

GENERAL NOTES

ROOF EXHAUST FAN NO. 1 SHALL BE A 2100 CFM CAPACITY AT 3/8" STATIC PRESSURE FAN, DRIVEN BY A 1725 RPM, 3 PHASE, 60 HERTZ, 460 VOLT, 3/4 HORSEPOWER, TEFC MOTOR, AND SHALL BE MODEL 15UC17D BY LOREN COOK OR EQUAL BY ACME, EXITAIRE OR GREENHECK.

ROOF EXHAUST FAN NO. 2 SHALL BE A 350 CFM CAPACITY AT 1/4" STATIC PRESSURE FAN, DRIVEN BY A 1050 RPM, SINGLE PHASE, 60 HERTZ 110/220 VOLT, 1/40 HORSEPOWER OPEN TYPE MOTOR, AND SHALL BE MODEL 10UC10D BY LOREN COOK OR EQUAL BY ACME, EXITAIRE OR GREENHECK.

LOUVER:

THE WALL LOUVER SHALL BE COMPRISED OF AN EXTERIOR STATIONARY LOUVER AND INSECT SCREEN.

THE STATIONARY LOUVERS SHALL BE CONSTRUCTED OF MINIMUM 0.110" THICK EXTRUDED ALUMINUM ALLOY 6063-T; BLADES, FRAME AND SILL SHALL BE OF THE SAME MATERIAL. LOUVERS SHALL BE WELDED CONSTRUCTION, GROUND SMOOTH AND GIVEN A 30 MINUTE ANODIZED FINISH IN A COLOR APPROVED BY THE ENGINEER. STATIONARY LOUVER SHALL BE EQUIPPED WITH A 14 X 18 MESH BRONZE INSECT SCREEN MOUNTED ON THE INSIDE, AND SHALL BE MODEL 1EL-6-304C BY LOUVERS AND DAMPERS INC., OR EQUAL BY AIROLITE.

PUMPS:

GENERAL. THREE SUBMERSIBLE PUMPS SHALL BE FURNISHED AND INSTALLED AS SHOWN ON THE DRAWINGS AND SPECIFIED HEREIN. THE PUMPING UNITS SHALL BE COMPLETE AND READY FOR OPERATION. THE PUMP MANUFACTURER SHALL SUBMIT SHOP DRAWINGS WHICH INCLUDE THE MANUFACTURER'S RECOMMENDATIONS FOR INSTALLATION AND STARTUP TO THE ENGINEER FOR APPROVAL. CORRECTED COPIES OF THE PUMP DRAWINGS, TECHNICAL MANUALS, PARTS LISTS, INSTALLATION REQUIREMENTS, MAINTENANCE PROCEDURES AND CONTROL WIRING DATA FOR THE PUMPS SHALL BE FURNISHED IN THE PROJECT O & M MANUALS.

THE PUMP MANUFACTURER SHALL WARRANT THE UNITS BEING SUPPLIED AGAINST DEFECTS IN WORKMANSHIP AND MATERIAL FOR A PERIOD NOT LESS THAN FIVE YEARS OR 10,000 HOURS OF USE. THE WARRANTY SHALL BE FOR 100% FOR THE FIRST 18 MONTHS OR 3000 HOURS. COPIES OF THE WARRANTY SHALL BE INCLUDED IN THE O & M MANUALS.

A REPRESENTATIVE OF THE PUMP MANUFACTURER SHALL SUPERVISE THE INSTALLATION AND INITIAL STARTUP OF THE PUMPING UNITS.

PUMP DESIGN: THE PUMPS SHALL BE CAPABLE OF HANDLING SCREENED STORM WATER AND SHALL BE ABLE TO PASS 3" SOLIDS. THE DISCHARGE CONNECTION ELBOW SHALL BE FURNISHED BY THE PUMP MANUFACTURER AND BE PERMANENTLY INSTALLED IN THE WET WELL WITH THE DISCHARGE PIPING. THE PUMP AND DISCHARGE ELBOW SHALL PROVIDE FOR AN AUTOMATIC CONNECTION AND DISCONNECTION WHEN THE PUMPS ARE LOWERED INTO PLACE BY A SIMPLE LINEAR DOWNWARD MOTION, OR HOISTED FROM THE WET WELL. THE SEAL BETWEEN THE CONNECTION AND THE PUMP SHALL BE A PRESSURE-RESISTANT, METAL TO METAL CONTACT. THE PUMP SHALL NOT BEAR DIRECTLY ON THE FLOOR. THE PUMPING UNIT SHALL BE CAPABLE OF CONTINUOUS SUBMERGENCE WITHOUT LOSS OF WATER-TIGHT INTEGRITY WHEN SUBMERGED TO DEPTHS OF UP TO 65 FEET.

PUMP CONSTRUCTION: MAJOR PUMP COMPONENTS SHALL BE OF GRAY CAST IRON, CLASS 30, WITH SMOOTH SURFACES DEVOID OF BLOW HOLES AND OTHER IRREGULARITIES. WATERTIGHT SEALS SHALL BE MADE WITH O-RINGS OF NITRILE RUBBER. ALL EXPOSED NUTS AND BOLTS SHALL BE 304 STAINLESS STEEL. ALL SUBMERGED SURFACES, OTHER THAN STAINLESS STEEL, SHALL BE PAINTED IN ACCORDANCE WITH THESE GENERAL NOTES. ALL PRIMERS SHALL BE COMPATIBLE WITH THE SPECIFIED FINISH COATS.

WATERTIGHT MATING SURFACES SHALL BE MACHINED AND FITTED WITH O-RINGS WHICH SHALL BE COMPRESSED BETWEEN AND CONFINED BY THE METAL SURFACES. THE PUMP CABLE ENTRY SHALL BE A WATERTIGHT AND SUBMERSIBLE SEAL, COMPRISED OF A CYLINDRICAL ELASTOMER GROMMET, FLANKED BY WASHERS AND PROVIDING STRAIN RELIEF CONNECTION. THE ASSEMBLY SHALL BEAR AGAINST A SHOULDER IN THE PUMP TOP FOR STABILITY.

THE CABLE ENTRY JUNCTION AND MOTOR SHALL BE SEPARATED BY A STATOR LEAD SEALING GLAND OR TERMINAL BOARD, WHICH SHALL ISOLATE THE MOTOR INTERIOR FROM THE PUMP TOP SECTION.

THE PUMP MOTORS SHALL BE 460 VOLT, 3 PHASE, 60 HERTZ, SQUIRREL-CAGE, INDUCTION, SHELL TYPE DESIGN HOUSED IN AN AIR-FILLED, WATERTIGHT CHAMBER, NEMA B DESIGN. THE STATOR WINDING AND STATOR LEADS SHALL BE INSULATED WITH MOISTURE RESISTANT CLASS F INSULATION. THE STATOR SHALL BE THrice DIPPED AND BAKED IN CLASS F VARNISH. THE MOTOR SHALL BE DESIGNED FOR CONTINUOUS DUTY, CAPABLE OF SUSTAINING A MINIMUM OF 10 STARTS PER HOUR.

EACH PUMPING UNIT SHALL BE PROVIDED WITH A COOLING SYSTEM, CONSISTING OF A WATER JACKET WHICH ENCIRCLES THE STATOR HOUSING AND WHICH IS PROVIDED WITH A SEPARATE CIRCULATION OF PUMPED LIQUID. ALL COOLING MEDIA CHANNELS AND PORTS SHALL BE OF NON-CLOG DESIGN. PROVISION FOR EXTERNAL COOLING AND FLUSHING SHALL ALSO BE PROVIDED.

THERMAL SENSOR SHALL BE EMBEDDED IN THE END COILS OF STATOR WINDINGS TO MONITOR STATOR TEMPERATURE; THREE ARE REQUIRED, PROVIDING ONE SENSOR FOR EACH PHASE. PUMPS NOS. 1 AND 3 SHALL ALSO HAVE AN INDEPENDENT THERMAL SENSOR TO MONITOR LOWER BEARING TEMPERATURE IN THE LOWER BEARING HOUSING AND A MECHANICAL LEAK-SENSING FLOAT SWITCH LOCATED IN THE STATOR HOUSING TO DEACTIVATE THE PUMP PRIOR TO THE LIQUID LEVEL REACHING THE STATOR END COILS. PUMP NO. 2 SHALL HAVE A MOISTURE-DETECTING THERMISTOR IN THE STATOR HOUSING TO DEACTIVATE THE PUMP PRIOR TO LEAKING LIQUID REACHING THE STATOR END COILS. ALL THERMISTOR-BASED SENSORS SHALL OPERATE VIA THERMISTOR RELAYS FURNISHED BY THE PUMP MANUFACTURER.

THE PUMP SHAFT SHALL BE C1034 CARBON STEEL OR 316 STAINLESS STEEL AND BE COMPLETELY ISOLATED FROM THE PUMPED LIQUID. EACH PUMP SHALL BE PROVIDED WITH A TANDEM MECHANICAL SHAFT SEAL SYSTEM WHICH RUNS IN AN OIL RESERVOIR. THE SEAL UNITS SHALL CONSIST OF ONE STATIONARY AND ONE POSITIVELY DRIVEN ROTATING RING, EACH UNIT HELD IN CONTACT BY ITS OWN SPRING SYSTEM. EACH PUMP SHALL BE PROVIDED WITH AN OIL CHAMBER FOR THE SHAFT SEALING SYSTEM WHICH ALLOWS SUFFICIENT AIR/OIL INTERFACE VOLUME TO CONTROL THERMAL EXPANSION OF THE OIL.

PUMP NOS. 1 AND 3 SHALL HAVE THREE PERMANENTLY LUBRICATED SHAFT BEARINGS; UPPER BEARINGS SHALL BE ROLLER BEARINGS AND THE LOWER BEARINGS SHALL CONSIST OF ONE SINGLE ROW OF ANGULAR CONTACT BALL BEARINGS AND A ROW OF ROLLER BEARINGS. PUMP NO. 2 SHALL HAVE TWO PERMANENT LUBRICATED SHAFT BEARINGS; THE UPPER BEARINGS SHALL BE A SINGLE ROW DEEP GROOVE BALL BEARING AND THE LOWER BEARING SHALL BE A TWO ROW ANGULAR CONTACT BALL BEARING.

PUMP IMPELLERS SHALL BE GRAY CAST IRON, CLASS 30, DYNAMICALLY BALANCED, DOUBLE SHROUDED, NON-CLOGGING DESIGN CAPABLE OF HANDLING SOLIDS, FIBROUS MATERIALS HEAVY SLUDGE AND OTHER NORMAL MATERIALS FOUND IN STORM WATER PUMPING APPLICATIONS. THE IMPELLER SHALL BE TRIMMED TO MEET THE DESIGN POINT AS REQUIRED BY THE ENGINEER. THE FIT BETWEEN THE IMPELLER AND SHAFT SHALL BE A SLIDING FIT WITH ONE KEY, AND THE FASTENING OF THE IMPELLER TO THE SHAFT SHALL BE BY MEANS OF A LOCKING ASSEMBLY CONSISTING OF A PROTECTIVE RUBBER CAP AND A BOLT THREADED TO THE SHAFT TERMINUS.

A WEAR RING SYSTEM SHALL BE INSTALLED TO PROVIDE EFFICIENT SEALING BETWEEN THE VOLUTE AND IMPELLER, AND SHALL CONSIST OF A STATIONARY RING OF NITRILE RUBBER MOLDED WITH A STEEL RING INSERT WHICH IS DRIVE FITTED TO THE VOLUTE INLET AND A ROTATING 304 STAINLESS STEEL RING DRIVE FITTED TO THE IMPELLER EYE.

THE PUMP MOTOR CABLES SHALL BE FURNISHED IN SUFFICIENT LENGTH TO MAKE A CONTINUOUS RUN TO THE CONNECTING POWER BLOCKS LOCATED IN THE PUMP CONTROL PANEL SHOWN ON THE DRAWINGS. THE PUMP MOTOR CABLES SHALL BE SUITABLE FOR SUBMERSIBLE PUMP APPLICATIONS WITH P 122-MSHA APPROVAL. CABLE SIZING SHALL CONFORM TO NEC REQUIREMENTS. STAINLESS STEEL, HEAVY DUTY, WIRE BRAID CABLE GRIP SUPPORT SLEEVES OF SINGLE EYE DOUBLE WEAVE CLOSED GRIP DESIGN SHALL BE PROVIDED FOR EACH CABLE TO CONNECT TO THE UNDERSIDE OF THE ACCESS FRAME.

PUMP TESTS: THE PUMP MANUFACTURER SHALL PERFORM THE FOLLOWING TESTS AND INSPECTIONS AT THE FACTORY PRIOR TO SHIPMENT OF ANY UNIT. ALL TESTS SHALL BE IN ACCORDANCE WITH APPLICABLE HYDRAULIC INSTITUTE STANDARDS, AND SHALL BE WITNESSED BY THE ENGINEER. COMPLETED TEST DATA SHEETS FOR ALL TESTS OF THE PUMPS, BOTH AT THE FACTORY AND IN THE PUMPING STATION SHALL BE INCLUDED AS PART OF THE PUMPING STATION RECORDS.

- VERIFY IMPELLER, MOTOR RATING AND ELECTRICAL CONNECTIONS FOR COMPLIANCE WITH SPECIFICATION AND SHOP DRAWINGS.
- TEST THE MOTOR AND CABLE INSULATION FOR MOISTURE CONTENT. MEGGER STATOR AND CABLE FOR INSULATION DEFECTS.
- OPERATE THE PUMP FOR A MINIMUM OF 30 MINUTES, SUBMERGED A MINIMUM OF 6 FEET BELOW THE CABLE ENTRY. THE PUMP SHALL BE OPERATED AT THE DESIGN POINT TO VERIFY CAPACITY-HEAD, EFFICIENCY (WIRE TO WATER) AND MOTOR INPUT KW.

D. REPEAT THE REQUIREMENTS OF ITEM B. AFTER A POSITIVE TEST, IMMEDIATELY SEAL THE PUMP CABLE END TO MAKE IT IMPERVIOUS TO MOISTURE OR WATER SEEPAGE.

SITE TESTS ARE REQUIRED FOR EACH PUMPING UNIT AND SHALL BE PERFORMED BY THE MANUFACTURER'S REPRESENTATIVE AT STARTUP. THE MINIMUM TEST REQUIREMENTS SHALL BE AS FOLLOWS:

- MEGGER THE CABLE AND STATOR FOR INSULATION DEFECTS. COMPARE WITH THE SHOP TESTS.
- CHECK PUMP ROTATION BY USE OF A PHASE ROTATION TESTER PRIOR TO CONNECTING TO POWER.
- MEASURE CURRENT AND VOLTAGE DURING STARTUP OPERATION.

REQUIRED PUMP PERFORMANCE:

PUMP NO.	DESIGN POINT U.S. GPM FT-TOH	MIN. IMPELLER EFFICIENCY	MIN WIRE TO WATER EFFICIENCY	MAX. MOTOR SPEED
1	11,100 GPM @ 25	80%	70%	514 RPM
2	2,750 GPM @ 26	65%	57%	1,200 RPM
3	11,100 GPM @ 25	80%	70%	514 RPM

PUMPS NO. 1 AND NO. 3 SHALL BE FLYGT MODEL 20" CP 3500, OR EQUAL BY PEC/EMU. PUMP NO. 2 SHALL BE FLYGT MODEL 12" CP 3201, OR EQUAL BY PEC/EMU.

SPECIAL TOOLS AND SPARE PARTS: EACH PUMPING UNIT SHALL BE FURNISHED WITH ALL SPECIAL TOOLS REQUIRED TO TEAR DOWN AND MAINTAIN THE PUMPING UNIT. THIS SHALL INCLUDE SPECIAL IMPELLER WRENCHES, PULLERS AND OTHER ITEMS SPECIFICALLY LISTED BY THE MANUFACTURER AS SPECIAL TOOLS. SPARE PARTS FURNISHED SHALL INCLUDE, AS A MINIMUM, ONE COMPLETE SET OF SEALS, WEAR RINGS AND GASKETS PER PUMP. ALL SPARE PARTS SHALL BE FURNISHED SUITABLY PACKAGED TO RESIST MOISTURE, CORROSION AND OTHER DETERIORATION IN STORAGE.

PUMP ACCESSORIES: EACH SUBMERSIBLE PUMPING UNIT SHALL BE FURNISHED WITH THE MANUFACTURER'S STANDARD ACCESSORIES FOR AN INSTALLATION OF THIS CONFIGURATION, INCLUDING UPPER GUIDE BAR BRACKET ASSEMBLY, INTERMEDIATE GUIDE BAR BRACKET ASSEMBLY, PUMPING UNIT STAINLESS STEEL LIFTING CHAIN, STAINLESS STEEL CABLE AND MISCELLANEOUS HARDWARE INCLUDING SAFETY CHAIN HOOK ASSEMBLY, AND DISCHARGE CONNECTION AS SHOWN ON THE DRAWINGS, INCLUDING HEAVY DUTY HARDWARE AND STAINLESS STEEL BASE ANCHOR BOLTS.

PIPE AND FITTINGS:

DUCTILE IRON PIPE SHALL CONFORM TO AWWA C151 AND C150, AND SHALL BE COATED INSIDE WITH AWWA BITUMINOUS ENAMEL. MINIMUM CLASS OF DUCTILE IRON PIPE SHALL BE CLASS 53. FITTINGS FOR USE WITH DUCTILE IRON PIPE SHALL BE DUCTILE IRON OR CAST IRON. DUCTILE IRON FITTINGS SHALL CONFORM TO AWWA C110. CAST IRON FITTINGS SHALL CONFORM TO AWWA C110 FOR NOT LESS THAN 150 PSI WORKING PRESSURE. BOTH DUCTILE IRON AND CAST IRON FITTINGS SHALL BE COATED WITH BITUMINOUS ENAMEL ON THE INTERIOR OF THE PIPE. PIPE AND FITTINGS 4" AND LARGER SHALL BE DUCTILE IRON.

MECHANICAL JOINTS SHALL CONFORM TO THE REQUIREMENTS OF AWWA C111. MECHANICAL JOINT BOLTS OR STUDS SHALL BE CORROSION-LIMITING HARDENED STEEL SUITABLE FOR UNDERGROUND SERVICE.

FLANGED JOINTS SHALL CONFORM TO ANSI B16.1 FOR CLASS 125 FLANGES. FLANGE BOLTS SHALL BE HOT DIPPED GALVANIZED OR STAINLESS STEEL. FLANGE GASKETS SHALL BE REINFORCED NEOPRENE. FLANGES FOR FLANGED PIPE SHALL CONFORM TO AWWA C115 AND ANI A21.10.

PUMP GUIDE BARS SHALL BE SCHEDULE 40 GALVANIZED STEEL PIPE CONFORMING TO ASTM A 120.

WALL SLEEVES AND WALL PIPES SHALL BE CAST IRON, WITH A MINIMUM PRESSURE RATING OF 150 PSI AND SHALL HAVE AN INTEGRAL CAST SEEPAGE FIN LOCATED AT APPROXIMATELY THE MIDPOINT OF THE WALL. PIPE PASSAGES THROUGH WALL SLEEVES SHALL BE YARNED WITH PURE WHITE OAKUM AND SEALED WITH POURED, CAULKED LEAD, BOTH ENDS.