TIMBERLAINE TRAILS

ST. CHARLES COUNTY NEIGHBORHOOD IMPROVEMENT DISTRICT

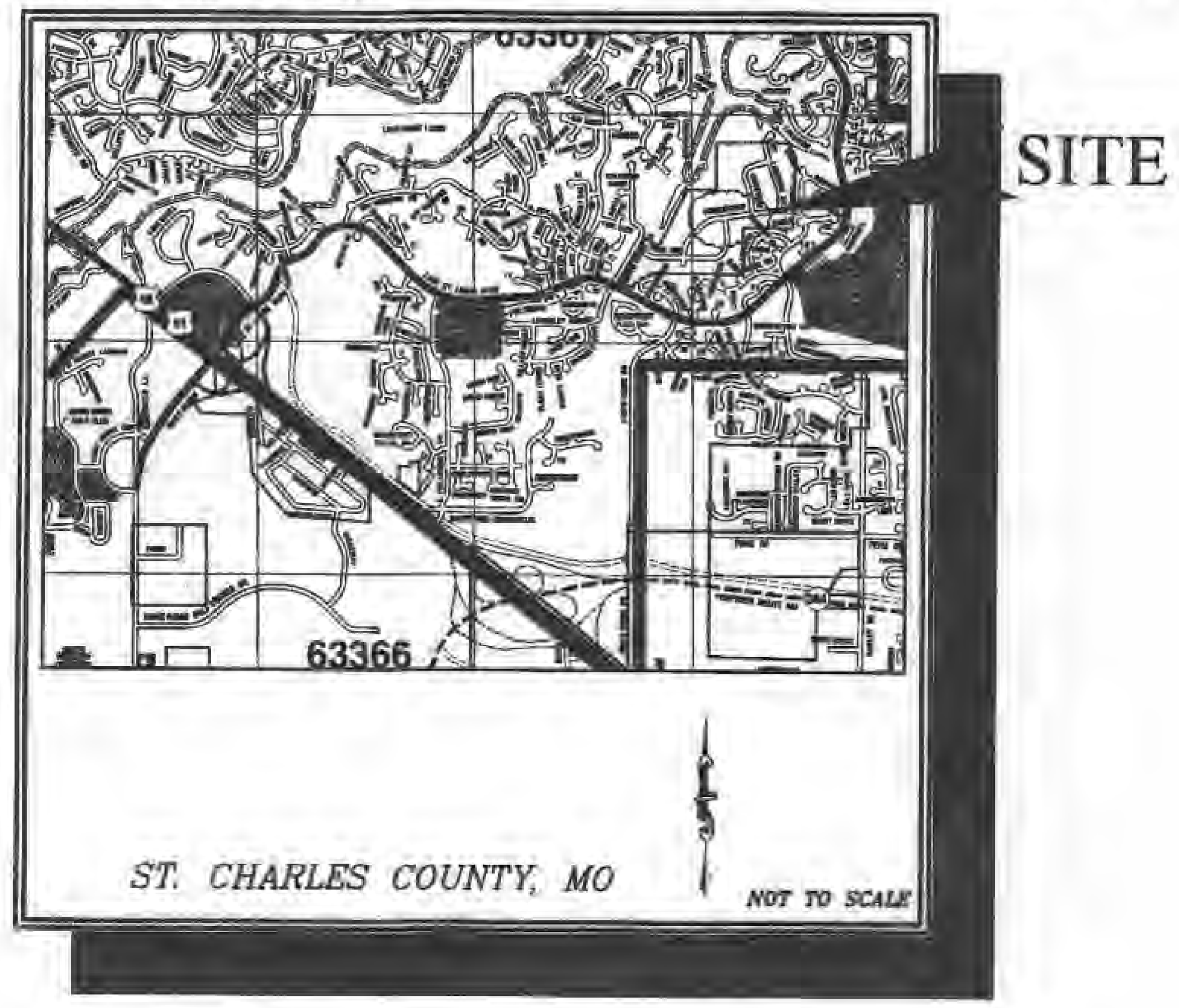
A TRACT OF LAND BEING PART OF
THE TIMBERLAINE TRAILS SUBDIVISION
US SURVEY 287, T.47N., R.2E.
ST. CHARLES COUNTY, MO

SEWER DISTRICT GENERAL NOTES

1. Gas, water and other underground utilities shall not conflict with the depth or horizontal locations of existing and proposed sanitary sewers, including house laterals.
2. Underground utilities have been plotted from available information and, therefore, their locations must be considered approximate only. The verification of the location of all underground utilities, either shown or not shown on these plans, shall be the responsibility of the contractor and shall be located prior to grading or construction of improvements.
3. No area shall be cleared without permission of the developer.
4. All grades shall be within 0.2 feet (more or less) of those shown on the grading plan.
5. PWSD#2 of St. Charles County shall be notified at least 48 hours prior to construction of sanitary sewers for coordination and inspection.
6. All sanitary sewers shall meet all specifications and installation requirements of the local governing authority.
7. All trench backfills under paved areas shall be granular backfill and water jetted. All other trench backfills may be earth material (Free of large clods or stones) and shall be water jetted.
8. Easements shall be provided for sanitary sewers. See plans for location and size of easements.
9. Modify inverts of existing manholes to insure positive drainage.
10. The contractor shall prevent any and all storm water, mud or construction debris from entering the existing sanitary system.
11. Existing sanitary sewer service shall not be interrupted.
12. Pre-manufactured adapters shall be used at all PVC to DIP connections. Rubber boot/Mission type coupling will not be allowed.
13. Construction Equipment access to development shall be directly off Timberlaine Trails.
14. All existing improvements damaged or destroyed during construction shall be replaced or repaired in kind.
15. Polyvinyl Chloride (PVC) shall conform to the requirements of ASTM D-3034 Standard Specifications for the PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings, SDR 35.
16. All P.V.C. sanitary sewer pipe to be SDR-35 or equal with "clean" 1/2" to 1" granular stone bedding uniformly graded. This bedding shall extend from 4" below the pipe to springline of pipe. Immediate backfill over pipe shall consist of same size "clean" or "minus" stone from springline of pipe to 6 inches above the top of pipe.
17. All sanitary sewer manholes shall be waterproofed on the exterior in accordance with Missouri Department of Natural Resources specifications. 10 CSR-8.120 (7)(E).
18. Brick shall not be used to construct manholes.
19. The minimum vertical distance from the low point of the basement to the flowline of a sanitary sewer at the corresponding house connection shall not be less than the diameter of the sanitary sewer plus a vertical distance not less than two and one-half feet (2-1/2').
20. All manhole and catch basin tops built without elevations furnished by the Engineer will be the responsibility of the sewer contractor. At the time of construction stake-out of the sewer lines, all curb and grate inlets will be face staked. If normal face stakes fall in line with sewer construction, the Engineer will set these stakes on a double offset. It shall be the responsibility of the sewer contractor to preserve all face stakes from destruction.
21. Per PWSD#2, show positive drainage through manholes. No flat base structures allowed.
22. "Temporary siltation control measures (structural) shall be maintained until vegetative cover has been established to a sufficient density to provide erosion control on the site".
23. Manhole frame and cover shall be as specified in construction details.
24. Maintain access to existing residential driveways and streets.
25. All areas disturbed during construction shall be restored back to preconstruction conditions and approved by the inspector.
26. The existing trunkline is not located within the 100 Year Flood Plain Limits as shown on the F.E.M.A. map for this area.
27. Septic tanks and aerators are shown on plan sheet from best available information and therefore, must be considered approximate only. The verification of the location of all septic tanks, either shown or not shown on these plans, shall be the responsibility of the contractor and shall be located prior to retirement (as per specs.)
28. The low pressure sewer system shall be built to current PWSD#2 District Specifications.

THIS TRACT IS SERVED BY:
WATER – PWSD#2 OF ST. CHARLES COUNTY
ELECTRIC – CUIVRE RIVER ELECTRIC COOP.
TELEPHONE – SOUTHWESTERN BELL
SEWERS – PWSD#2 OF ST. CHARLES COUNTY
GAS – ST. CHARLES GAS
FIRE PROTECTION – LAKE SAINT LOUIS FIRE PROTECTION DISTRICT
SCHOOL DISTRICT – WENTZVILLE

NOTICE TO HOMEOWNER(S) REGARDING LOW PRESSURE SANITARY SEWER SYSTEM.
NOTE: This subdivision will utilize a Low Pressure Sanitary Sewer System consisting of individual private grinder pump station(s) with pressurized discharge lateral line(s) for each lot, and public-type common collector pressure mains. Construction shall be in accordance with PWSD#2 of St. Charles County specifications for Low Pressure Sewer Systems. Ownership and maintenance responsibility for individual grinder pump station(s) and individual pressure discharge lateral(s) shall belong to the owner(s) of the respective residence/lot.



LOCATION MAP

BENCHMARKS:

PROJECT BENCHMARK:

SITE BENCHMARK: 551.60
SANITARY SEWER MANHOLE AT FRONT CORNER OF LOT 15 (THE WILDWOOD OF LSL) AND COMMON GROUND ON LAFAYETTE PLACE.

NOTES:

1. CONTRACTOR SHALL NOTIFY ST. CHARLES COUNTY 48 HOURS PRIOR TO ANY CONSTRUCTION OR DISTURBANCE ACTIVITIES IN ST. CHARLES COUNTY RIGHT-OF-WAY.
2. ALL PUMPS IN THUS LOW PRESSURE SEWER SYSTEM MUST BE E/ONE CORPORATION GRINDER PUMPS.

DRAWING INDEX

LEGEND

Sanitary Sewer (Proposed)
Sanitary Sewer (Existing)
Storm Sewer (Proposed)
Storm Sewer (Existing)
Water Line & Size
Existing Water line
Tee & Valve
Hydrant
Cap
18 Lot or Building Number
Existing Fence Line
Existing Tree Line
Street Sign
Existing Contour
Proposed Contour
Grouted Rip-Rap
End of Laterals
Asphalt Pavement
Concrete Pavement
Existing profile grade
Proposed profile grade
Common Collector Main (Size & Flow Direction)
Concrete Thrust Block (Deflection Angle) 22.5°
C.O. Cleanout & Valve Vault (Flushing Station)
V.V. 42" Dia. Valve Vault (Single House Connection)
D.V.V. 48" Dia. Duplex Valve Vault (Double House Connection)
A.R.V. Air Release Valve Vault
C.O. ISO. Cleanout & Isolation valve vault

Sanitary Structure
Storm Structure
Test Hole
Power Pole
Light Standard
Double Water Meter Setting
Single Water Meter Setting

C.I.	Curb Inlet
S.C.I.	Skewed Curb Inlet
D.C.I	Double Curb Inlet
G.I.	Grate Inlet
A.I.	Area Inlet
D.A.I.	Double Area Inlet
C.C.	Concrete Collar
F.E.	Flared End Section
E.P.	End Pipe
E.D.	Energy Dissipator
M.H.	Manhole
C.P.	Concrete Pipe
R.C.P.	Reinforced Concrete Pipe
C.M.P.	Corrugated Metal Pipe
C.I.P.	Cast Iron Pipe
P.V.C.	Polyvinyl Chloride
V.C.P.	Vitrified Clay Pipe
C.O.	Clean Out
V.T.	Vent Trap
T.B.R.	To Be Removed
T.B.R.&R	To Be Removed & Relocated
T.B.P.	To Be Protected
T.B.A.	To Be Abandoned
B.C.	Base Of Curb
T.C.	Top Of Curb
T.W.	Top Of Wall
B.W.	Base Of Wall
(TYP)	Typical
U.N.O.	Unless Noted Otherwise
U.I.P.	Use In Place
D.V.V.	Duplex Valve Vault
V.V.	Valve Vault
A.R.V.	Air Release Valve

APPROVED FOR CONSTRUCTION AND/OR INSTALLATION
ST. CHARLES ... WATER SUPPLY DISTRICT NO. 2

UTILITY NOTE:
UNDERGROUND FACILITY STRUCTURES AND UTILITIES HAVE BEEN PLOTTED FROM AVAILABLE SURVEYS AND RECORDED INFORMATION AND, THEREFORE, THEIR LOCATIONS MUST BE CONSIDERED APPROXIMATE ONLY. VERIFICATION OF LOCATION OF ALL UNDERGROUND STRUCTURES AND FACILITIES EITHER SHOWN OR NOT SHOWN ON THESE PLANS, SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

REVISIONS

12-13-04 PER PWSD#2 COMMENTS

PICKETT RAY & SILVER

Civil Engineers
Planners
Land Surveyors

333 Mid Rivers Mall Dr.
St. Peters, MO 63376
397-1211 FAX 397-1104

ENGINEERS AUTHENTICATION
The responsibility for professional engineering liability on this project is hereby limited to the set of plans authenticated by the seal, signature and date hereunder attached. Responsibility is disclaimed for all other engineering plans involved in the project and specifically includes revisions after this date unless reauthenticated.

PICKETT, RAY & SILVER, INC.

Signature 12/13/04 Date

OWNER - DEVELOPER
ST. CHARLES COUNTY DEPARTMENT
OF COMMUNITY DEVELOPMENT
CHARLES FELDMAN, P.E., NID COORD.
201 N. SECOND STREET, SUITE 420
ST. CHARLES, MO 63301
(636) 949-7305

DRAWN G.W.M. DATE 11-30-04
CHECKED DATE
FIELD BOOK #912 & #401
PROJECT # 8123.STCC.00R
JOB ORDER #

TIMBERLAINE TRAILS
PLAT TWO
TIMBERLAINE TRAILS
LOT 24
LOT 25
LOT 26
LOT 12
LOT 1
LOT 2
LOT 11
LOT 27
LOT 17
LOT 16
LOT 15
LOT 14
LOT 18
BRIDLEWOOD (50'W.)
TRAILSIDE (50'W.)
SCALE: 1"= 40'
40 0 40 80 120 Feet
50' BUILDING LINE
GRINDER PUMP
LATERAL ASSEMBLY W/CURB BOX
THRUST BLOCK
NOTE: TRACER WIRE TO BE ATTACHED TO FORCE MAIN.
NOTE: ALL SEPTIC TANKS TO BE DESTROYED, FILLED WITH WET SAND WITHIN 4" OF FINISH GRADE.
NOTE: ALL LATERALS CROSSING WATER LINES SHALL BE CONCRETE ENCASED.
NEW 48" SANITARY MANHOLE
CONNECT TO EXISTING WET WELL AND CONSTRUCT INSIDE DROP
NOTE: LIFT STATION FLOWS INTO O'FALLON EAST LIFT STATION
FND.IRON PIPE

PICKETT RAY & SILVER

CIVIL ENGINEERS
PLANNERS
LAND SURVEYORS

333 Mid Rivers Mall Drive
St. Peters, MO 63376
Phone (636) 397-1211
Fax (636) 397-1104

TIMBERLAINE TRAILS

N.I.D.

SITE PLAN

Prepared For:
ST. CHARLES COUNTY

REVISIONS	
NO.	DATE

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PICKETT, RAY & SILVER, INC

12/13/04

DRAWN MK	DATE 10/28/04
CHECKED DST	DATE 10/28/04
PROJECT # 83123.STCC.00R	
TASK # 1	FIELD 217 BOOK

TIMBERLAINE TRAILS
N.I.D.
SITE PLAN

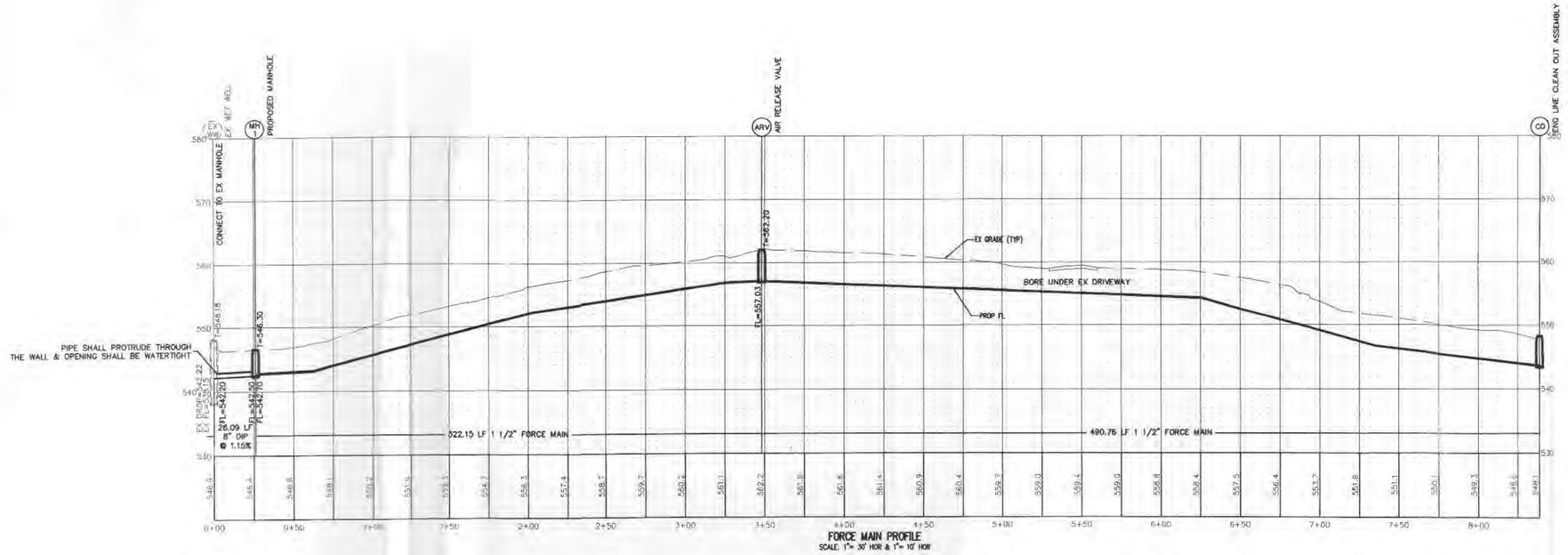
SHEET 2 OF 8

TIMBERLAINE TRAILS NEIGHBORHOOD IMPROVEMENT DISTRICT
ANALYSIS OF LOW PRESSURE SEWER SYSTEM WITH PIPE SCHEDULE
SDR 21 PVC

1 Branch No.	2 No. of Pumps	3 Accum Total	4 Max. On	5 Max. Flow (gpm)	6 Pipe Size (in)	7 Max. Velocity (ft/sec)	8 Length (ft)	9 Friction Loss (ft/100 ft)	10 Friction Loss Total (ft)	11 Accum. Friction Loss (ft)	12 Max. Main Elev. (ft)	13 Minimum Pump Elev. (ft)	14 Elev. Diff. (ft)	15 Max. Total Head (ft)
1	1	1	1	11	1.25	1.99	10	1.15	0.115	17.186	557	532	25	42.186
2	1	2	2	22	1.50	3.04	235	2.15	5.053	17.071	557	545	12	29.071
3	1	3	2	22	1.50	3.04	559	2.15	12.019	12.019	557	550	7	19.019

This table based on 200 gallons of usage per dwelling unit.

1 Branch No.	2 Accum No. of Pumps	3 Pipe Size (in)	4 Gal Per 100 Lineal Feet	5 Length (ft)	6 Capacity of Branch	7 Average Daily Fow	8 Average Fluid Changes Per Day	9 Average Retention Time (hr)	10 Accum. Retention Time (hr)
1	1	1.25	9.2	10	0.92	200	217.39	0.11	4.51
2	2	1.50	12.07	235	28.36	400	14.10	1.70	4.40
3	3	1.50	12.07	559	67.47	600	8.89	2.70	2.70



FORCE MAIN PROFILE
SCALE: 1"= 50' HOR & 1"= 10' VER

PICKETT RAY & SILVER
333 Mid Rivers Mall Drive
St. Peters, MO 63376
Phone (636) 397-1211
Fax (636) 397-1104
CIVIL ENGINEERS
PLANNERS
LAND SURVEYORS

TIMBERLAINE TRAILS
N.I.D.
FORCE MAIN PROFILE
Prepared For:
ST. CHARLES COUNTY

REVISIONS
NO. | DATE

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PICKETT, RAY & SILVER, INC
12/9/04

DRAWN	DATE
MK	10/26/04
CHECKED	DATE
DST	10/26/04

PROJECT # 83123.STCC.00R
TASK # 1 FIELD BOOK 217

TIMBERLAINE TRAILS
N.I.D.
FORCE MAIN PROFILE
SHEET 3 OF 8

SPECIFICATIONS

LOW-PRESSURE, FORCED MAIN SANITARY SEWER

DCSD LPSS SPECIFICATIONS: PACKAGE GRINDER SEWAGE PUMPS, SEMI-POSITIVE DISPLACEMENT TYPE

A. GENERAL:

1. Developer shall furnish and install Package Grinder Pump Stations completely factory built and tested, each consisting of a grinder pump suitably mounted in a fiberglass basin. All parts and accessories indicated, specified or required for proper installation, operation and maintenance shall also be provided.
2. All package grinder sewage pump stations in a Low Pressure Sewer System shall be of one manufacturer.
3. Developer shall furnish a computer printout showing system pipe sizing and branch analysis for the system as shown on the drawings. Information is to demonstrate retention times, total head losses and velocities at peak flows.
4. Submittals for District review shall include, but not limited to, the following data: (Hydraulic Institute Standards, ANSI Standards and ASTM Standards apply):

   a. Pumps: Name of manufacturer
   Type and model
   Rotative speed
   Net weight of pump
   Complete performance curves showing capacity versus head.

   b. UL Certification
   c. Show drawings specifically prepared for this project.
   d. Product data such as standard printed information on manufactured products that has not been specifically prepared for the project.
   e. Miscellaneous submittals such as specially prepared and standard printed warranties, testing and certification reports, operating and maintenance manuals.

B. OPERATING CONDITIONS:

1. The pumps shall be capable of delivering 11 gpm against a total dynamic head of 92 feet (40 psig) and 8 gpm at 138 feet (60 psig). The pumps must also be able to operate at negative heads without overloading the motors.
2. The grinder pump stations shall be of simplex or duplex design as indicated on the drawings. All pumps shall be of the same horsepower throughout the project area.
3. Characteristics of the liquid to be pumped: domestic wastewater.

C. GENERAL CONSTRUCTION:

1. Pump and Appurtenances:

a. PUMP.

The pump shall be custom designed, integral, vertical rotor, motor driven, solids handling pump of the progressing cavity type with mechanical seal. The rotor shall be through-hardened, highly polished, precipitation hardened stainless steel. 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, good aging and properties, and outstanding wear resistance.

b. GRINDER.

The grinder shall be positioned 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. The grinder will be of the rotating type with a stationary hardened and ground chrome steel shredding rings spaces close annular alignment to the driven impeller assembly, which shall carry two hardened type 400 stainless steel cutter bars. The assembly shall operate without objectionable noise or vibration over the entire range of recommended operating pressures.

The grinder shall be constructed 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 and sludge banks which would impair the operation of the pump. These requirements shall be accomplished by the following items in conjunction with the grinder tank pump:

1) The grinder shall be positioned in such a way that solids are fed in an up-flow direction.
2) At maximum flow, the average inlet velocity should not exceed .2 feet per second.
3) The impeller disc shall rotate at a nominal speed of 1725 RPM, or less.

c. TANK

The tank shall be custom molded of fiberglass reinforced polyester resin or thermoplastic or thermo-set material and shall be furnished with one PVC closed inlet flange to accept a 4-inch ASTM 3034-ADR 35 pipe. Tank capacities and dimensions shall be as shown on the contract drawings. The accessway shall be an integral extension of the FRP tank and shall be custom molded of fiberglass reinforced polyester resin and have a minimum burial of depth as shown on the contract drawings. It shall have an access opening at the top to accept a lockable fiberglass cover with skirt.

All discharge piping shall be constructed of 304 Series Stainless Steel and terminate outside the accessway bulkhead with a stainless steel, 1 ¼ inch female NPT fitting. The discharge piping shall include a stainless steel ball valve rated for 200 psi WOG. The bulkhead penetration shall be factory installed and warranted by the manufacturer to be watertight.

The accessway shall include a NEMA 4X junction box, factory installed with accessway penetrations warranted by the manufacturer to be weathertight. The accessway shall also include a 2 inch PVC vent to prevent sewage gases from entering accessway.

d. PUMP UNIT.

The grinder pump shall be easily removed from the basin.

e. MECHANICAL SEAL.

The core shall be provided with a mechanical shaft seal to preclude leakage between the motor and pump. The seal shall have a stationary ceramic seat and carbon rotating sealing surface with faced precision lapped and held in position by a stainless steel spring.

f. VALVES.

1) Check Valve.

The pump discharge shall be equipped with factory installed, gravity operated, flapper-type integral check valve or ball check valve built into the stainless steel discharge pipe. 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. Working parts of the flapper-type check valve will be made of a 300 series stainless steel and fabric reinforced synthetic elastomer to ensure corrosion resistance, dimensional stability, and fatigue strength. A non-metallic 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. Working parts of the ball check valve will be made of 300 series stainless steel. The valve body of the flapper type check valve shall be a high gloss injection molded part made of PVC and the valve body of the ball check valve shall be cast iron.

2) Redundant Check Valve.

Each grinder pump station shall include in its package one separate check valve for installation in the 1 ¼" service lateral between the Grinder Pump Station and the sewer main. The redundant check valve shall be a 1 ¼" gravity-operate, flapper-type check valve or ball check valve. This redundant check valve shall be constructed of the identical materials as specified for the check valve.

3) Anti-Siphon Valve.

The pump shall be constructed in a positively-primed flooded suction configuration. As added assurance that the pump cannot lose prime, even under negative pressure conditions in the discharge piping system, the pump shall be equipped with a factory installed, anti-siphoning air relief valve, in the discharge piping immediately below the check valve. This valve will automatically open when the pump is off.

g. ELECTRIC MOTOR

The motor shall be a 1 HP, 1725 RPM, 240 volt, 60 Hertz, 1 Phase capacitor start, ball bearing, squirrel cage, 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 in the motor. This motor protector combination shall have been specifically investigated and listed by Underwriters Laboratories, Inc., for the application.

h. CONTROLS.

Non-fouling wastewater level detection for controlling pump operation shall be accomplished by monitoring the pressure changes in an integral air-bell sensor 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.

Each level control shall have its own built-in fail safe design which will prevent the entrance of moisture into the controls. To assure reliable operation of the pressure sensitive switches, each pump shall be equipped with a quick disconnect breather assembly, complete with a check valve to prevent accidental entry of water into the motor compartment.

The grinder pump will be furnished with a minimum of two ten foot (10) lengths of type UF cable, pre-wired and water tight.

i. ALARM DISCONNECT PANEL.

Each grinder pump station shall include a NEMA 3R, UL listed ALARM/DISCONNECT PANEL suitable for wall or pole mounting. The NEMA 3R enclosure shall be manufactured of thermoplastic or fiberglass to assure corrosion resistance. The enclosure shall include a hinged, pad lockable cover, secured dead front and component knockouts.

For each pump, the panel shall contain one (1) – double pole circuit breaker for the power circuit and one (1) – single pole circuit breaker for the alarm circuit. The panel shall contain terminal blocks, integral power bus, and a complete alarm circuit.

The Alarm/Disconnect Panel shall include an audio-visual alarm device with alarm sequence as follows:

1) When liquid level in sewage wet-well rises above alarm level, visual and audio alarms will be activated.
2) Audio alarm may be silenced by means of the externally mounted, push-to-silence button.
3) Visual alarm remains illuminated until sewage in wet-well returns to normal operating level.

The visual alarm shall be 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 rain proof integrity. For duplex units, in addition to the above, two high level indicator lights shall be mounted behind the access cover. During a high level alarm condition the appropriate light will illuminate to indicate which pump requires service.

The audio alarm shall be a minimum 86 dB horn or buzzer. The audio alarm shall be capable of being de-activated by depressing a push-type silence switch which is encapsulated in a weatherproof silicone boot and mounted on the bottom of the enclosure.

The entire Alarm/Disconnect Panel as manufactured, shall be listed by Underwriters Laboratories, Inc.

j. WIRING.

Contractor shall be responsible to furnish and install service entrance equipment and/or branch circuit protection and all wiring to the grinder pump leads, in compliance with national and local electric codes. Contractor shall be responsible for providing power to the pumping stations as indicated on the drawings.

k. CORROSION PROTECTION.

All materials exposed to wastewater shall have inherent corrosion protection i.e., cast iron, fiberglass, stainless steel, PVC. Any exterior steel surfaces are to be suitably protected against corrosion. Galvanized steel is prohibited.

l. SERVICEABILITY.

The grinder pump shall have lifting eyes with nylon/polypropylene rope used to facilitate easy removal of the pump from the tank when necessary.

m. 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 in its tank shall be listed by Underwriters Laboratories, Inc.

n. SPARE PUMPS

Furnish three (3) complete spare grinder pump units. Each unit shall include motor, grinder, pump, check valve, anti-siphon valve and pressure switch assemblies of the same type as furnished for the grinder pump stations to assure replacement or repair within a reasonable period of time.

o. MANUALS.

Each grinder pump unit shall be furnished to the Owner with three (3) copies of detail wiring diagrams, operation and maintenance manual and detailed installation instructions for each type of unit.

p. Developer shall provide one complete 300-lb. capacity tripod lifting hoist for use in grinder pump removal including winch, tripod, pulleys, cables, and necessary accessories.

D. INSTALLATION:

Installation procedures shall be as recommended by the pump manufacturer, the Hydraulic Institute Standards, and as required herein.

E. PERFORMANCE TESTING:

Each grinder pump shall be submerged and operated for five (5) minutes (minimum). At no time during the installation or testing of the grinder pump station shall water be introduced into the access way of the station. Contractor shall consult with the pump manufacturer. Included in this procedure will be the testing of all appurtenances components such as, the anti-siphon valve, check valve, discharge piping, level sensors, each unit's dedicated controls, respective alarm/disconnect panel, etc. All factory tests shall incorporate each of the above listed items. Actual appurtenances and motor controls which will be installed in the field, shall be particular to the tested pump only, a common set of appurtenances and motor controls for all pumps will not be acceptable. Certified test results shall be supplied showing the operation of each grinder pump at three (3) different points on its curve, with the maximum pressure not less than 60- psi.

F. MANUFACTURER'S INSTALLATION AND START-UP SERVICES:

Manufacturer shall provide a factory-trained serviceman to perform installation, start-up, and field testing services prior to acceptance by the Owner. Services shall include: (1) train Contractor on proper installation of equipment, (2) train Contractor on proper testing procedures, (3) inspect all installations and review all test results. All equipment and materials necessary to perform testing shall be the responsibility of the Contractor. This will include, as a minimum, a portable generator (if temporary power is required), ammeter, and water in each basin.

Upon completion of the start-up and testing, the Contractor shall obtain from Manufacturer and submit to Engineer the Manufacturer's start-up authorization form describing the results of the tests performed for each grinder pump station tested, and bearing the signature of the manufacturer's authorized technician, signifying approval of the installation and test results. Final acceptance of the system will not occur until authorization forms have been received for each pump station installed.

G. WARRANTY AND GUARANTEE:

PICKETT RAY & SILVER
CIVIL ENGINEERS
PLANNERS
LAND SURVEYORS
333 Mid Rivers Mall Drive
St. Peters, MO 63376
Phone (636) 397-1211
Fax (636) 397-1104

TIMBERLAINE TRAILS
SANITARY SEWER IMPROVEMENTS
FORCE MAIN SPECS.

Prepared For:
Charles Feldman, P.E.
NID COORDINATOR
201 N. SECOND STREET
SUITE 420
ST.CHARLES, MISSOURI 63301
(636) 949-7305

REVISIONS NO.	DATE	

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PICKETT, RAY & SILVER, INC

DRAWN G.M.	DATE 7-14-04
CHECKED G.M.	DATE 7-14-04
PROJECT # 83123STCCOOR	
TASK # -	FIELD BOOK -

TIMBERLAINE TRAILS
SANITARY SEWER IMPROVEMENTS

SHEET 4 OF 8

SPECIFICATIONS

LOW–PRESSURE, FORCED MAIN SANITARY SEWER

The Manufacturer shall warrant and guarantee to the Owner that all equipment will be in accordance with the foregoing specifications and will not be defective. All defective equipment, whether or not in place, may be rejected.

The Manufacturer shall provide the following warranty from the date of final acceptance of the project as established by the Owner. The warranty shall be a full parts and labor warranty covering every component of the station tank, pump housing, controls, wiring, direct burial cable, pump assembly, (including pump stator and controls), alarm disconnect panel, and any on site diagnostic time or travel time to pump station site.

Inclusive of this warranty, service provider will be responsible for providing and replacing any defective pump or component with a loaner pump or component during the time frame required to repair to the original pump and replacing original pump and retrieving loaner pump after repair is complete. The time and travel for this will also be covered by this warranty. Manufacturer shall be responsible for shipment costs and shipment scheduling of any pumps, parts, and/or any combination of the aforementioned items that make up the entire grinder pump station as an assembled unit.

The warranty shall include service with a maximum two (2) hour response time to the pump station site, twenty-four (24) hours a day, seven (7) days a week utilizing a toll free 1-800 number to a staffed answering service.

This warranty will begin at the date of final acceptance of the project by the Owner and according to the following schedule. This schedule represents the manufacturer's responsibility for parts, labor and other expenses on warranty items with the balance due by the Owner.

Year		Year	
1	100%	6	100%
2	100%	7	100%
3	100%	8	50%
4	100%	9	33.5%
5	100%	10	25%

Any and all service providers must be approved and trained by the Manufacturer.

A. LPSS SYSTEM GENERAL REQUIREMENTS:

1. Upon completion of construction, establishment of easements, final field approval by the District, and proper execution of all required Connection and Dedication Agreements, the District may accept the public dedication of the **Common Collector Mains**, to include collector main lines, appurtenances directly attached to the main, branch mains and valve vaults.
2. The gravity lateral, grinder pump station, control panel, electric service, and pressure discharge lateral for each individual home/unit/connection, will belong to, and be the responsibility of the owner of each respective home/unit/connection. Pressure lateral connections to the valve vault on the public main is the responsibility of the respective home owner. Connections must be done in a proper manner and require inspection approval from the District.
3. District approval and inspection is required for the entire common collector main portion of the system.
4. District approval and inspection is required for the connections to the valve box. County Building Department Permits and/or Inspections are required for septic tank demolitions, electrical and/or plumbing work. The individual owners or builders are required to secure said Permits and/or Inspections.
5. District reserves the right to reject or disallow pressure lateral connection to Valve Box when non-specified equipment is used in the aforementioned "private individual portion" of the system. See sections A.6, A.7, and B.3.
6. Upon connection to the system, each individual homeowner will be responsible for payment of their own respective sewer user charges and applicable surcharges, as determined by the District and in accordance with its 'Rules, Rates and Regulations'. Non-payment of said sewer user charges and/or applicable surcharges by the homeowner to the District, may result in placement of lien on property, discontinuance of water supply or disconnection from the common public main system, or other measures necessary as determined by the District. All sewer users are subject to the 'Rules, Rates and Regulations' of the District.
7. Homeowners are responsible for supply and maintenance of their own respective electrical power source.

B. LPSS COLLECTOR MAIN SPECIFICATIONS:

1. All Collector Main construction requires plan approval and field inspection by the Duckett Creek Sanitary District. An Engineer's Report shall accompany all plan submittals and shall specify appropriate strength, sizing and type of all materials. Self-cleaning velocities and six (6) hour maximum retention times are recommended.
2. All Collector Mains, main branches and Valve Boxes shall be placed in dedicated Recorded Public right-of-way or easement.
3. The Collector Pressure Main shall discharge to a District gravity sewer 42" I.D. manhole at or within one foot of the gravity low flow line. Connections to a 48" I.D. manhole may be performed utilizing District approved "inside-drop pipe". All connections to gravity manholes should provide a smooth transition from pressure to gravity, minimizing "free-fall" or splashing conditions.
4. 12 AWG tracer wire shall be placed on the entire length of the force main, to be accessed at existing gravity manholes, air-release valve vaults, clean-out vaults and other surface appurtenances.

5. Unless special design parameters dictate otherwise (provide Engineering documentation), all **Common Collector Pressure Mains** shall:
   a. Be laid using "equal to or stronger than", bell and gasketed SDR 21 PVC pressure pipe. Glued Schedule 80 PVC fittings shall be allowed within the valve box interiors and as shown on detail. Bury at minimum 36" Depth for frost protection.
   b. Maintain a minimum pipe inside diameter of two inches, or as approved by the District.
   c. All PVC fittings on the Collector Pressure Main shall be SDR 21 PVC.
   d. Force main flushing clean-outs shall be provided appropriately to facilitate complete flushing of the Collector Pressure Main. One and one-half inch (1-1/2") I.D. bronze Cam-lock female Disconnect fittings are recommended. In general, clean-outs should be installed at the terminus end of each main, every 1,000 feet on straight runs of pipe, and whenever two or more mains come together and feed into another main.
   e. Air-release valves shall be provided at all high points on the Collector Pressure Main. Cleanout flushing fixtures may be placed within the Air-Release valve vault. Increase size of vault to 48" I.D. to accommodate additional fixtures.
   f. Isolation valves shall be provided at junctions of two or more mains.
   g. Concrete thrust blocks shall be provided for all elbows and tee fittings on the Collector Pressure Main.
   h. All appurtenances on the collector main requiring surface access, such as flushing clean-outs, air-release valves, isolation valves, etc., shall be housed within a 42" minimum I.D. concrete type vault, with cast-iron frame and cover. Materials shall be of strength similar to standard gravity sewer manhole construction. It is anticipated that some vaults may fall in paved driveway or roadway areas, wherein lock type lid will be required.
   i. Any permits, licenses, easements or approvals required to work on public or private properties or roadways are the responsibility of the developer.
   j. Individual pressure main branches from the Collector Pressure Main to the valve box shall be SDR 21 PVC, and sized appropriately. Bury at minimum 36" depth for frost protection.
   k. Pressure main stub branches shall terminate within a valve box located within either dedicated recorded public right-of-way or easement adjacent to ROW. District must access valve boxes from public roadway. A lockable ball/gate valve and check valve shall be provided for each individual pressure lateral connection within the valve box. Direct burial of valves not allowed.
   l. Check valve and ball valve sets shall be placed in valve vault for each individual pressure lateral connection. Recommend Ball Valve, Brass, female x female McDonald #2131 or Ford 1 1/4" x 1 1/4" or approved equal. Bronze body valves will be considered only if internal parts and fasteners are stainless steel. Recommend Check Valve compatible and equal to E-1 Corporation. Victaulic Couplings/Unions on both sides of valves must be utilized to allow removal and/or replacement valves within the valve box. Placement of multiple check and ball valve sets within valve vault require District approval.
   m. It shall be the Developer/Homeowner's responsibility to maintain proper match of grade-to-top elevation of the Valve Box. All adjustments of the Valve Box top elevations require District inspection.
   n. Inside diameter of valve vaults for single valve connections shall be a minimum of 42". 48" inside diameter vaults shall be utilized for all duplex valve connections.
   o. The Contractor shall apply a liner or Epoxy Seal Coat to the interior of the existing gravity manhole(s) receiving the LPSS discharge, for protection against Hydrogen Sulfide damage.
   p. Material for bedding and immediate backfill for pressure pipes in the Common Collector Main shall be Select Earth unless otherwise noted on the construction plan.

C. COLLECTOR MAIN PRESSURE TEST:

1. Successful Field Pressure Testing of the Common Collector Main system shall be required prior to initial 90% Escrow Release. Contractor shall perform test in presence of DISTRICT Inspector.
2. Pressure tests shall be made only after the completion of backfilling operations and after the concrete thrust blocks have set for at least thirty-six (36) hours.
3. The pipe line shall be slowly filled with water. During filling of the pipe and before applying the specified pressure, all air shall be expelled from the pipeline via exercise of the Air Release Valves, Valve Vault Valve Sets and/or Clean-outs. Contractor to verify said Air Release Valve operation.
4. The specified pressure measured at the lowest point of elevation shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Design Engineer and/or Inspector. (Typically, via a Clean-Out fixture on the main).
5. Test pressure of seventy (70) PSI to ninety (90) PSI shall be maintained for a duration of one (1) hour unless otherwise directed by the Engineer and/or Inspector. Minimum allowable pressure shall be fifty (50) PSI.

D. INSPECTIONS:

1. Connections of the individual pressure discharge pipe to the connection in the Valve Box requires approval and approval by the Sewer District, 24 hour advance notification required. The Sewer District shall verify that the connection to the Valve Box has been completed correctly and that the proper authorized brand pump has been installed in the pump station. District reserves the right to deny connection for an unauthorized or improper pump station.
2. Individual Electric Control Panel shall be installed per applicable Building Codes/Building Permit requirements, and shall be installed within eye-sight of the corresponding pump station.
3. Corresponding Municipal Building Department may require written verification that pump/pump station has been installed by a Factory Authorized Installer. Installer shall be prepared to produce a Letter of Verification stating he is an Authorized Installer and that the pump/pump station for referenced lot/address has been installed in accordance with the Factory requirements.

4. Escrow release and disbursements by the Escrow Holder to be made only upon written notification by the Sewer District, shall be typically of 90% of the Escrow Sum upon initial completion of the installation of the Common Collector Main improvements and successful pressure testing of same. Final 10% release of the Escrow Sum shall typically be authorized upon District approval of recorded easementation submittals, formal Dedication by the Developer, and final field inspection approval by the District.

LPSSPlanDetailSpecs

PICKETT RAY & SILVER
CIVIL ENGINEERS
PLANNERS
LAND SURVEYORS
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TIMBERLAINE TRAILS
SANITARY SEWER IMPROVEMENTS
FORCE MAIN SPECS.

201 N. SECOND STREET
SUITE 400
ST.CHARLES, MISSOURI 63301
(636) 946-7505

Prepared For:
Charles Feldman,P.E.
NID COORDINATOR

REVISIONS		
NO.	DATE	

ENGINEERS AUTHENTICATION
The responsibility for professional engineering liability on this project is hereby limited to the set of plans authenticated by the seal, signature, and date hereunder attached. Responsibility is disclaimed for all other engineering plans involved in this project and specifically excludes revisions after this date unless reauthenticated.
PICKETT, RAY & SILVER, INC

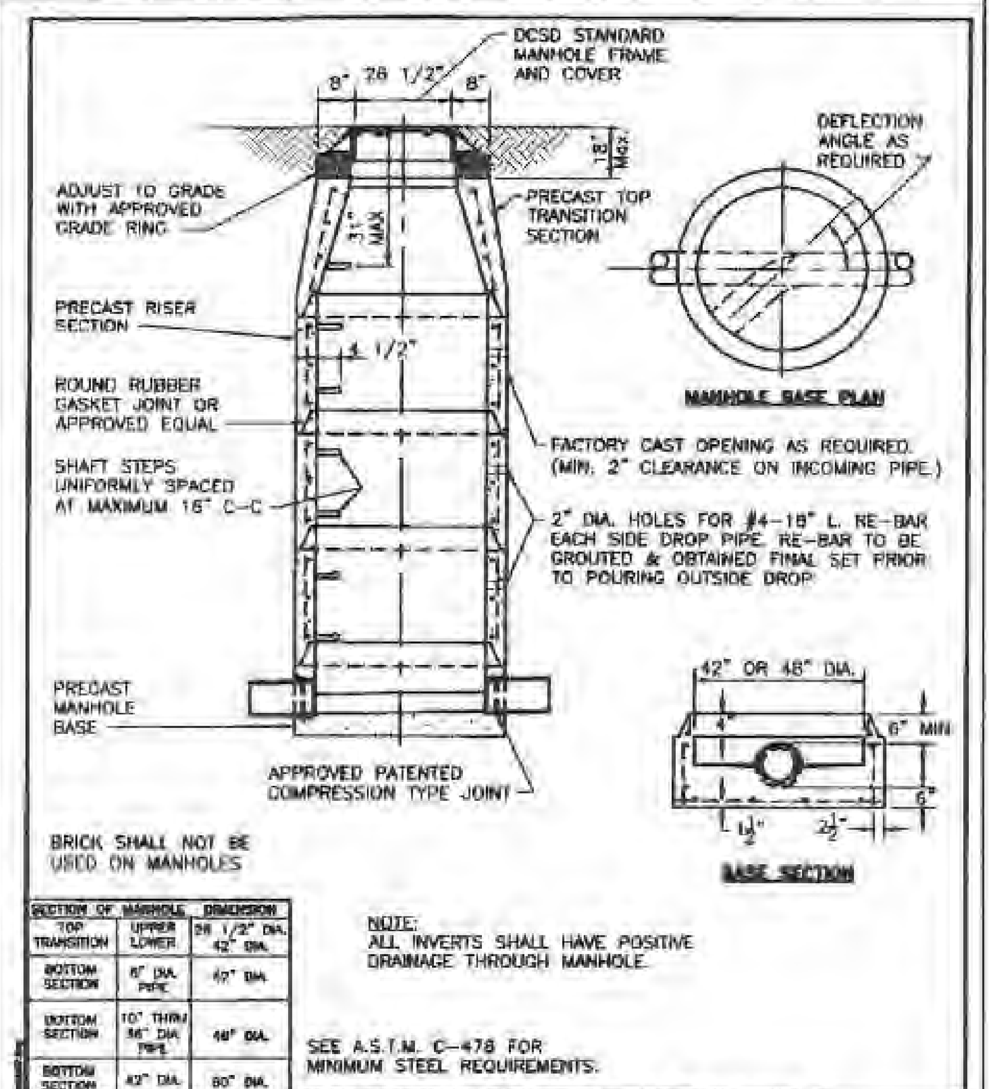
12/15/04

DRAWN	DATE
G.M.	7-14-04
CHECKED	DATE
G.M.	7-14-04
PROJECT # 8312.35TCCOOR	
TASK # –	FIELD BOOK –

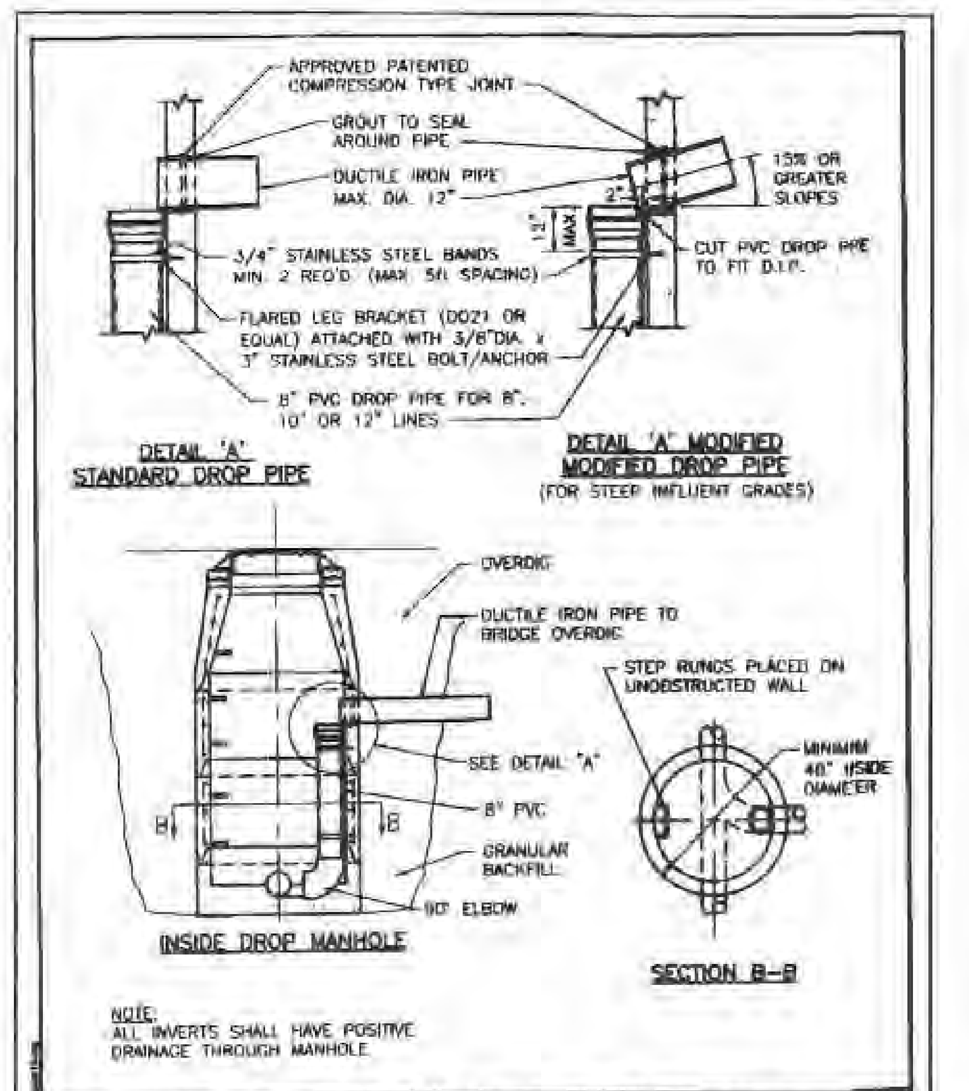
TIMBERLAINE TRAILS
SANITARY SEWER IMPROVEMENTS
SHEET 5 OF 8

TIMBERLAINE TRAILS FORCED MAIN SPECS.

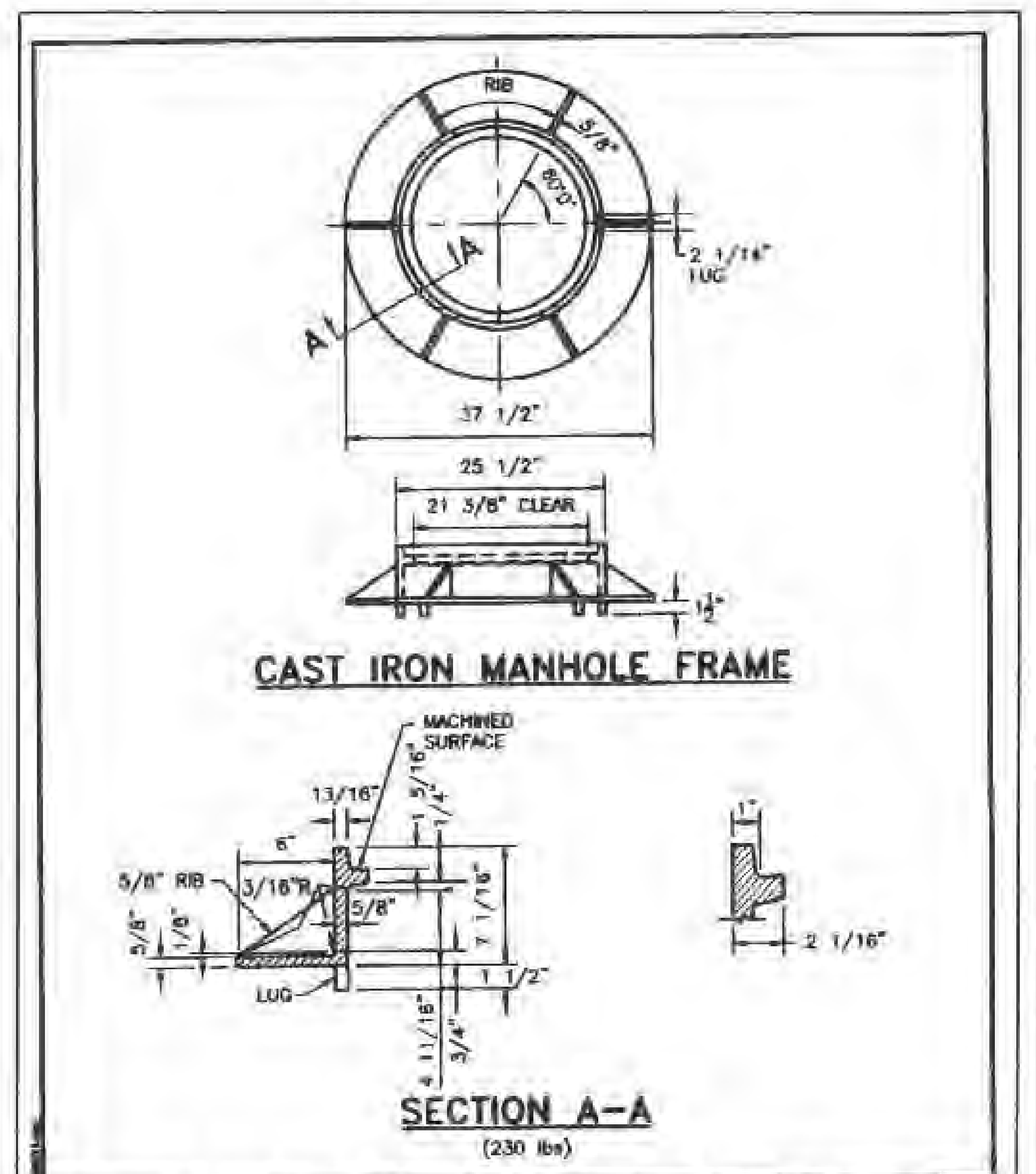
JOB# 831/23.STCC.DOR DECEMBER 2004



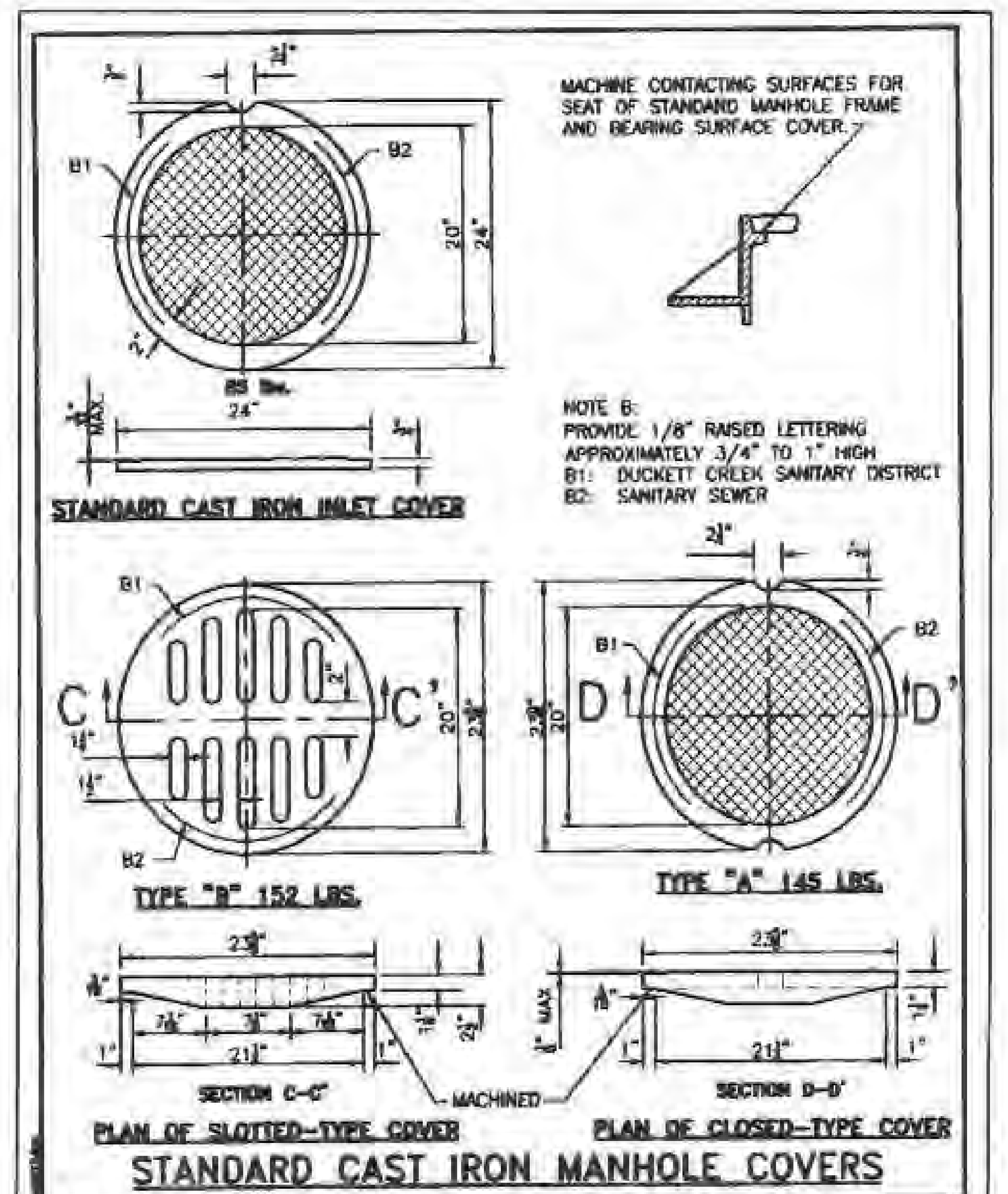
Duckett Creek Sanitary District — PRE-CAST CONCRETE MANHOLE FOR SEWERS 8" THROUGH 18" — Dsn By: BSM — App By: KLA — Chd By: MDOB — Date: 12-30-99 — Detail No. 7



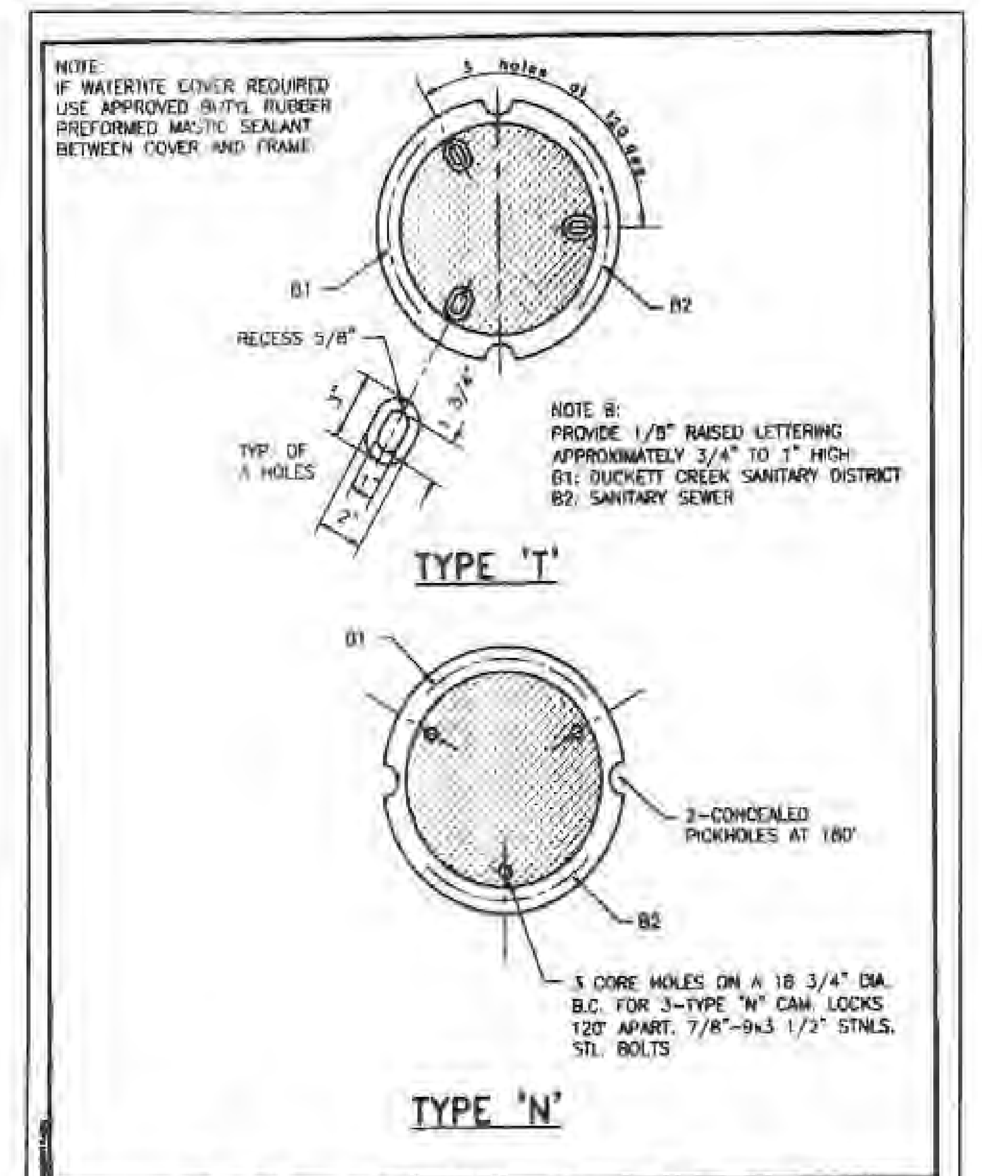
Duckett Creek Sanitary District — INSIDE DROP MANHOLE — Dsn By: BSM — App By: KLA — Chd By: MDOB — Date: 01-10-00 — Detail No. 10



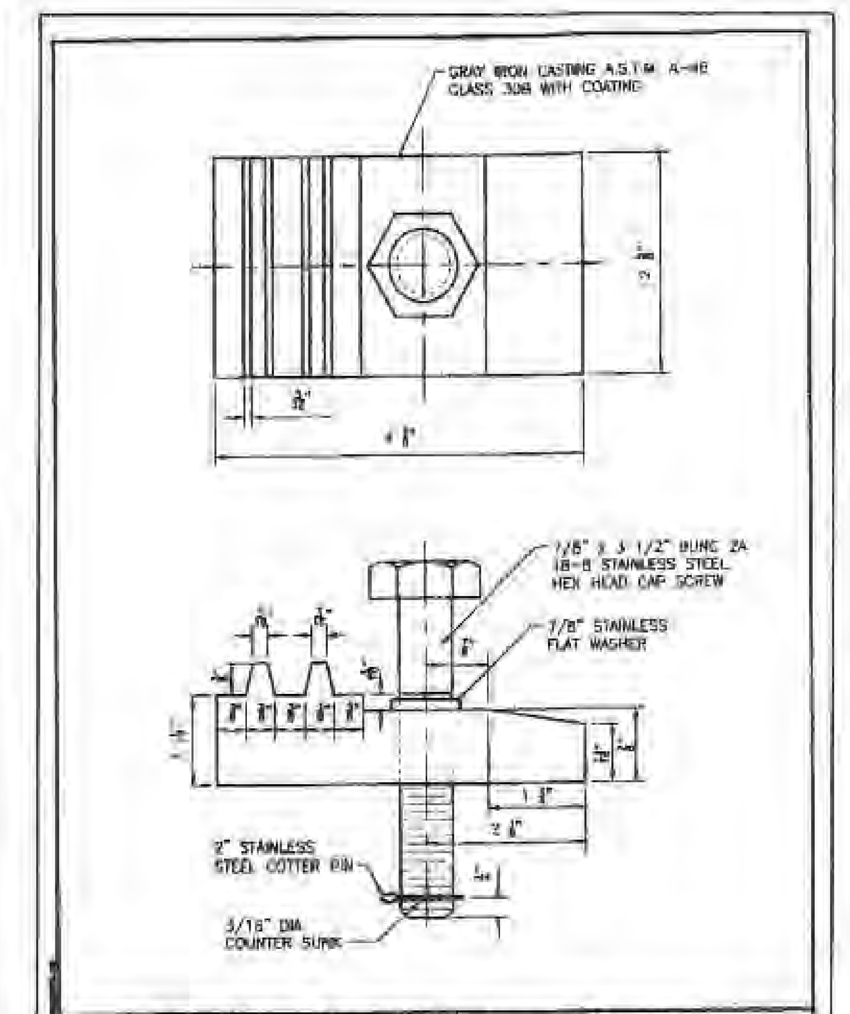
Duckett Creek Sanitary District — CAST IRON MANHOLE FRAME — Dsn By: BSM — App By: KLA — Chd By: MDOB — Date: 01-14-00 — Detail No. 11



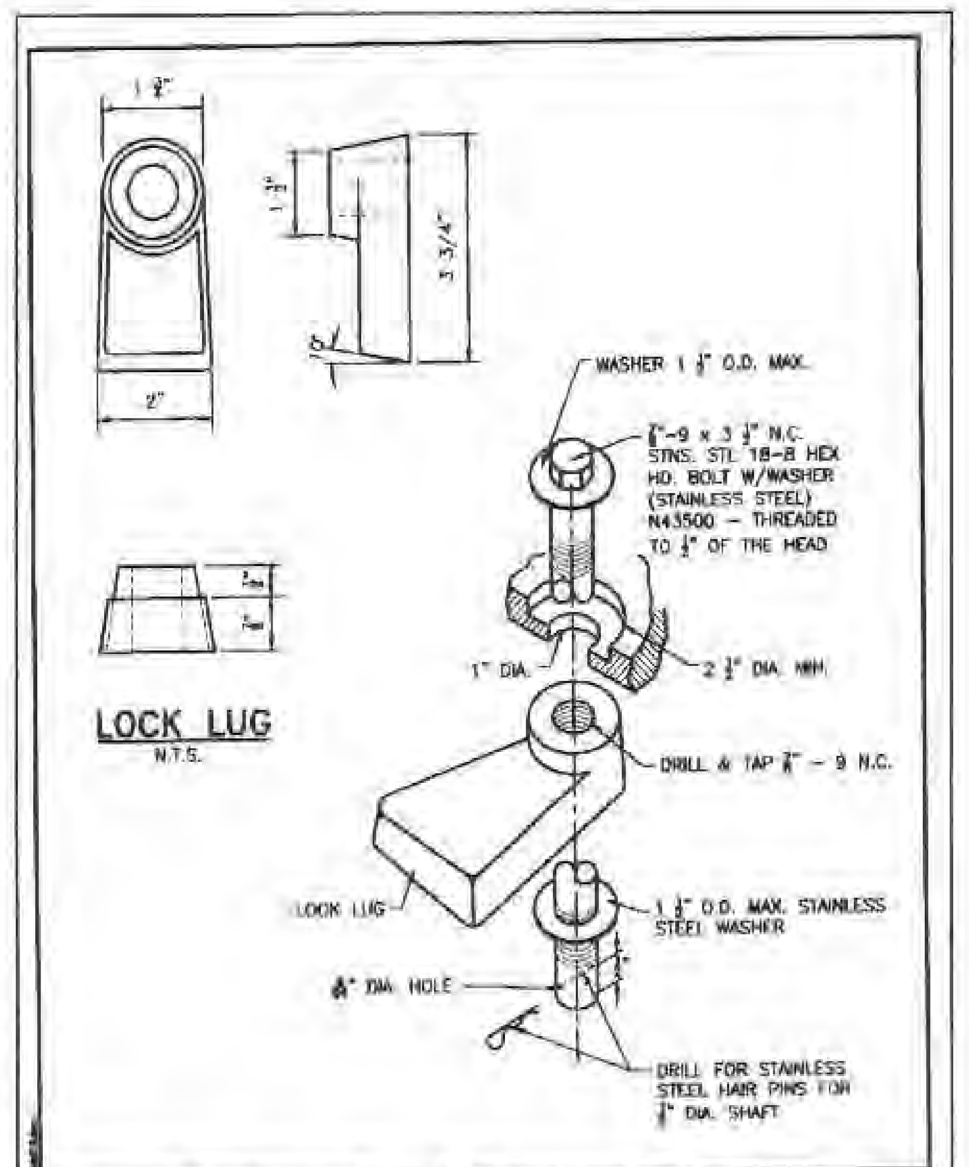
Duckett Creek Sanitary District — CAST IRON COVERS MANHOLES AND INLETS — Dsn By: BSM — App By: KLA — Chd By: MDOB — Date: 12-22-00 — Detail No. 13



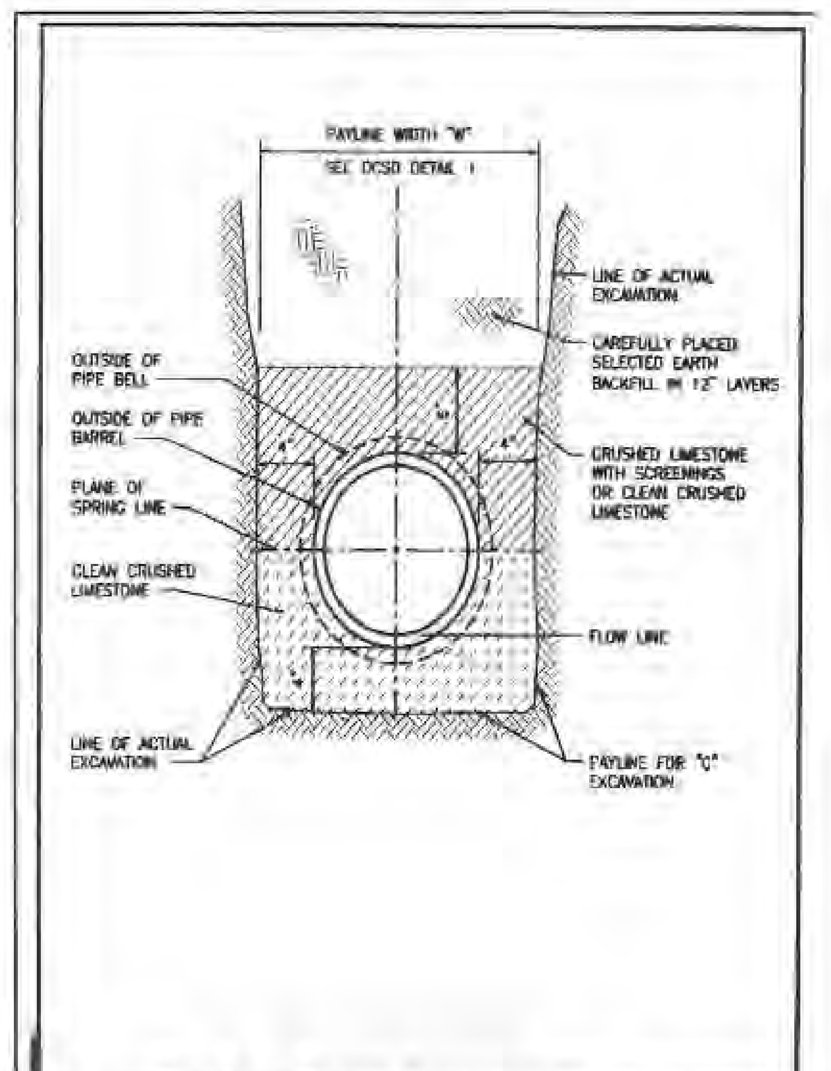
Duckett Creek Sanitary District — CAST IRON MANHOLE COVERS (LOCK TYPE) — Dsn By: BSM — App By: KLA — Chd By: MDOB — Date: 12-27-00 — Detail No. 14



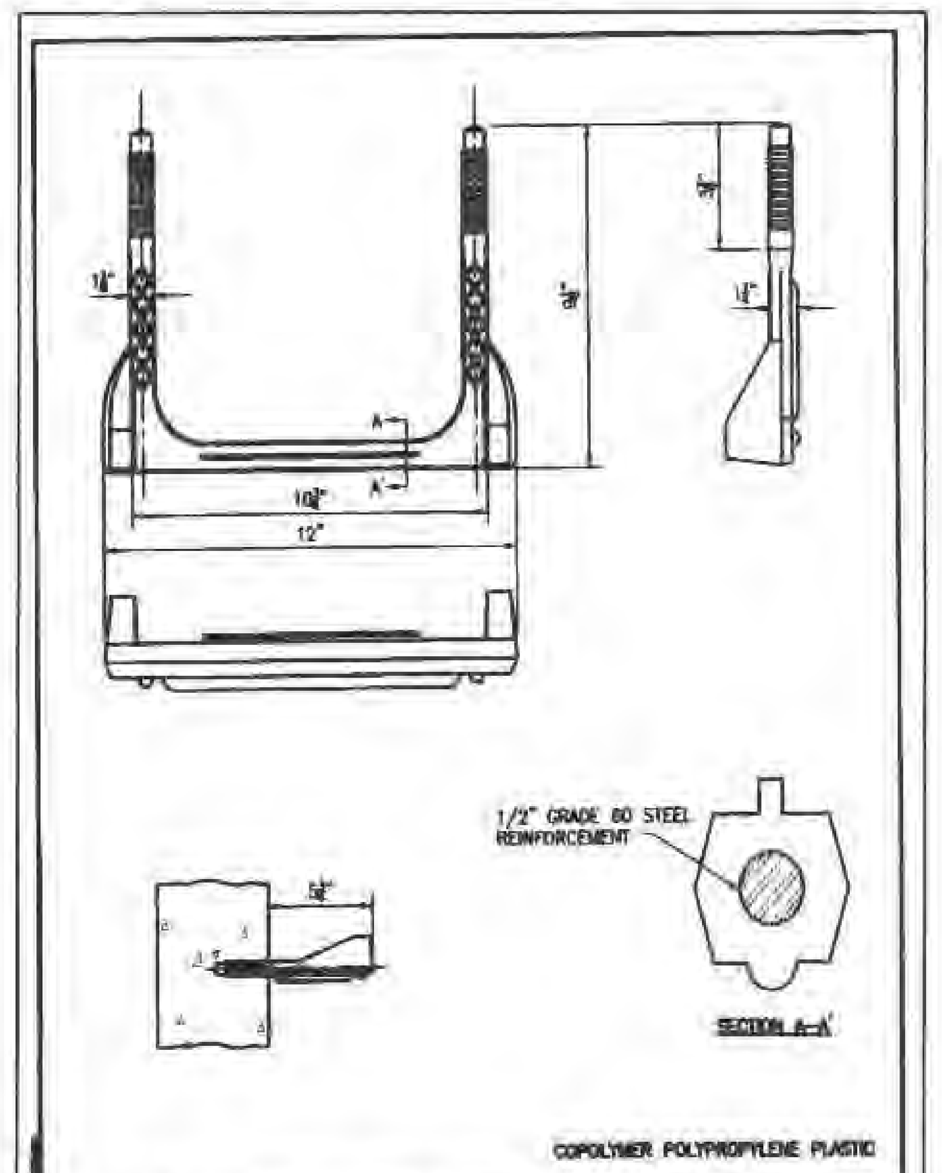
Duckett Creek Sanitary District — LOCKING DEVICE FOR TYPE "T" LOCK TYPE MANHOLE COVER — Dsn By: BSM — App By: KLA — Chd By: MDOB — Date: 12-27-00 — Detail No. 15



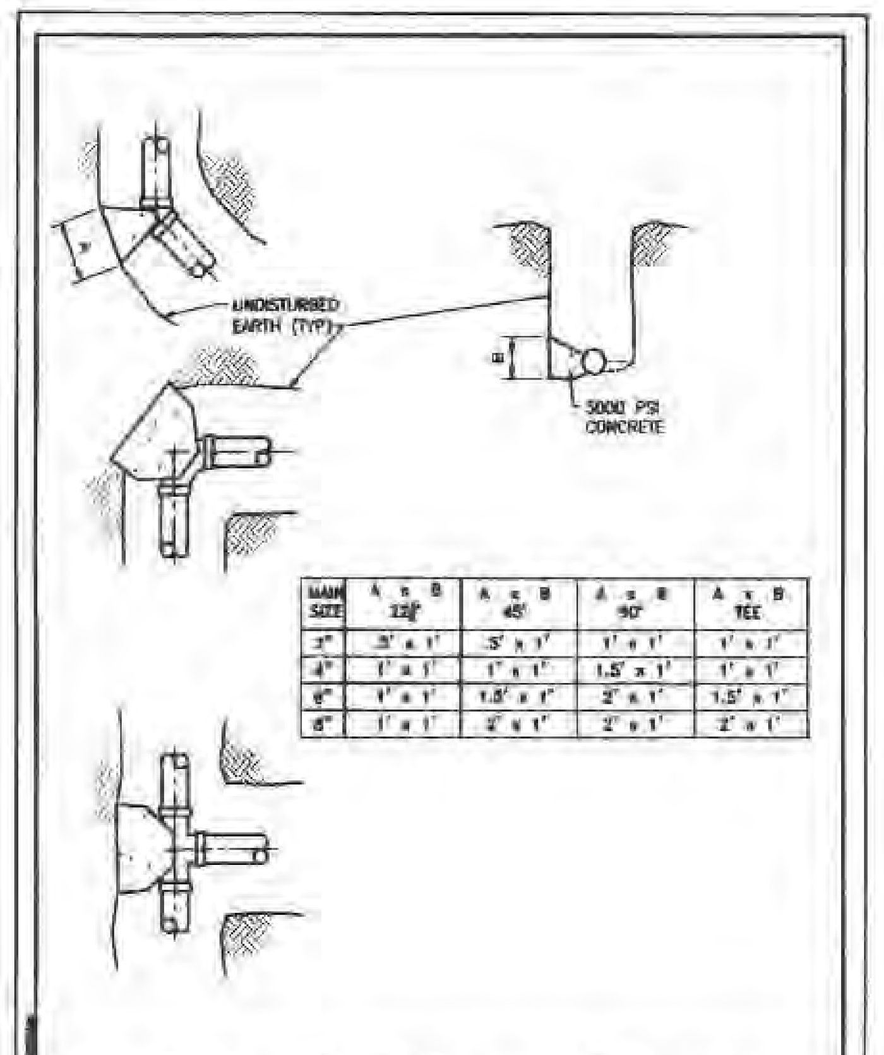
Duckett Creek Sanitary District — LOCKING DEVICE FOR TYPE "N" LOCK TYPE MANHOLE COVER — Dsn By: BSM — App By: KLA — Chd By: MDOB — Date: 12-28-00 — Detail No. 16



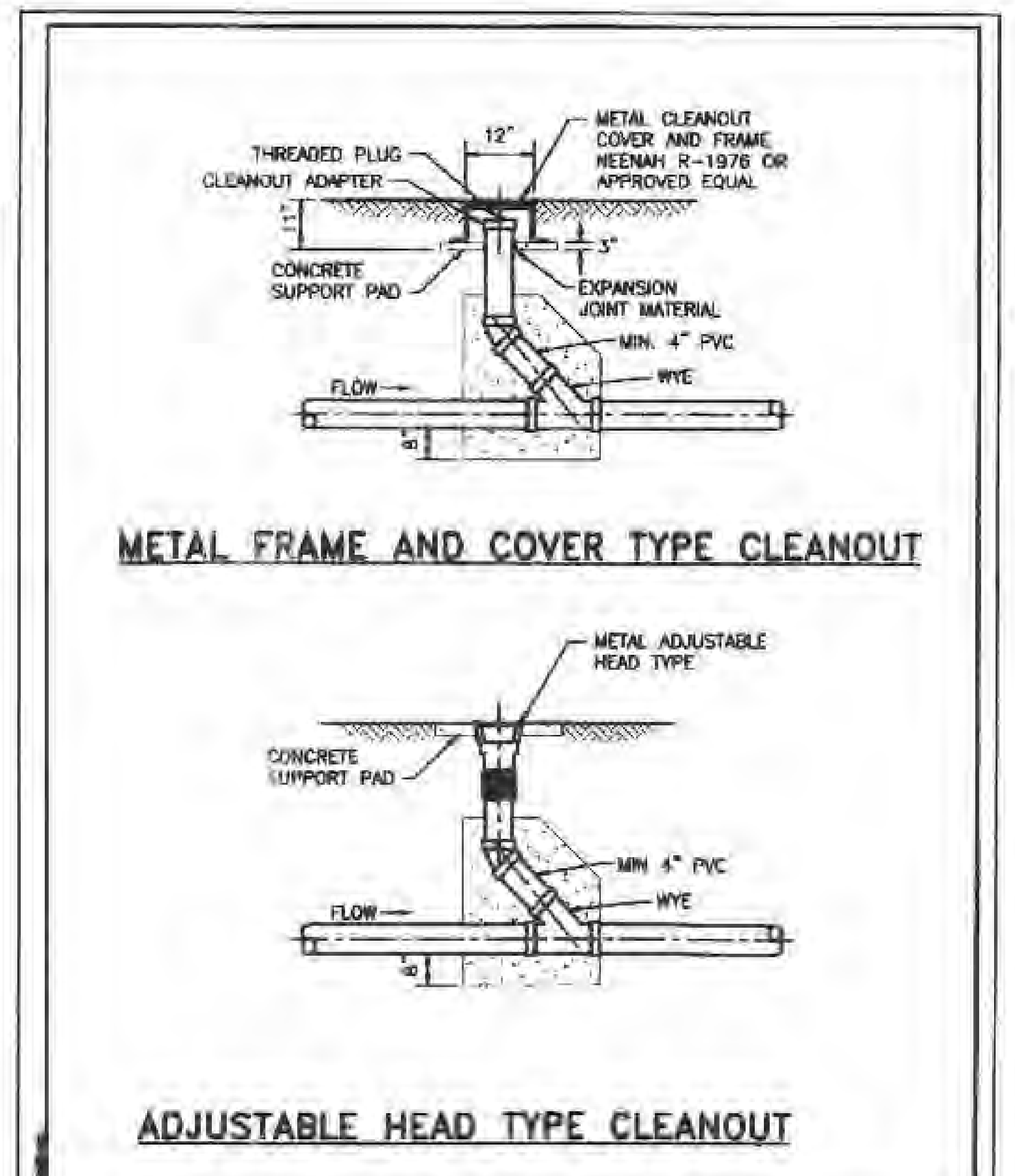
Duckett Creek Sanitary District — PIPE BEDDING CLASS "C" (FOR ALL PIPE EXCEPT REINFORCED CONCRETE PIPE) — Dsn By: BSM — App By: KLA — Chd By: MDOB — Date: 12-21-00 — Detail No. 3



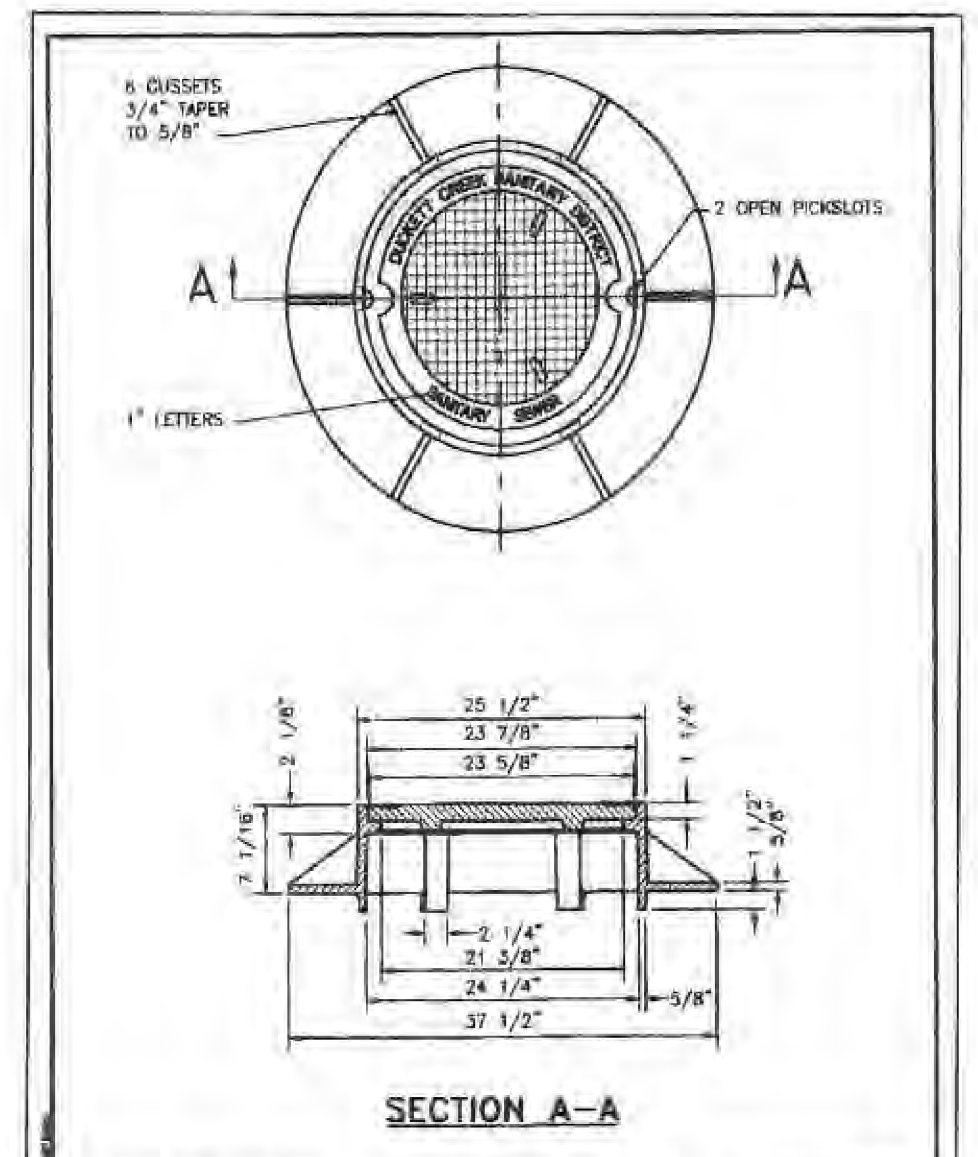
Duckett Creek Sanitary District — MANHOLE STEP PRECAST MANHOLE — Dsn By: BSM — App By: KLA — Chd By: MDOB — Date: 1-3-01 — Detail No. 18



Duckett Creek Sanitary District — THRUST BLOCK DETAIL AND SIZE SCHEDULE — Dsn By: BSM — App By: KLA — Chd By: MDOB — Date: 1-8-01 — Detail No. 29



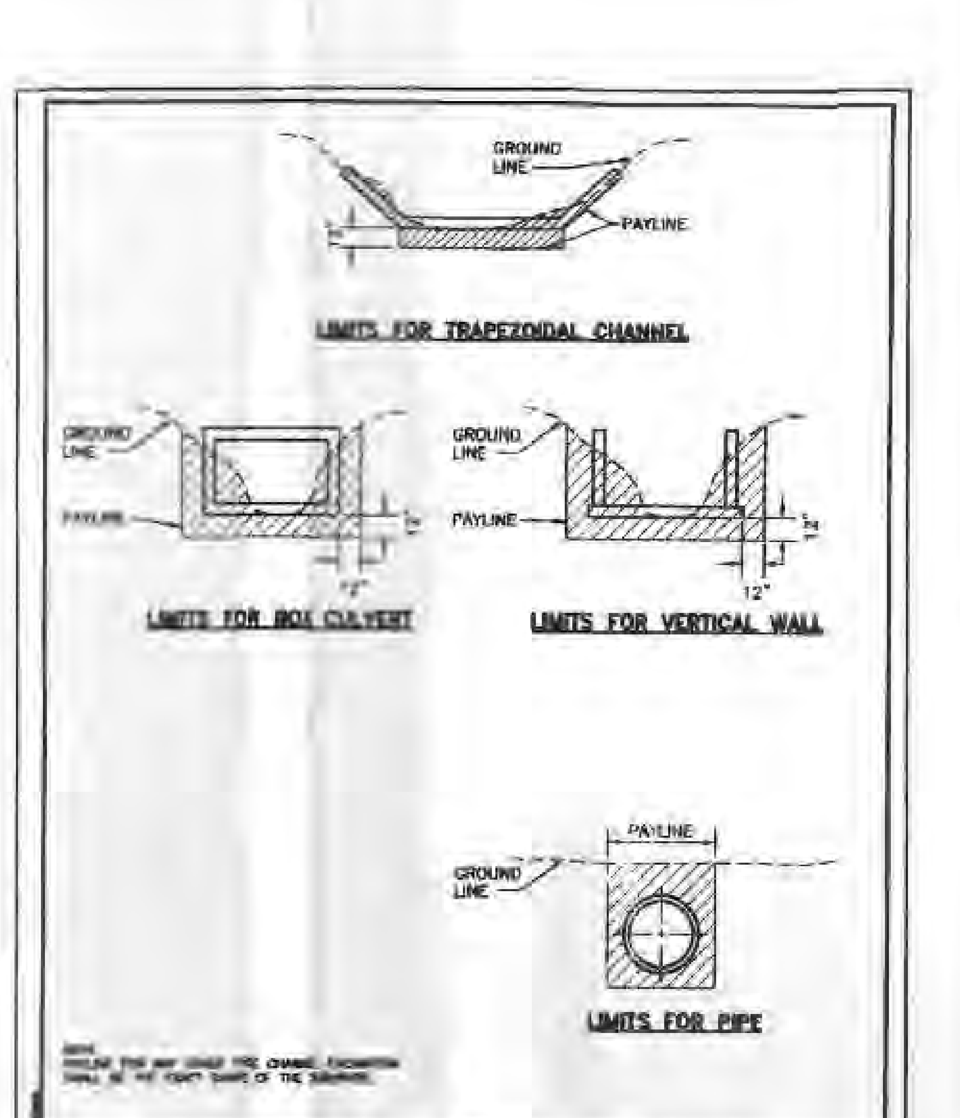
Duckett Creek Sanitary District — TYPICAL SEWER LATERAL CLEANOUT DETAILS — Dsn By: BSM — App By: KLA — Chd By: MDOB — Date: 1-8-01 — Detail No. 25



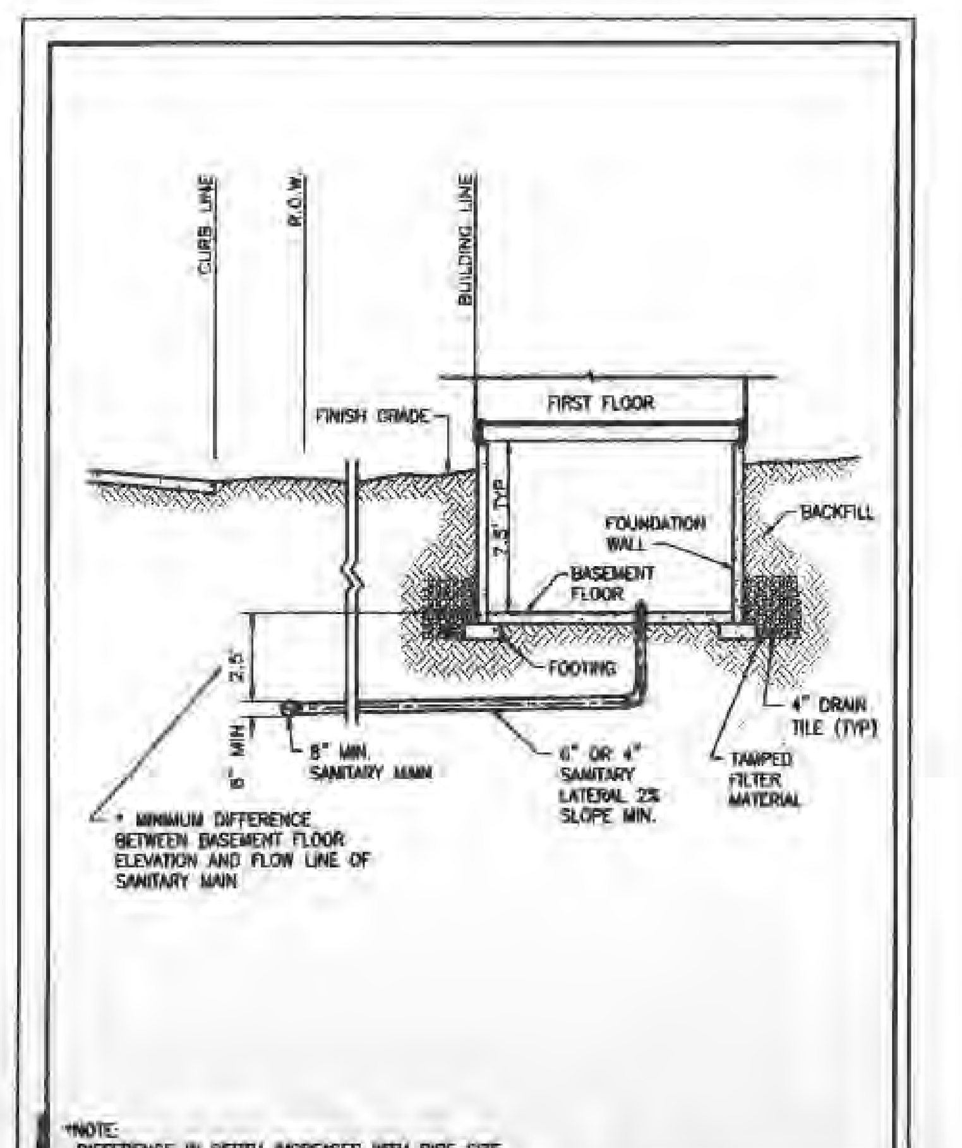
Duckett Creek Sanitary District — MANHOLE FRAME AND COVER — Dsn By: BSM — App By: KLA — Chd By: MDOB — Date: 01-14-00 — Detail No. 12

ROUND PIPE				HORIZONTAL ELLIPTICAL PIPE			
INSIDE DIAMETER OF PIPE (INCHES)	"W" PAYLINE WIDTH OF TRENCH (INCHES)	"W" PAYLINE WIDTH OF TRENCH (FEET)	PAY-VOLUMES CU. FT. PER FT. CONCRETE ENCASEMENT	INSIDE DIAMETER OF PIPE (INCHES)	"W" PAYLINE WIDTH OF TRENCH (INCHES)	"W" PAYLINE WIDTH OF TRENCH (FEET)	PAY-VOLUMES CU. FT. PER FT. CONCRETE ENCASEMENT
4	30	2.50	3.28				
6	30	2.50	3.59				
8	30	2.50	3.87				
10	30	2.50	4.09				
12	30	2.50	4.25				
15	36	3.00	5.55				
18	36	3.00	5.77	14 x 23	41	3.42	5.84
21	39	3.25	6.61				
24	42	3.50	7.39	19 x30	49	4.08	7.85
27	45	3.75	8.18	22 x 34	53	4.42	8.61
30	49	4.08	9.30	24 x 38	58	4.83	9.70
33	53	4.42	10.53	27 x 42	62	5.17	10.71
36	56	4.67	11.43	29 x 45	66	5.50	11.72
39	DISCONTINUED			32 x 49	71	5.92	13.14
42	63	5.25	13.38	34 x 53	75	6.25	14.05
48	70	5.83	15.67	38 x 60	83	6.92	16.18
54	77	6.42	18.15	43 x 68	92	7.67	18.81
60	84	7.00	20.73	48 x 76	101	8.42	21.59
66	91	7.58	23.45	53 x 83	109	9.08	24.35
72	98	8.17	26.37	58 x 91	118	9.83	27.45
78	105	8.75	29.39	63 x 98	126	10.50	30.50
84	112	9.33	32.57	68 x 106	135	11.25	33.91
90	119	9.92	35.90	72 x 113	143	11.92	36.99
96	126	10.50	39.37	77 x 121	152	12.67	40.69
102	133	11.08	42.99	82 x 128	160	13.33	44.45
108	140	11.67	46.75	87 x 136	168	14.00	47.79
114	147	12.25	50.66	92 x 143	176	14.67	51.70
120	154	12.83	54.72	97 x 151	185	15.42	56.01
126	161	13.42	58.92				
132	168	14.00	63.27	106 x 166	202	16.83	64.46
144	182	15.17	72.40	116 x 180	218	18.17	73.59

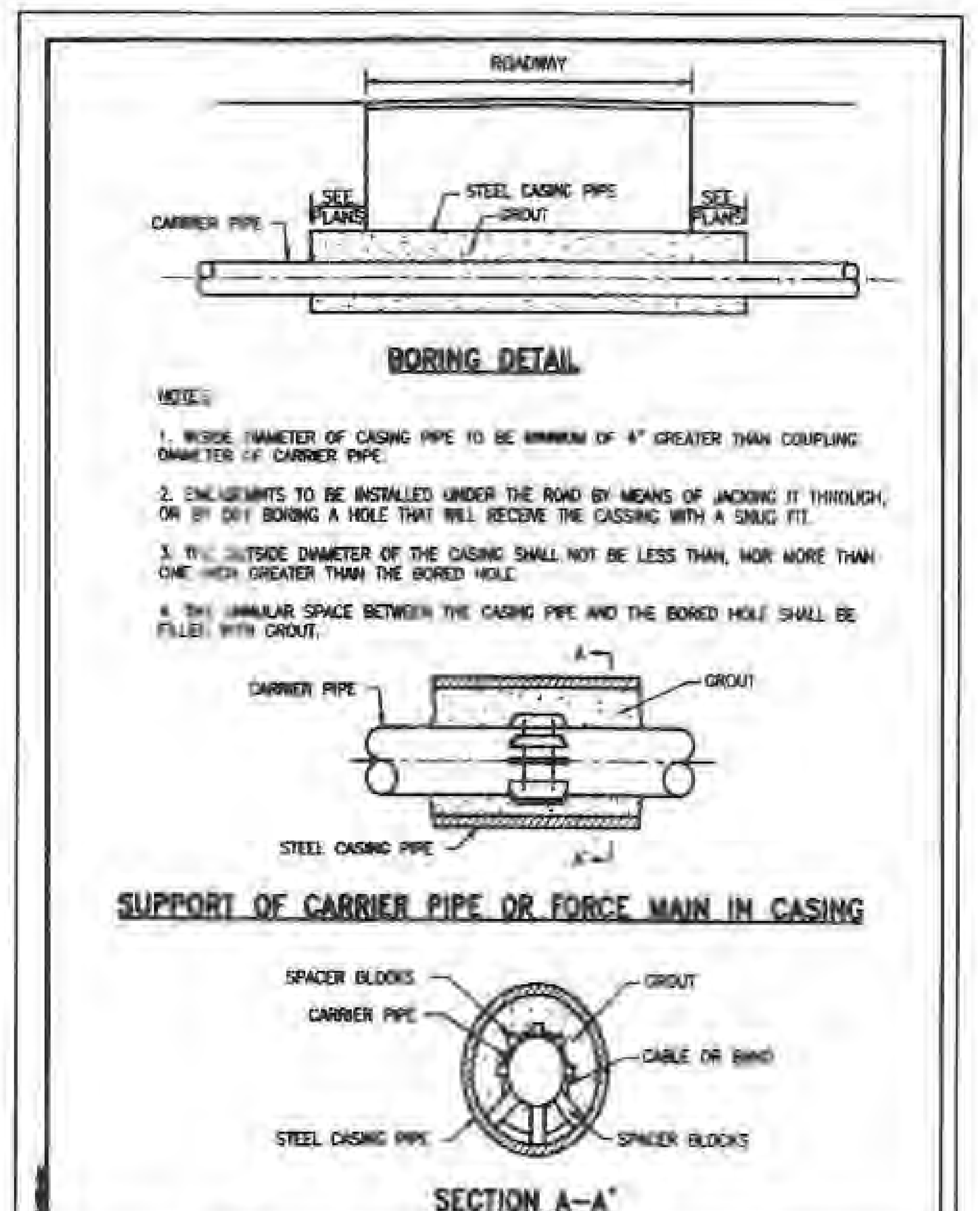
Duckett Creek Sanitary District — PAYLINE WIDTHS OF TRENCH AND PAY-QUANTITIES OF CONCRETE — Dsn By: BSM — App By: KLA — Chd By: MDOB — Date: 12-21-99 — Detail No. 1



Duckett Creek Sanitary District — PAYLINE LIMITS FOR EXCAVATION — Dsn By: BSM — App By: KLA — Chd By: MDOB — Date: 12-21-99 — Detail No. 2

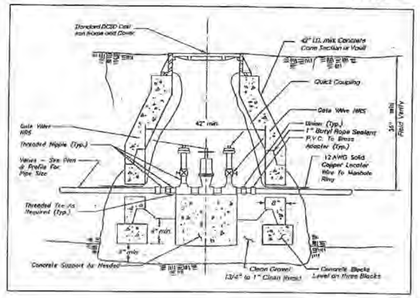


Duckett Creek Sanitary District — TYPICAL SANITARY SEWER LATERAL PROFILE — Dsn By: BSM — App By: KLA — Chd By: MDOB — Date: 1-9-01 — Detail No. 26

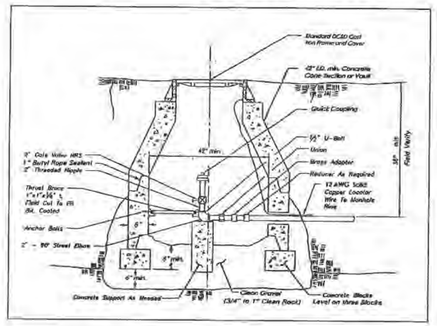


Duckett Creek Sanitary District — ROADWAY BORING DETAIL — Dsn By: BSM — App By: KLA — Chd By: MDOB — Date: 1-5-01 — Detail No. 23

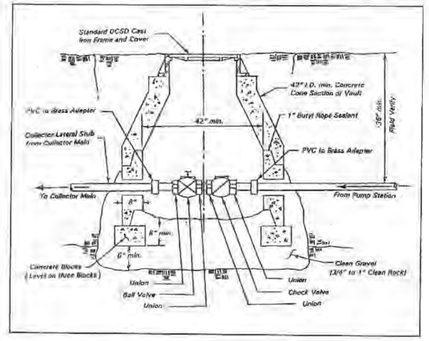
DUPLEX VALVE VAULT

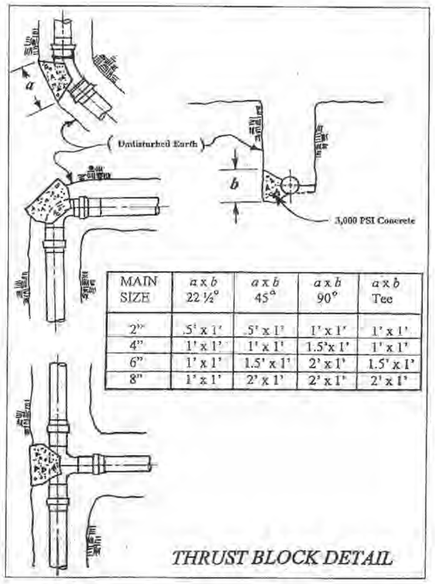


TYPICAL CLEANOUT & VALVE



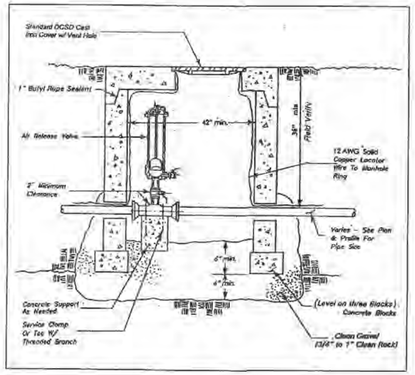
TYPICAL VALVE VAULT

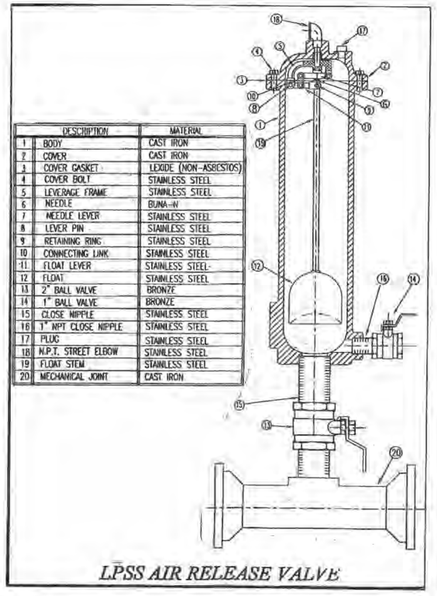




MAIN SIZE	a x b 22 ½°	a x b 45°	a x b 90°	a x b Tee
2"	.5' x 1'	.5' x 1'	1' x 1'	1' x 1'
4"	1' x 1'	1' x 1'	1.5' x 1'	1' x 1'
6"	1' x 1'	1.5' x 1'	2' x 1'	1.5' x 1'
8"	1' x 1'	2' x 1'	2' x 1'	2' x 1'

THRUST BLOCK DETAIL





	DESCRIPTION	MATERIAL
1	BODY	CAST IRON
2	COVER	CAST IRON
3	COVER GASKET	LEXIDE (NON-ASBESTOS)
4	COVER BOLT	STAINLESS STEEL
5	LEVERAGE FRAME	STAINLESS STEEL
6	NEEDLE	BUNA-N
7	NEEDLE LEVER	STAINLESS STEEL
8	LEVER PIN	STAINLESS STEEL
9	RETAINING RING	STAINLESS STEEL
10	CONNECTING LINK	STAINLESS STEEL
11	FLOAT LEVER	STAINLESS STEEL
12	FLOAT	STAINLESS STEEL
13	2" BALL VALVE	BRONZE
14	1" BALL VALVE	BRONZE
15	CLOSE NIPPLE	STAINLESS STEEL
16	1" NPT CLOSE NIPPLE	STAINLESS STEEL
17	PLUG	STAINLESS STEEL
18	M.P.T. STREET ELBOW	STAINLESS STEEL
19	FLOAT STEM	STAINLESS STEEL
20	MECHANICAL JOINT	CAST IRON

LPSS AIR RELEASE VALVE

A.R.I. No. D-025 PN10 air release valve or approved equal

AIR RELEASE VALVE

An air release valve shall be installed on any high points on the run of the force main. The air release valve shall be ~~"APCO" model D-040W, or pre-approved equal.~~ Valve cover bolts pipe nipples and plugs shall be stainless steel. Street elbows shall be stainless steel or bronze. Isolation and flush valves shall be threaded ball valves with bronze body, stainless steel ball and operating lever, and nylon seats.

Air release valves shall be attached to the force main by means of a stainless steel pipe nipple threaded to a cast iron mechanical joint (m.j.) x m.j. x top tee.

The 400 APCO SEWAGE VALVE is an Air Release Valve specially adapted for use with sewage. The long float stem and body keep the valve operating mechanism as free from contact with the sewage as possible. This is achieved as follows: when sewage enters the valve it rises forcing out the air ahead of it. When the sewage reaches the float it raises the float and float stem approximately 1/2"; this closes the venting mechanism in the cover and traps the remaining air in the valve body. This entrapped air is initially at atmospheric pressure but it compresses as the sewage continues to rise in the valve body after the venting mechanism closes until both air and sewage are the same pressure. The sewage then stoops rising and leaves the venting mechanism free from contamination with the sewage. Additional gases given off by the sewage rise up into the valve body displacing the sewage which lowers until the float is exposed. The float will then also lower, opening the venting mechanism and allowing some gas to escape. The sewage again rises to occupy the space vacated by the escaped gas and lifts the float which closes the venting mechanism. The cycle is repeated as frequently as gas gathers in the valve body.

The float hangs freely in the center of the valve body with ½" clearance all around. This prevents large solids getting above the float and the float's free suspension virtually eliminates risk of solids jamming between the float and valve wall.

A rubber hose with quick disconnect is furnished for back flushing the valve. Two quick disconnect couplings are furnished on the valve cover to which the hose may be rapidly connected and disconnected for flushing using an approved water supply. The center quick disconnect coupling permits flushing of the venting orifice and mechanism while the other with the ¼" Shut Off Valve permits flushing the valve body when the ½" Shut Off Valve is opened.

MATERIALS:
Cast Iron Body and Cover, Mechanism-Delrin or Bronze, Needle-Buna N, Lever Pint-Stainless Steel, Seat-Delrin or Bronze, Float-Stainless Steel.

PHYSICAL DIMENSIONS:

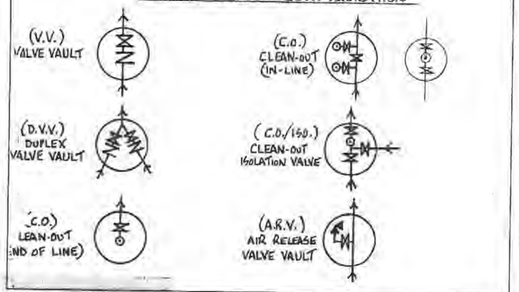
Overall Height-Valve alone.....26 ½"	**Overall Height with Accessories.....33 ½"**
Diameter of Flange.....7"	**Shipping Weight with Accessories.....63#**
Inlet Size.....2",3" or 4" pipe thread	**Outlet Size.....¾" pipe thread**

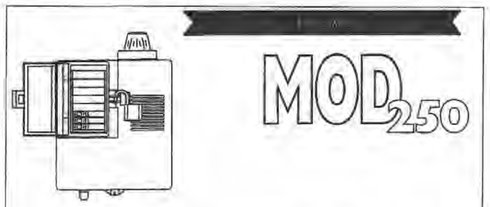
LPSS AIR RELEASE VALVE

LEGEND
LOW PRESSURE SEWER SYSTEM

- EXISTING PROFILE GRADE
- PROPOSED PROFILE GRADE
- 3" F.M. — COMMON COLLECTOR MAIN (SIZE & FLOW DIRECTION)
- 22.5° — CONC. THRUST BLOCK (DEFLECTION ANGLE)
- A.R.V. — AIR RELEASE VALVE VAULT
- V.V. — 42" DIA. VALVE VAULT (SINGLE HOUSE CONNECTION)
- D.V.V. — 48" DIA. DUPLEX VALVE VAULT (DOUBLE HOUSE CONNECTION)
- C.O. — CLEANOUT & VALVE (FLUSHING STATION) VAULT
- C.O. ISO. — CLEANOUT & ISOLATION VALVE VAULT

TYPICAL VAULT CONFIGURATION





MOD 250

Simplex Alarm/Disconnect Panel

Description

The MOD 250 Electrical Panels are custom designed for use with Environment One Simplex Grinder Pumps. They are specified for installations that require an electrical disconnect separate from the residence distribution panel.

MOD Panels can be supplied with audible, visual or combination alarms. They are easily installed in accordance with relevant national and local codes. Standard MOD Alarm Panels are listed by Underwriters Laboratories to assure high quality and safety.

Please consult factory for special applications.

Standard Features

Corrosion-proof enclosure
NEMA 3R rated
Hinged access panel
Lockable latch with padlock
Secured dead front
Access knockouts
Circuit breakers
Terminal blocks and ground lugs
Integral power bus

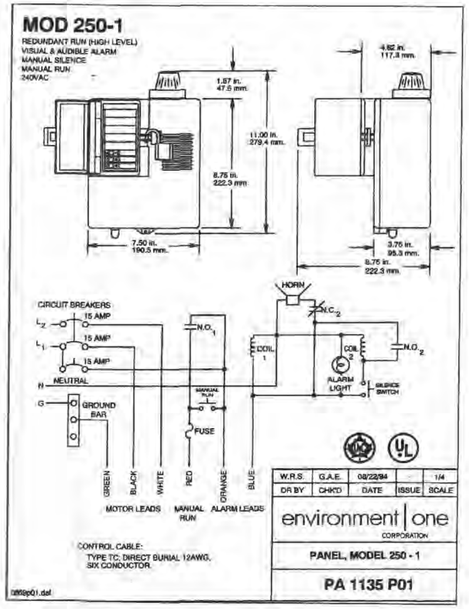
Optional Features

Audible alarm with silence
Red alarm light
Audible alarm with silence and lamp
120 VAC or 240 VAC Service

environment | one

MOD 250-1

REDUNDANT RUN (HIGH LEVEL)
VISUAL & AUDIBLE ALARM
MANUAL SILENCE
MANUAL RUN
240VAC



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

W.R.S.	G.A.E.	08/22/94	-	1/4
DR BY	CHK'D	DATE	ISSUE	SCALE

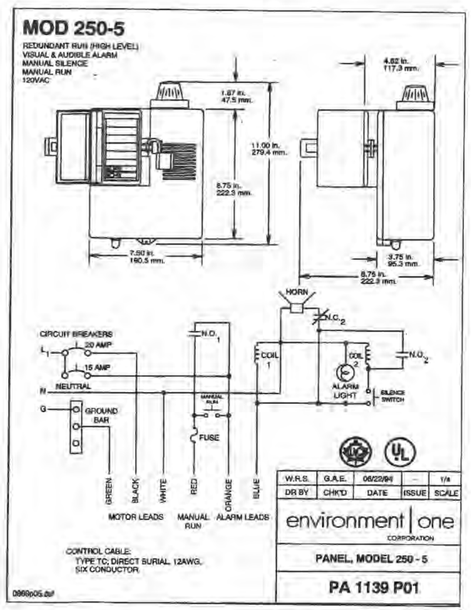
environment | one CORPORATION

PANEL, MODEL 250 - 1

PA 1135 P01

MOD 250-5

REDUNDANT RUN (HIGH LEVEL)
VISUAL & AUDIBLE ALARM
MANUAL SILENCE
MANUAL RUN
120VAC



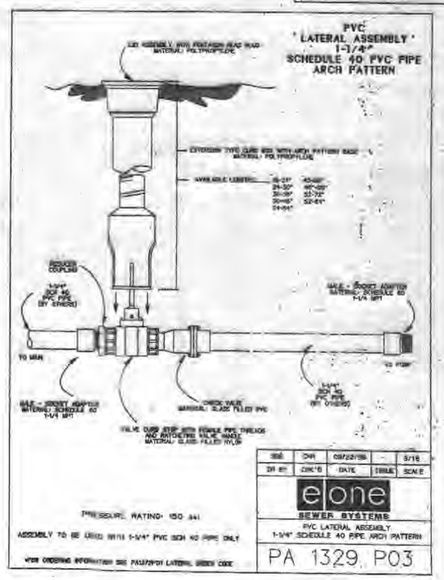
CONTROL CABLE:
TYPE TC; DIRECT BURIAL, 12AWG, SIX CONDUCTOR

W.R.S.	G.A.E.	08/22/94	-	1/4
DR BY	CHK'D	DATE	ISSUE	SCALE

environment | one CORPORATION

PANEL, MODEL 250 - 5

PA 1139 P01



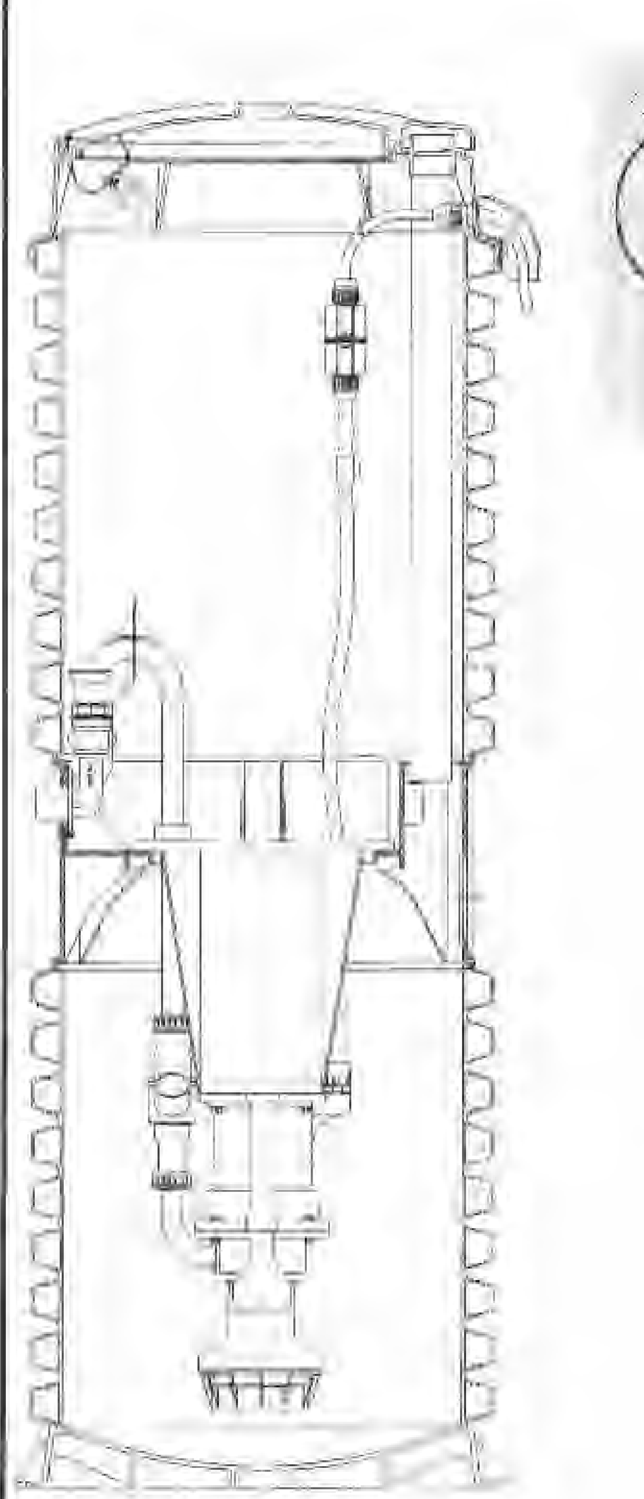
DR BY	CHK'D	DATE	ISSUE	SCALE

e|one SEWER SYSTEMS

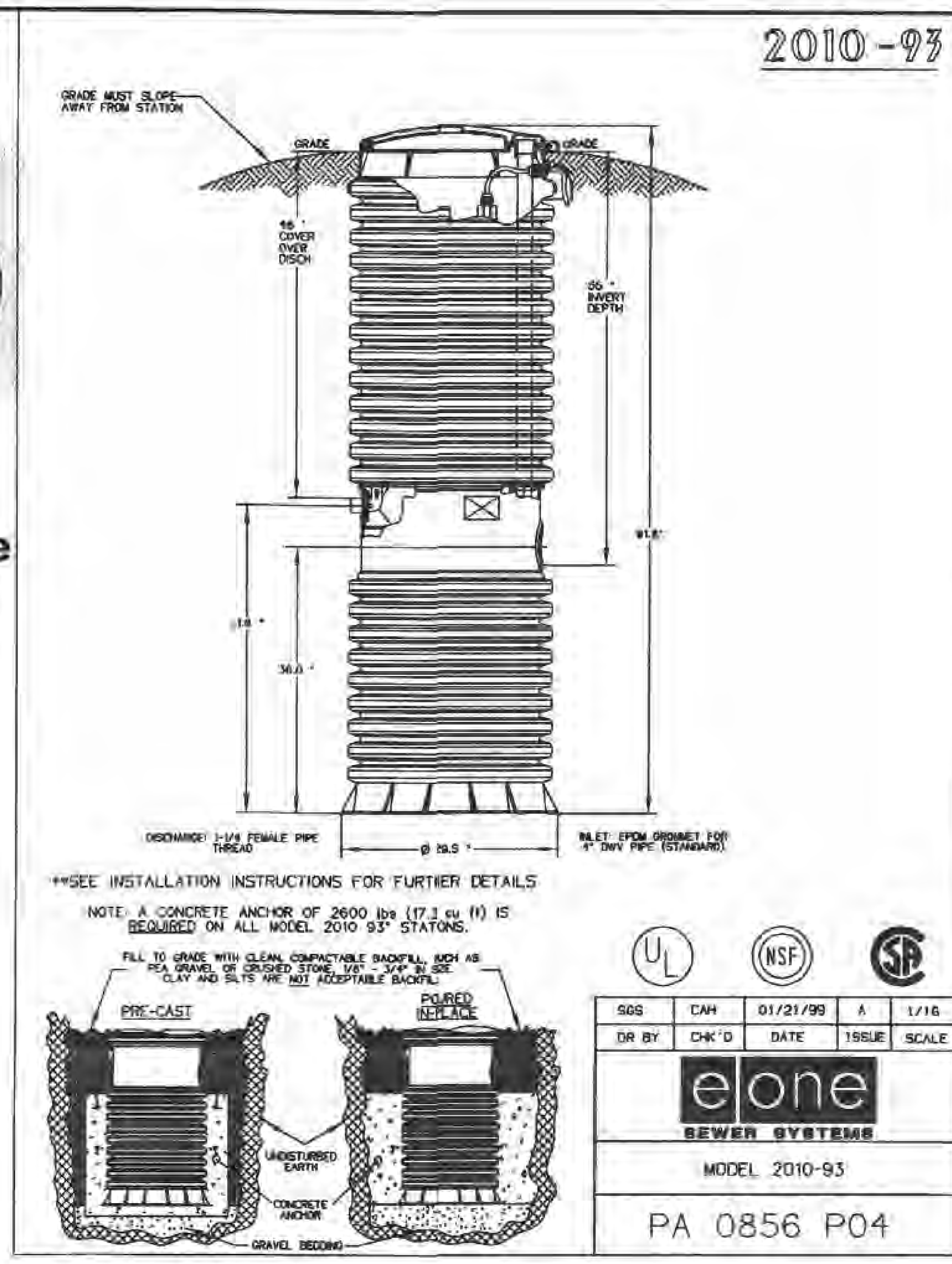
PVC LATERAL ASSEMBLY
1-1/4" SCHEDULE 40 PIPE ARCH PATTERN

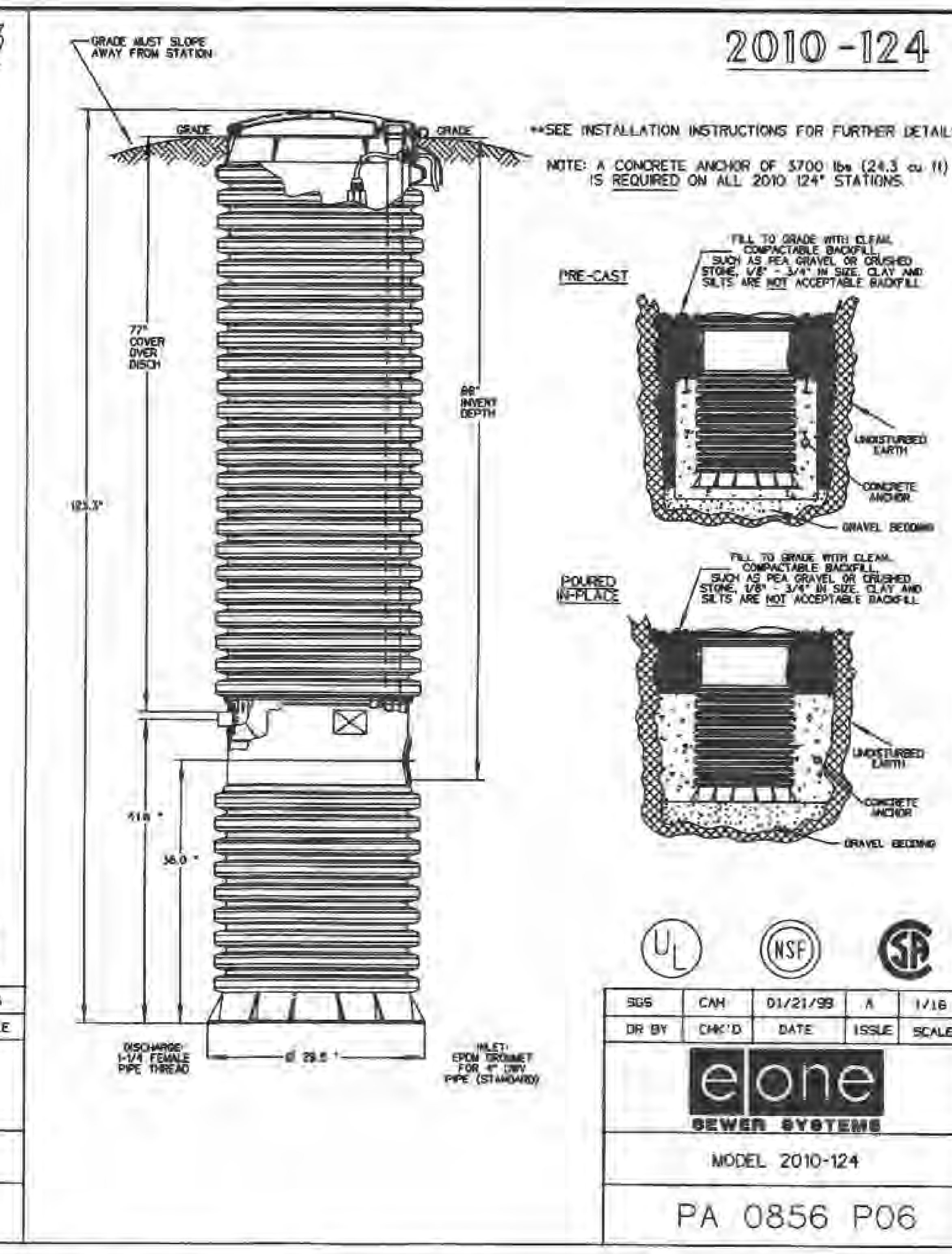
PA 1329. P03

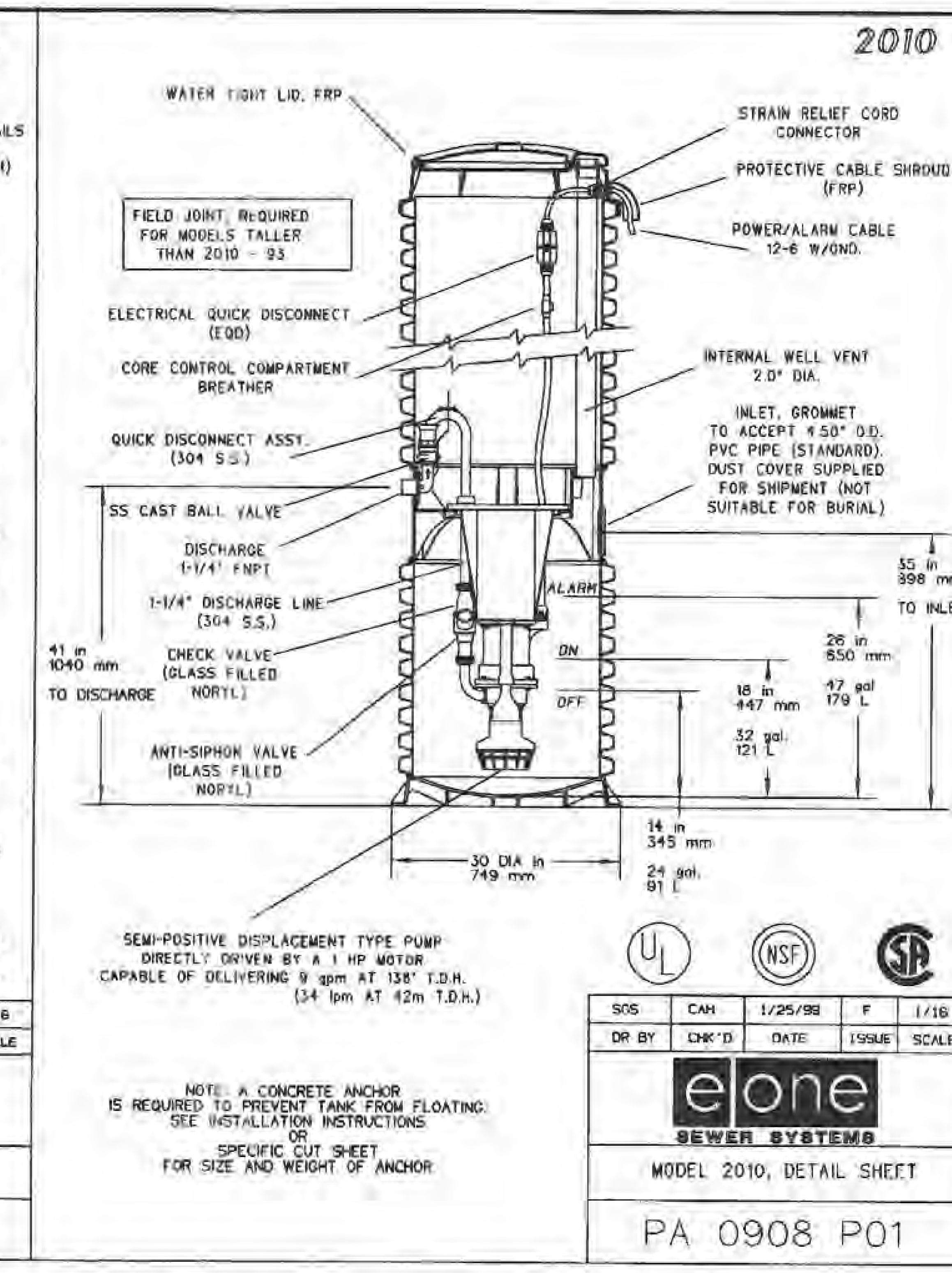
Typical Specifications



Semi-positive Displacement Type Grinder Pump Stations







TIMBERLAINE TRAILS
FORCED MAIN SPECS.
DECEMBER 2004
JOB# 63123.STCC.DOR

Typical Specifications

Semi-positive Displacement Type Grinder Pump Stations

SECTION: GRINDER PUMP STATIONS
1. 0 GENERAL

1.01 GENERAL DESCRIPTION: The MANUFACTURER shall furnish complete factory-built and tested Grinder Pump Station(s), each consisting of grinder pump(s) suitably mounted in a basin constructed of fiberglass or high density polyethylene (HDPE), electrical quick disconnect (NEMA 6P), pump removal system, shut-off valve, anti-siphon valve, and check valve assembled within the basin, electrical alarm/disconnect panel, 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 SHOP DRAWINGS: 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: 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 three of it's largest contiguous grinder pump installations.

1.04 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.

1.05 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 defects found during the warranty period will be reported to the MANUFACTURER by the OWNER.

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 through-hardened, highly polished, precipitation hardened stainless steel. The stator shall be of a specifically compounded ethylene propylene synthetic elastomer. The material shall be suited for domestic waste water service. Its physical properties shall include high tear and abrasion resistance, grease resistance, water and detergent resistance, temperature stability, good aging properties, and outstanding wear resistance.

2.02 GRINDER: The grinder shall be placed immediately below the pumping elements and shall be direct-driven by a single, one-piece stainless steel motor shaft. The grinder impeller assembly shall be securely fastened to the pump motor shaft. The grinder will be of the rotating type with a stationary hardened and ground stainless steel shredding ring spaced in accurate 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 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 inlet shroud shall have a diameter no less than 5 inches

3. At maximum flowrate through the cutting mechanism must not exceed 4 feet per second

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 which will pass freely through the passages of the pump and the 1-1/4" diameter s/s discharge piping.

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, squirrel cage 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.

2.04 MECHANICAL SEAL: The 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 AND INTEGRAL ACCESSWAY: (Model 2010) High Density Polyethylene Construction. The tank shall be made of high density polyethylene, with a melt index of 2.0 grams/10 minutes or lower to assure high 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 inch 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 one EPDM grommet (4" DWV or SCH 40) fitting to accept a 4.50" OD DWV pipe. Tank capacities shall be as shown on the contract drawings.

The accessway shall be an integral extension of the wet well assembly and include a tamper-proof cover assembly providing low profile mounting and water-tight capability. Accessway design and construction shall enable field adjustment of station height in increments of 4" or less.

The station shall have all necessary penetrations molded in and factory sealed. No field penetrations shall be acceptable.
All discharge piping shall be constructed of 304 Series Stainless Steel and terminate outside the accessway bulkhead with a stainless steel, 1 1/4 inch female NPT fitting. The dischage piping shall include a stainless steel ball valve rated for 200 psi WOG. The bulkhead penetration shall be factory installed and warranted by the manufacturer to be watertight.

The accessway shall include a single NEMA 6P electrical quick disconnect for all power and control functions, factory installed with accessway penetrations warranted by the manufacturer to be watertight. The accessway shall also include a 2 inch PVC vent to prevent sewage gases from accumulating in the tank.

2.06 TANK & INTEGRAL ACCESSWAY: (Models 2012 & 2014) High Density Polyethylene Construction. The tank shall be made of rotationally molded high density polyethylene, with a mel index of 2.0 grams/10 minutes or lower to assure high environmental stress cracking resistance. The tank shall have a nominal thickness of 1/2". 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 one EPDM grommet (SDR 35 or SDR 40) fitting to accept a 4.50" OD DWV pipe. Tank capacities shall be as shown on the contract drawings.

The accessway shall be an integral extension of the wet well assembly and include a lockable cover assembly providing low profile mounting and water-tight capability. Accessway desig and construction shall facilitate field adjustment of station height in increments of 4" or less without the use of any adhesives or sealants requiring cure time before installation can be completed.
The station shall have all necessary penetrations molded in and factory sealed. No field penetrations shall be acceptable.

All discharge piping shall be constructed of 304 Series Stainless Steel and terminate outside the accessway bulkhead with a stainless steel, 1 1/4 inch female NPT fitting. The dischage piping shall include a stainless steel ball valve rated for 200 psi WOG. The bulkhead penetration shall be factory installed and warranted by the manufacturer to be watertight.

The accessway shall include a single NEMA 6P electrical quick disconnect for all power and control functions, factory installed with accessway penetrations warranted by the manufacturer to be watertight. The accessway shall also include a 2 inch PVC vent to prevent sewage gases from accumulating in the tank.

2.07 TANK & INTEGRAL ACCESSWAY: (Models 2015 & 2016) Fiberglass reinforced polyester resin. The tank shall be custom molded of fiberglass reinforced polyester resin and shall be furnished with one inlet grommet to accept a 4.50" OD DWV pipe. Tank capacities and dimensions shall be as shown on the contract drawings.

The accessway shall be an integral extension of the FRP tank and shall be made of high density polyethylene of a grade selected for environmental stress cracking resistance. It shall have an access opening at the top to accept a lockable fiberglass cover.

2.08 CHECK VALVE: The pump discharge shall be equipped with a factory installed, gravity operated, flapper-type integral check valve built into the stainless steel discharge piping. 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. Working 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 non-metallic 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.

Each grinder pump station shall also include one separate check valve for installation in the 1 1/4" service lateral between the grinder pump station and the sewer main, preferably next to the curb stop.

2.09 CORE UNIT: The Grinder Pump Station shall have cartridge type easily removable core assemblies containing pump, motor, grinder, all motor controls, check valve, anti-siphon valve, electrical quick disconnect and wiring. The watertight integrity of each core unit, shall be established by 100% factory test at a minimum of 5 PSIG.

2.10 CONTROLS: All necessary controls shall be located in the top housing of the core unit. The top housing will be attached with stainless steel fasteners.

Non-fouling waste water level detection for controlling pump operation shall be accomplished by monitoring the pressure changes in an integral air-bell level sensor connected to a pressure switch. The level detection device shall have no moving parts in direct contact with the waste water. High-level sensing will be accomplished in the manner detailed above by a separate air-bell sensor and pressure switch of the same type.

To assure reliable operation of the pressure sensitive 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 length of 6 conductor 14 gauge, type SJOW cable, pre-wired and watertight to meet UL requirements.

2.11 ALARM/DISCONNECT PANEL: Each grinder pump station shall include a NEMA 4X, UL listed ALARM/DISCONNECT PANEL suitable for wall or pole mounting. The NEMA 3R enclosure shall be manufactured of thermoplastic to assure corrosion resistance. The enclosure shall include a hinged, pad lockable cover, secured dead front and component knockouts. The enclosure shall not exceed 7.5"W x 8.75"H x 3.75"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/Disconnect Panel shall include the following features: audio & 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 3R rating. For duplex units, in addition to the above, two high level indicator lights shall be mounted behind the access cover.

During a high level alarm condition the appropriate light will illuminate to indicate which pump core requires servicing.

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 de-activated 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/Disconnect Panel as manufactured, shall be listed by Underwriters Laboratories, Inc.

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

2.12.5 OHSA CONFINED SPACE: All maintenance tasks for the grinder pump station must be possible without entry of the grinder pump station (as per OHSA 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."

2.13 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 shall be listed by Underwriters Laboratories, Inc., to be safe and appropriate for the intended use.

The grinder pump shall meet accepted standards for plumbing equipment for use in or near residences, shall be free from 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 seal of NSF International

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, level sensors and each unit's dedicated 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.

All completed stations shall be factory leak tested to assure the integrity of all joints, seams and penetrations. All necessary penetrations such as inlets, discharge fittings and cable connectors shall be included in this test along with their respective sealing means (grommets, gaskets etc.).

3.02 DELIVERY: All Grinder Pump units will be delivered to the job site, 100% completely assembled, including testing, ready for installation. Grinder pump units will be individually mounted on wooden pallets.

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 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 4" inlet grommet (4.50" OD) 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" inch (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 pre-cast 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. 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 water tight 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/disconnect Panel."

The CONTRACTOR shall mount the alarm device in a conspicuous location, as per national and local codes. The Alarm/disconnect Panel will be connected to the Grinder Pump Station by a length of six (6) conductor 12 gauge TC type cable as shown on the contract drawings. The power and alarm circuits must be on separate power circuits.

3.04 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 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 one (1) - four (4) day week for each 100 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.

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.

END OF SECTION

environment/one Corporation
2773 Balltown Road
Niskayuna, New York 12309

LM000110 Rev. A 6/98

ENVIRONMENT ONE GRINDER PUMP FEATURE IDENTIFICATION

1. **GRINDER PUMP BASIN** - High density polyethylene (HDPE).
2. **ACCESSWAY COVER** - FRP (furnished with padlock).
3. **ELECTRICAL QUICK DISCONNECT (EQD)** - Cable from pump core terminates here.
4. **POWER AND ALARM CABLE** - Circuits to be installed in accordance with local codes. (100 feet maximum length)
5. **DISCONNECT PANEL** - Rain proof (NEMA 3R) enclosure. Equipped with circuit breakers or disconnect switch. Locate according to local codes.
6. **ALARM DEVICE** - Every installation is to have an alarm device to alert the homeowner of a potential malfunction. Visual devices should be placed in very conspicuous locations.
7. **INLET** - EPDM grommet (4.5" ID). For 4.5" OD DWV pipe.
8. **WET WELL VENT** - 2.0" tank vent, supplied by factory in units with accessways.
9. **GRAVITY SERVICE LINE** - 4" DWV, (4.5" OD). Supplied by others.

9a. **STUB-OUT** - 4" X 5' Long watertight stub-out, to be installed at time of burial unless the gravity service line is connected during installation. Supplied by others.

10. **DISCHARGE VALVE** - 1-1/4" Female pipe thread.
11. **DISCHARGE LINE** - 1-1/4" Nominal pipe size. Supplied by others.
12. **CONCRETE ANCHOR** - See Chart 1 for specific weight for your station height. Supplied by others.
13. **BEDDING MATERIAL** - 6" minimum depth, round aggregate, (gravel). Supplied by others.
14. **FINISHED GRADE** - Grade line to be 1 to 4 inches below removable lid and slope away from the station.
15. **VENT** - Indoor installation. See section 6, Venting, on page 4.
16. **VALVE** - Full ported ball valve. Recommended option, for use during service operations. Supplied by others.
17. **CONDUIT** - 1" or 1-1/4", material and burial depth as required by local code. Supplied by others.
18. **UNION** - 1-1/4" or compression type coupling. Supplied by others. (Do not use rubber sleeve and hose clamp type coupling.)
19. **VALVE** - Ball valve, must provide a full-ported 1-1/4" round passage when open. Supplied by others.
20. **REBAR** - Required to lift tank after ballast (concrete anchor) has been attached, 4 places, evenly spaced around tank.