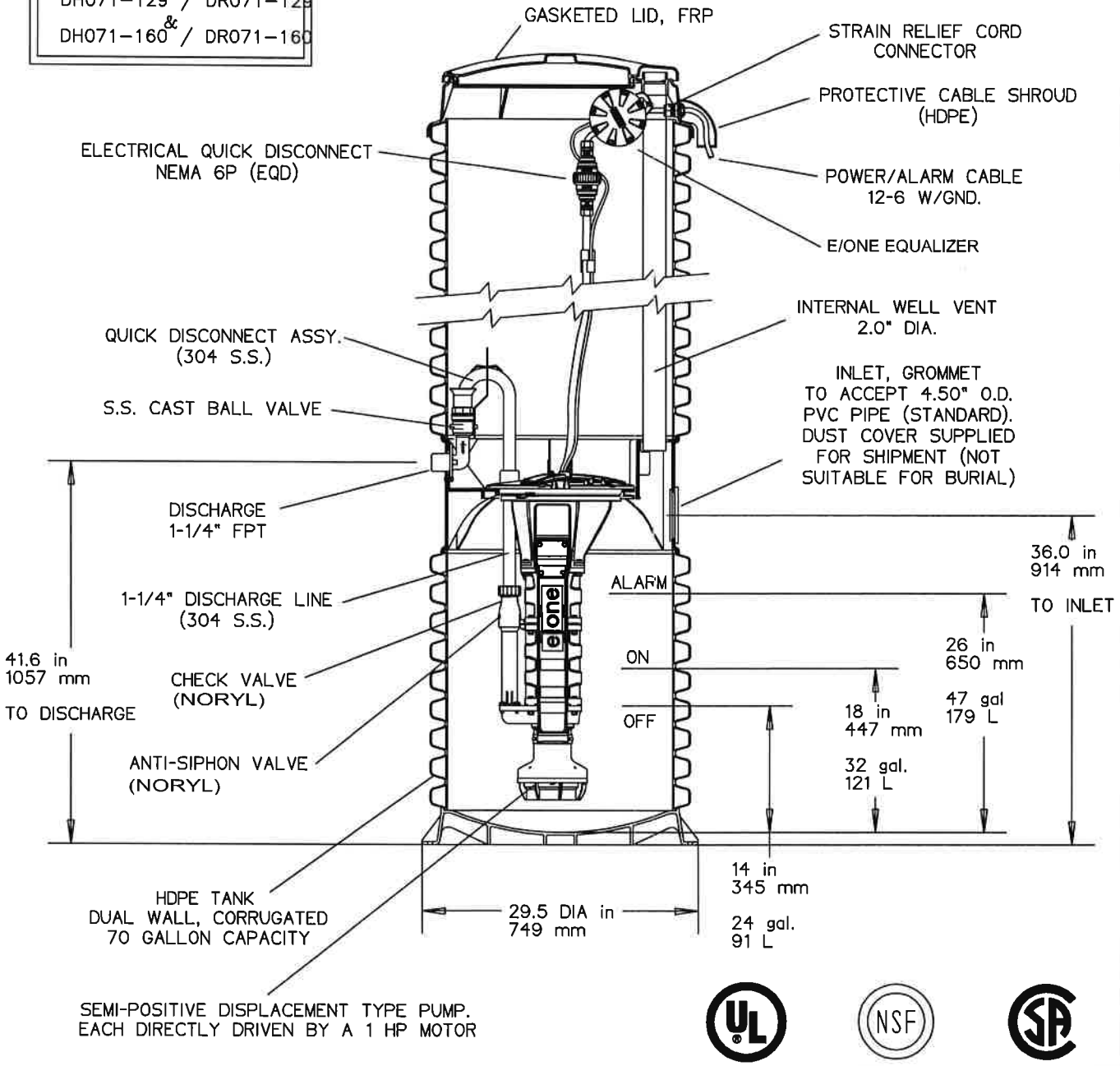
SEWER SYSTEMS

MODEL DH071-93 / DR071-93

NA0050P06

OPTIONS: ☒ DH071 (HARD WIRED LEVEL CONTROLS)
☐ DR071 (WIRELESS LEVEL CONTROLS)

FIELD JOINT REQUIRED FOR MODELS DH071-129 / DR071-129 & DH071-160 / DR071-160



CONCRETE BALLAST MAY BE REQUIRED
SEE INSTALLATION INSTRUCTIONS
FOR DETAILS

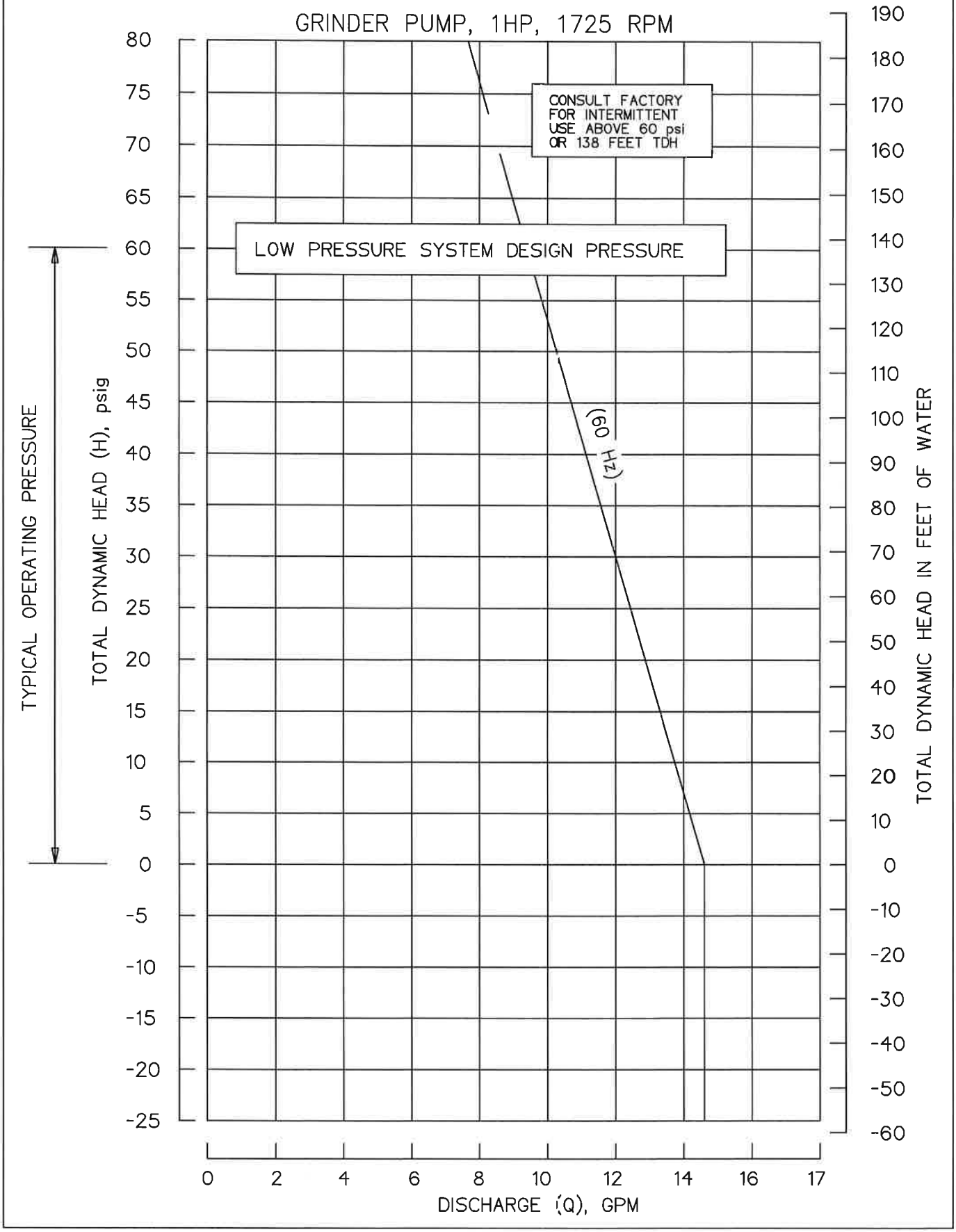
AD	CH	07/12/07	A	
DR BY	CHK'D	DATE	ISSUE	SCALE

e/one SEWER SYSTEMS

MODEL DH071 / DR071
DETAIL SHEET

NA0050P02

E|ONE SPD PUMP PERFORMANCE CURVE



GRINDER PUMP STATION SPECIFICATIONS

1. 0 GENERAL

1.01 GENERAL DESCRIPTION: The MANUFACTURER shall furnish complete, factory-built and -tested grinder pump unit(s), each consisting of a grinder pump core suitably mounted on an integral stand of stainless steel, electrical quick disconnect (NEMA 6P), pump removal harness, discharge assembly and shut-off valve, anti-siphon valve and check valve assembly, electrical alarm assembly, and all necessary internal wiring and controls. For ease of serviceability, all pump motor/grinder units shall be of like type and horsepower throughout the system.

1.02 SUBMITTALS: After receipt of notice to proceed, the MANUFACTURER shall furnish a minimum of six (6) sets of shop drawings detailing the equipment to be furnished, including dimensional data and materials of construction. The ENGINEER shall promptly review this data, and return two (2) copies as accepted, or with requested modifications. Upon receipt of accepted shop drawings, the MANUFACTURER shall proceed immediately with fabrication of the equipment.

1.03 MANUFACTURER: Grinder pump stations, complete with all appurtenances, form an integral system, and as such, shall be supplied by one grinder pump station manufacturer. The CONTRACTOR shall be responsible for the satisfactory operation of the entire system. The equipment specified shall be a product of a company experienced in the design and manufacture of grinder pumps for specific use in low pressure sewage systems. The company shall submit detailed installation and user instructions for its product, submit evidence of an established service program including complete parts and service manuals, and be responsible for maintaining a continuing inventory of grinder pump replacement parts. The MANUFACTURER shall provide a reference and contact list from 10 of its largest contiguous grinder pump installations of the type of grinder pumps described within this specification.

The MANUFACTURER of the grinder pump station shall be Environment One Corporation (or proposed alternate).

Attention is directed to the fact that the drawings and overall system design are based on a particular piece of equipment from a particular manufacturer. These specifications are intended to provide guidelines for standard equipment of a recognized manufacturer who already meets all the requirements of this specification.

1.03a ALTERNATE EQUIPMENT: In the event that the CONTRACTOR or another supplier proposes an alternate to the specified MANUFACTURER, the ENGINEER recognizes that it will be difficult to conform to certain details of this specification due to different manufacturing techniques or grinder pump station designs. If proposing an alternate, the CONTRACTOR (supplier) must submit, no less than 15 business days in advance of the bid date, a complete description of any changes that will be necessary to the system design, a complete submittal package as outlined in Section 1.02 SUBMITTALS, a system hydraulic analysis (including pipe sizes, flows, velocities, retention times and number and location of recommended valves and cleanouts, if any) based on the proposed pump, a list of exceptions to this specification, and demonstration of compliance to Section 1.04 EXPERIENCE CLAUSE of this

specification. This information must be submitted to the ENGINEER for pre-approval of the alternate equipment being proposed and determination of compliance with these contract documents. If the equipment differs materially or differs from the dimensions given on the drawings, the CONTRACTOR (supplier) shall submit complete drawings showing elevations, dimensions, or any necessary changes to the contract documents for the proposed equipment and its installation. Pre-approval, if granted, will be provided in writing by the Engineer to the Contractor (supplier) at least five business days in advance of the bid date. If the ENGINEER'S approval is obtained for alternate equipment, the Contractor (supplier) must make any needed changes in the structures, system design, piping or electrical systems necessary to accommodate the proposed equipment at the expense of the Contractor (supplier).

1.04 EXPERIENCE CLAUSE: The equipment furnished hereunder shall be the product of a company experienced in the design and manufacture of grinder pumps specifically designed for use in low pressure systems. All manufacturers proposing equipment for this project shall have at least ten (10) years of experience in the design and manufacture of units of identical size(s) and performance to the specified units. All manufacturers proposing equipment for this project must also have not less than five hundred (500) successful installations of low pressure sewer systems utilizing grinder pumps of like type to the grinder pumps specified herein. An installation is defined as a minimum of twenty-five (25) pumps discharging into a common force main, which forms a low pressure sewer system. The contractor (supplier) proposing alternate equipment shall also submit, as part of the bid schedule, an installation list with contact person(s), phone number(s) and date(s) of at least ten (10) installations of the type of pump specified herein that have been in operation for at least 10 years.

In lieu of this experience clause, the contractor (supplier) of alternate equipment will be required to submit a five (5) year performance bond for one hundred (100) percent of the stipulated cost of the equipment as bid and as shown in the bid schedule. This performance bond will be used to guarantee the replacement of the equipment in the event that it fails within the bond period.

1.05 OPERATING CONDITIONS: The pumps shall be capable of delivering 15 GPM against a rated total dynamic head of 0 feet (0 PSIG) and 9 GPM against a rated total dynamic head of 138 feet (60 PSIG). The pump(s) must also be capable of operating at negative total dynamic head without overloading the motor(s). Under no conditions shall in-line piping or valving be allowed to create a false apparent head.

1.06 WARRANTY: The grinder pump MANUFACTURER shall provide a part(s) and labor warranty on the complete station and accessories, including, but not limited to, panel and redundant check valve, for a period of twenty-four (24) months after notice of OWNER'S acceptance, but no greater than twenty-seven (27) months after receipt of shipment. Any manufacturing defects found during the warranty period will be reported to the MANUFACTURER by the OWNER and will be corrected by the MANUFACTURER at no cost to the OWNER.

1.07 WARRANTY PERFORMANCE CERTIFICATION: As a bid certification requirement, each bidder shall provide with their bid schedule a warranty performance certification statement executed by the most senior executive officer of the grinder pump MANUFACTURER, which certifies a minimum of a twenty-four (24) month warranty. They must further detail any exclusions from the warranty or additional cost items required to maintain the equipment in warrantable condition, including all associated labor and shipping fees, and certify that the MANUFACTURER will bear all costs to correct any original equipment deficiency for the effective period of the warranty. All preventive-maintenance-type

requirements shall be included in this form as exclusions. These requirements include, but are not limited to, unjamming of grinder mechanism, unplugging of lines, periodic motor maintenance, and periodic cleaning of liquid level controls. Should the CONTRACTOR (supplier) elect to submit a performance bond in lieu of the experience clause outlined above, this warranty performance certification shall also be used as a criterion to evaluate the CONTRACTOR'S (supplier's) performance over the warranty period. A warranty performance certification form is included with the bid schedule and must be completed and submitted as part of the bid package. Bids with incomplete forms or missing forms will be considered non-responsive.

2.0 PRODUCT

2.01 PUMP: The pump shall be a custom-designed, integral, vertical rotor, motor-driven, solids-handling pump of the progressing-cavity type with a single mechanical seal. The rotor shall be constructed of stainless steel. Plating on the rotor will not be acceptable due to its tendency to delaminate. The stator shall be of a specifically compounded ethylene-propylene synthetic elastomer. The material shall be suitable for domestic wastewater service. Its physical properties shall include high tear and abrasion resistance, grease resistance, water and detergent resistance, temperature stability, excellent aging properties, and outstanding wear resistance. Buna-N is not acceptable as a stator material because it does not exhibit the properties as outlined above and required for wastewater service.

2.02 GRINDER: The grinder shall be placed immediately below the pumping elements and shall be direct-driven by a single, one-piece motor shaft. The grinder impeller assembly shall be securely fastened to the pump motor shaft by means of a threaded connection attaching the grinder impeller to the motor shaft. Attachment by means of pins or keys will not be acceptable. The grinder will be of the rotating type with a stationary-hardened and -ground stainless steel shredding ring spaced in close annular alignment with the driven impeller assembly, which shall carry two hardened, type 400 series stainless steel cutter bars.

This assembly shall be dynamically balanced and operate without objectionable noise or vibration over the entire range of recommended operating pressures. The grinder shall be constructed so as to eliminate clogging and jamming under all normal operating conditions including starting. Sufficient vortex action shall be created to scour the tank free of deposits or sludge banks which would impair the operation of the pump. These requirements shall be accomplished by the following, in conjunction with the pump:

1. The grinder shall be positioned in such a way that solids are fed in an upward flow direction.

2. The maximum flow rate through the cutting mechanism must not exceed 4 feet per second. This is a critical design element to prevent jamming and as such must be adhered to.

3. The inlet shroud shall have a diameter of no less than 5 inches. Inlet shrouds that are less than 5 inches in diameter will not be accepted due to their inability to maintain the specified 4 feet per second maximum inlet velocity which by design prevents unnecessary jamming of the cutter mechanism and eliminates blinding of the pump by large objects blocking the inlet shroud.

4. The impeller mechanism must rotate at a nominal speed of no greater than 1800 rpm.

The grinder shall be capable of reducing all components in normal domestic sewage, including a reasonable amount of "foreign objects," such as paper, wood, plastic, glass, rubber and the like, to finely divided particles that will pass freely through the passages of the pump and the 1-1/4" diameter discharge.

2.03 ELECTRIC MOTOR: As a maximum, the motor shall be a 1 HP, 1725 RPM, 240 Volt 60 Hertz, 1 Phase, capacitor-start, ball bearing, air-cooled induction type with a low starting current not to exceed 30 amperes and high starting torque of 8.4 foot pounds. Inherent protection against running overloads or locked rotor conditions for the pump motor shall be provided by the use of an automatic reset, integral thermal overload protector incorporated into the motor. This motor protector combination shall have been specifically investigated and listed by Underwriters Laboratories, Inc. for the application. Non-capacitor-start motors or permanent-split capacitor motors will not be accepted because of their reduced starting torque and consequent diminished grinding capability. To reduce the potential of environmental concerns, the expense of handling and disposing of oil, and the associated maintenance costs, oil-filled motors will not be accepted.

2.04 MECHANICAL SEAL: The pump/core shall be provided with a mechanical shaft seal to prevent leakage between the motor and pump. The seal shall have a stationary ceramic seat and carbon rotating surface with faces precision lapped and held in position by a stainless steel spring.

2.05 TANK: High Density Polyethylene Construction. The tank shall be made of high density polyethylene of a grade selected for environmental stress cracking resistance. Corrugated sections are to be made of a double-wall construction with the internal wall being generally smooth to promote scouring. Corrugations of outside wall are to be of a minimum amplitude of 1 1/2" to provide necessary transverse stiffness.

Any incidental sections of a single wall construction are to be a minimum .250" thick. All seams created during tank construction are to be thermally welded and factory-tested for leak tightness. Tank wall and bottom must withstand the pressure exerted by saturated soil loading at maximum burial depth. All station components must function normally when exposed to maximum external soil and hydrostatic pressure.

The tank shall be furnished with PVC inlet flange to accept a 4.50" OD DWV pipe. Tank capacities shall be as shown on the contract drawings.

The station shall be designed for a maximun of 15 feet of flood water over the cover.

The tank shall include a primed and painted steel cover that provides low-profile mounting. The cover shall allow no more than 1 cup of water into the station per hour during a 15-foot flood condition.

The station shall have all necessary penetrations factory sealed and tested. No field penetrations shall be acceptable.

All discharge piping shall be constructed of reinforced PVC flexible hose and terminate outside the accessway bulkhead with a PVC, 1-1/4" female solvent-weld fitting. The discharge piping shall include a PVC slide-face, quick-disconnect assembly rated for 200 psi WOG. The bulkhead penetration shall be factory-installed and -warranted by the manufacturer to be watertight.

The tank shall be equipped with an EPDM grommet to accept a 2" DWV vent pipe. The vent pipe shall extend above the predicted flood level and shall include a 180-degree bend on the end to prevent infiltration. This vent pipe and bend shall be supplied by the CONTRACTOR. A perforated, stainless steel screen and 2" NPT nut, provided by the manufacturer, shall be threaded onto the end of the 180-degree bend to prevent the vent from becoming obstructed.

The accessway shall include a single NEMA 6P electrical quick disconnect (EQD) for all power and control functions, factory installed with accessway penetrations warranted by the manufacturer to be watertight. The accessway shall also be vented to prevent sewage gases from accumulating in the tank.

2.06 DISCHARGE HOSE AND DISCONNECT/VALVE: All discharge fittings and piping shall be constructed of 304 Series stainless steel, polypropylene, EPDM or PVC. The discharge hose assembly shall include a shut-off valve rated for 200 psi WOG and a quick-disconnect feature to simplify installation and pump removal. The bulkhead penetration shall be factory-installed and -warranted by the manufacturer to be watertight.

2.07 ELECTRICAL QUICK DISCONNECT: The grinder pump unit shall include a single NEMA 6P electrical quick-disconnect (EQD) for all power and control functions. An integral tube shall allow venting of the control compartment to assure proper operation of the pressure switch level system. The grinder pump will be furnished with a length of 6-conductor, 14-gauge, type-SJOW cable, pre-wired and watertight to meet UL requirements.

2.08 Anti-Siphon Valve: The pump discharge shall be equipped with a factory-installed, gravity-operated, flapper-type integral anti-siphon valve built into the discharge assembly. Moving parts will be made of 300 series stainless steel and fabric-reinforced synthetic elastomer to ensure corrosion resistance, dimensional stability, and fatigue strength. A nonmetallic hinge shall be an integral part of the flapper assembly, providing a maximum degree of freedom to ensure proper operation even at a very low pressure. The valve body shall be injection-molded from a glass-filled thermoplastic resin. Holes or ports in the discharge piping are not acceptable anti-siphon devices, due to their tendency to clog from the solids in the slurry being pumped.

2.09 CHECK VALVE: The pump discharge shall be equipped with a factory-installed, gravity-operated, flapper-type integral check valve built into the discharge assembly. The check valve will provide a full-ported passageway when open, and shall introduce a friction loss of less than 6 inches of water at maximum rated flow. Moving parts will be made of a 300 series stainless steel and fabric-reinforced synthetic elastomer to ensure corrosion resistance, dimensional stability, and fatigue strength. A nonmetallic hinge shall be an integral part of the flapper assembly, providing a maximum degree of freedom to assure seating even at a very low back pressure. The valve body shall be an injection-molded part made of glass-filled PVC. Ball-type check valves are unacceptable due to their limited sealing capacity in slurry applications.

Each grinder pump installation shall also include one separate check valve of the type detailed in this section for installation in the 1-1/4" service lateral between the grinder pump station and the sewer main, preferably next to the curb stop. The separate check valve shall be provided as a separate line item in the bid schedule.

2.10 CORE UNIT: The grinder pump station shall have an easily removable core assembly containing pump, motor, grinder, all motor controls, check valve, anti-siphon valve, electrical quick disconnect and wiring. The watertight integrity of the core unit shall be established by 100% factory test at a minimum of 5 PSIG.

2.11 CURB BOXES: Curb boxes shall be constructed of cast iron and steel pipe. All components shall be heavily coated with asphalt paint to assure durability in the ground. Curb boxes shall provide 12" of height adjustment downward (shorter) from their extended height

2.12 CONTROLS: All necessary controls, including motor and level controls, shall be located in the top housing of the core unit. The top housing will be attached with stainless steel fasteners.

Non-fouling wastewater level controls for controlling pump operation shall be accomplished by monitoring the pressure changes in an integral air column connected to a pressure switch. The level detection device shall have no moving parts in direct contact with the wastewater. High-level sensing will be accomplished in the manner detailed above by a separate air-bell sensor and pressure switch of the same type. Closure of the high-level sensing device will energize an alarm circuit as well as a redundant pump-on circuit. For increased reliability, pump ON/OFF and high-level alarm functions shall not be controlled by the same switch. Float switches of any kind, including float trees, will not be accepted due to the periodic need to maintain (rinsing, cleaning) such devices.

To assure reliable operation of the pressure switches, each core shall be equipped with a breather assembly, complete with a suitable means to prevent accidental entry of water into the motor compartment. The grinder pump will be furnished with a 6-conductor, 14-gauge, type-SJOW cable, pre-wired and watertight to meet UL requirements with a FACTORY-INSTALLED NEMA 6P EQD half attached to it.

2.13 ALARM PANEL: Each grinder pump station shall include a NEMA 4X, UL-listed alarm panel suitable for wall mounting. The NEMA 4X enclosure shall be manufactured of thermoplastic to assure corrosion resistance. The enclosure shall include a hinged, lockable cover, padlock, and secured dead front. The enclosure shall not exceed 11.38"W x 13.5"H x 5.63"D.

For each core, the panel shall contain one (1) 15-amp, double-pole circuit breaker for the power circuit and one (1) 15-amp, single-pole circuit breaker for the alarm circuit. The panel shall contain terminal blocks, integral power bus, push-to-run feature and a complete alarm circuit.

The alarm panel shall include the following features: audio and visual alarm, push-to-run switch, and high level (redundant) pump starting control. The alarm sequence is to be as follows:

1. When liquid level in the sewage wet-well rises above the alarm level, visual and audio alarms will be activated. The contacts on the alarm pressure switch will close. The redundant pump starting system will be energized.

2. The audio alarm may be silenced by means of the externally mounted, push-to-silence button.

3. Visual alarm remains illuminated until the sewage level in the wet-well drops below the "off" setting of the alarm pressure switch.

The visual alarm lamp shall be inside a red fluted lens at least 2-5/8" in diameter and 1-11/16" in height. Visual alarm shall be mounted to the top of the enclosure in such a manner as to maintain NEMA 4X rating.

The audio alarm shall be a printed circuit board in conjunction with an 86 dB buzzer with quick-mounting terminal strip mounted in the interior of the enclosure. The audio alarm shall be capable of being deactivated by depressing a push-type switch, which is encapsulated in a weatherproof silicone boot and mounted on the bottom of the enclosure.

The entire alarm panel as manufactured, shall be listed by Underwriters Laboratories, Inc.

2.14 SERVICEABILITY: The grinder pump core unit shall have two lifting hooks, complete with nylon lift-out harness, to facilitate easy core removal when necessary. All mechanical and electrical connections must provide easy disconnect capability for core unit removal and installation. A push-to-run feature will be provided for field troubleshooting. All motor control components shall be mounted on a readily replaceable bracket for ease of field service.

2.15 OSHA CONFINED SPACE: All maintenance tasks for the grinder pump station must be possible without entry into the grinder pump station (as per OSHA 1910.146 Permit-required confined spaces). "Entry means the action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space."

2.16 SAFETY: The grinder pump shall be free from electrical and fire hazards as required in a residential environment. As evidence of compliance with this requirement, the completely assembled and wired grinder pump station in its tank shall be listed by Underwriters Laboratories, Inc., to be safe and appropriate for the intended use. UL listing of components of the station or third-party testing to UL standard will not be accepted.

The grinder pump shall meet accepted standards for plumbing equipment for use in or near residences, shall be free from objectionable noise, odor or health hazards, and shall have been tested by an independent laboratory to certify its capability to perform as specified in either individual or low pressure sewer system applications. As evidence of compliance with this requirement, the grinder pump shall bear the National Sanitation Foundation seal. Third-party testing to NSF standards will not be accepted.

3.0 EXECUTION

3.01 FACTORY TEST: Each grinder pump shall be submerged and operated for 5 minutes (minimum). Included in this procedure will be the testing of all ancillary components such as, the anti-siphon valve, check valve, discharge line and each unit's dedicated level and motor controls. All factory tests shall incorporate each of the above-listed items. Actual appurtenances and controls, which will be installed in the field, shall be particular to the tested pump only. A common set of appurtenances and controls for all pumps will not be acceptable. Certified test results shall be available upon request showing the operation of each grinder pump at two (2) different points on its curve, with the maximum pressure no less than 60 psi. The ENGINEER reserves the right to inspect such testing procedures with representatives of the OWNER, at the GRINDER PUMP MANUFACTURER'S facility.

Completed basins shall be factory leak tested to assure the integrity of all joints, seams and penetrations.

3.02 DELIVERY: All grinder pump units will be delivered to the job site, 100% completely assembled, including testing, ready for installation. Grinder pump stations will be individually mounted on wooden pallets. Grinder pump cores will be shipped in a separate container and are only required to be installed in the basin

3.03 INSTALLATION: Earth excavation and backfill are specified under SITE WORK, but are also to be done as a part of the work under this section, including any necessary sheeting and bracing. The CONTRACTOR shall be responsible for handling ground water to provide a firm, dry subgrade for the structure, and shall guard against flotation or other damage resulting from general ground water or flooding. The grinder pump stations shall not be set into the excavation until the installation procedures and excavation have been approved by the ENGINEER.

Remove packing material. Users instructions MUST be given to the OWNER. Hardware supplied with the unit, if required, will be used at installation. The basin will be supplied with a standard field-installed 4" inlet grommet (fiberglass tank) or flange (for high-density polyethylene tank); both will accept a 4.50" OD DWV pipe for connecting the incoming sewer line. Appropriate inlet piping must be used. The basin may not be dropped, rolled or laid on its side for any reason.

Installation shall be accomplished so that 1" to 4" of accessway, below the bottom of the lid, extends above the finished grade line. The finished grade shall slope away from the unit. The diameter of the hole must be large enough to allow for the concrete anchor.

A 6" (minimum) layer of naturally rounded aggregate, clean and free flowing, with particle size of not less than 1/8" or more than 3/4" shall be used as bedding material under each unit. A concrete anti-flotation collar, as detailed on the drawings, and sized according to the manufacturer's instructions, shall be required and shall be precast to the grinder pump or poured in place. Each grinder pump station with its precast anti-flotation collar shall have a minimum of three (3) lifting eyes for loading and unloading purposes. The unit shall be leveled and filled with water, to the bottom of the inlet, to help prevent the unit from shifting while the concrete is being poured and set. The concrete must be manually vibrated to ensure there are no voids. If it is necessary to pour the concrete to a level higher than the inlet piping, an 8" sleeve is required over the inlet prior to the concrete being poured.

The CONTRACTOR will provide and install a four (4) foot piece of four-inch SCH 40 PVC pipe with cap to stub-out the inlet for the property owners' installation contractor, as depicted on the contract drawings.

The electrical enclosure shall be furnished, installed and wired to the grinder pump station by the CONTRACTOR. An alarm device is required on every installation, there shall be NO EXCEPTIONS. It will be the responsibility of the CONTRACTOR and the ENGINEER to coordinate with the individual property owner(s) to determine the optimum location for the alarm panel.

The CONTRACTOR shall mount the alarm device in a conspicuous location, as per national and local codes. The alarm panel will be connected to the grinder pump station by a length of 6-conductor, 12-gauge, TC-type cable as shown on the contract drawings. The power and alarm circuits must be on separate power circuits. The grinder pumps station will be provided with a minimum of 32', 25' of usable electrical supply cable outside the station, to connect to the alarm panel. This cable shall be provided with a FACTORY-INSTALLED EQD half to connect to the mating EQD half on the core.

3.04 BACKFILL REQUIREMENTS: Proper backfill is essential to the long-term reliability of any underground structure. Several methods of backfill are available to produce favorable results with different native soil conditions. The most highly recommended method of backfilling is to surround the unit to grade using Class I backfill material as defined in ASTM 2321. Class 1A and Class 1B are recommended where frost heave is a concern; Class 1B is a better choice when the native soil is sand or if a high, fluctuating water table is expected. Class 1, angular crushed stone, offers an added benefit in that it doesn't need to be compacted.

If you are unsure of the consistency of the native soil, it is recommended that a geotechnical evaluation of the material is obtained before specifying backfill.

Another option is the use of a flowable fill (i.e., low slump concrete). This is particularly attractive when installing grinder pump stations in augured holes where tight clearances make it difficult to assure proper backfilling and compaction with dry materials. Flowable fills should not be dropped more than four feet from the discharge to the bottom of the hole to avoid separation of the constituent materials.

Backfill of clean, native earth, free of rocks, roots, and foreign objects, shall be thoroughly compacted in lifts not exceeding 12" to a final Proctor Density of not less than 95%. Improper backfilling may result in damaged accessways. The grinder pump station shall be installed at a minimum depth from grade to the top of the 1 1/4" discharge line to assure maximum frost protection. The finish grade line shall be 1" to 4" below the bottom of the lid, and final grade shall slope away from the grinder pump station.

All restoration will be the responsibility of the CONTRACTOR. Per-unit costs for this item shall be included in the CONTRACTOR'S bid price for the individual grinder pump station. The properties shall be restored to their original condition in all respects, including, but not limited to, curb and sidewalk replacement, landscaping, loaming and seeding, and restoration of the traveled ways, as directed by the ENGINEER.

3.05 START-UP AND FIELD TESTING: The MANUFACTURER shall provide the services of qualified, factory-trained technician(s) who shall inspect the placement and wiring of each station, perform field tests as specified herein, and instruct the OWNER'S personnel in the operation and maintenance of the equipment before the stations are accepted by the OWNER. All equipment and materials necessary to perform testing shall be the responsibility of the OWNER or INSTALLING CONTRACTOR. This will include, as a minimum, a portable generator (if temporary power is required) and water in each basin.

The services of a trained, factory-authorized technician shall be provided at a rate of 2 days for each 200 grinder pump stations supplied. Each day shall be ten (10) person hours in duration.

Upon completion of the installation, the authorized factory technicians will perform the following test on each station:

1. Make certain the discharge shut-off valve is fully open. This valve must not be closed when the pump is operating. In some installations, there may be a valve(s) at the street main that must also be open.

2. Turn ON the alarm power circuit.

3. Fill the wet well with water to a depth sufficient to verify the high level alarm is operating. Shut off water.

4. Turn ON pump power circuit. Initiate pump operation to verify automatic "on/off" controls are operative. Pump should immediately turn ON. Within one (1) minute alarm light will turn OFF. Within three (3) minutes, the pump will turn OFF.

Upon completion of the start-up and testing, the MANUFACTURER shall submit to the ENGINEER the start-up authorization form describing the results of the tests performed for each grinder pump station. Final acceptance of the system will not occur until authorization forms have been received for each pump station installed and any installation deficiencies corrected.

4.0 OPERATION AND MAINTENANCE

4.01 MANUALS: The MANUFACTURER shall supply four (4) copies of operation and maintenance manuals to the OWNER, and one (1) copy of the same to the ENGINEER

SANITARY SEWER FORCEMAIN SPECIFICATIONS

1. All sanitary sewer forcemain shall be P3408 high denisity polyethylene (HDPE) pressure pipe Class 160 SDR 11 conforming to ASTM D-3350 cell classification 345464C. Joints shall be butt fusion type conforming to ASTM D-3261.

2. Concrete thrust blocks shall be required at all fittings. Plastic shall be wrapped around the pipe and fitting prior to placing thrust blocks.

3. A leakage test shall be performed on the completed forcemain in the presence of a representative from the WCCD. The forcemain shall be tested at a static pressure of at least 150% of the design working pressure over a period of at least two consecutive hours in accordance with IDEM standards. All concrete thrust blocks shall have been in place for a period of at least ten (10) days prior to the test. The leakage shall not exceed ten gallons per day per inch mile of pipe diameter.

4. Connections to existing manholes shall be core drilled and fitted with a Kor-N-Seal boot or approved equal and witnessed by a representative from the WCCD.

5. Materials and construction of the forcemain shall conform to the minimum requirements of the WCCD. Installation shall be in accordance with Section 716 of the Indiana Department of Transportation 2006 Standard Specifications and ASTM F-1962.

6. In the event that elevations along the forcemain route are contained in these plans, such elevations shall serve as guides only, except that high points in the line shall be located as may be shown in these plans and the minimum cover shall be maintained as stated in these plans. This may necessitate portions of the line to be buried in excess of the minimum cover stated in these plans