LIFT-OUT RAIL SYSTEM - THE LIFT OUT RAIL SYSTEM SHALL BE A MYERS SRA-43 OR EQUAL LIFT-OUT RAIL SYSTEMS. EACH LIFT-OUT RAIL SYSTEM SHALL CONSIST OF A DUCTILE IRON DISCHARGE BASE, CAST IRON PUMP ATTACHING AND SEALING PLATE, CAST IRON PUMP GUIDE PLATE, AND CAST IRON ELBOW. ALL EXPOSED NUTS, BOLTS, AND FASTENERS SHALL BE OF 300 SERIES STAINLESS STEEL. NO FABRICATED STEEL PARTS SHALL BE USED. DISCHARGE ELBOW SHALL BE 4" X 3". ELBOW SHALL BOLT ONTO BASE AND HAVE STANDARD 125 LB. FLANGES. RAIL SYSTEMS REQUIRING PIPING INCREASERS TO ATTACH LARGER DISCHARGE PIPE, WHICH MIGHT INTERFERE WITH PUMP INSTALLATION AND REMOVAL, WILL NOT BE CONSIDERED EQUAL, A SEALING PLATE SHALL BE ATTACHED TO THE PUMP. A SIMPLE DOWNWARD SLIDING MOTION OF THE PUMP AND GUIDE PLATE ON THE GUIDE RAILS SHALL CAUSE THE UNIT TO BE AUTOMATICALLY CONNECTED AND SEALED TO THE BASE. THE OPEN FACE OF THE SEALING PLATE SHALL HAVE DOVE-TAILED GROOVE MACHINED INTO THE FACE TO HOLD A SEALING O-RING. THE O-RING SHALL PROVIDE A LEAK-PROOF SEAL AT ALL OPERATING PRESSURES. TWO RAIL PIPES SHALL BE USED TO GUIDE THE PUMP FROM THE SURFACE TO THE DISCHARGE BASE CONNECTION. THE GUIDE RAILS SHALL BE 2" SCHEDULE 40 STAINLESS STEEL PIPE, THE WEIGHT OF THE PUMP SHALL BEAR SOLELY ON THE DISCHARGE BASE AND NOT ON THE GUIDE RAILS, RAIL SYSTEMS WHICH REQUIRE THE PUMP TO BE SUPPORTED BY LEGS WHICH MIGHT INTERFERE WITH THE FLOW OF SOLIDS INTO THE PUMP SUCTION WILL NOT BE CONSIDERED EQUAL, THE GUIDE RAIL SHALL BE FIRMLY ATTACHED TO THE ACCESS HATCH FRAME. AN ADEQUATE LENGTH OF STAINLESS STEEL LIFTING CHAIN SHALL BE SUPPLIED FOR REMOVING THE PUMP. THE CHAIN SHALL BE OF SUFFICIENT LENGTH.

ACCESS FRAME AND DOOR — A SEPARATE ACCESS FRAME ASSEMBLY SHALL BE SUPPLIED. THE FRAME ASSEMBLY AND DOOR SHALL BE ALUMINUM WITH 300 SERIES STAINLESS STEEL HINGES AND HARDWARE. THE ALUMINUM DOOR SHALL BE RAISED TREAD PLATE TO PROVIDE A SKID PROOF SURFACE. THE FRAME SHALL SUPPORT THE FLOAT MOUNTING BRACKET. A RECESSED HANDLE SHALL BE PROVIDED WITH THE DOOR, AS WELL AS A SAFETY LATCH TO HOLD THE DOOR IN AN OPEN POSITION, A STAINLESS COMPRESSION STEEL SPRING ASSIST OPENER, AND A NEOPRENE GASKET TO LIMIT THE TRANSMISSION OF ODORS.

FLOAT MOUNTING BRACKET — A FLOAT MOUNTING BRACKET SHALL BE PROVIDED WITH STRAIN RELIEFS THAT SUPPORT AND HOLD THE LEVEL CONTROL CORDS. CONTINUOUS CORDS ARE TO RUN FROM THE PUMPS AND LEVEL CONTROLS TO A CONTROL PANEL OR JBOX. NO SPLICES SHALL BE MADE IN THE WIRING. THE BRACKET SHALL BE FABRICATED FROM STAINLESS STEEL AND ATTACHED TO THE ACCESS FRAME WITH 300 SERIES STAINLESS STEEL FASTENERS. THE BRACKET SHALL BE COATED WITH BITUMINOUS MASTIC BETWEEN DISSIMILAR METALS.

PIPING AND VALVES — PIPING SHALL INCLUDE ONE SWING CHECK VALVE AND ONE GATE VALVE FOR EACH PUMP AND ALL NECESSARY GASKETS, STRAIGHT PIPE, BRACKETS, ELBOWS, TEES AND FITTINGS. ALL PIPING SHALL BE DUCTILE IRON, COATED WITH COAL TAR EPOXY FOR CORROSION RESISTANCE. GATE VALVES SHALL BE MANUFACTURED IN ACCORDANCE WITH AWWA C509, WITH FLANGED ENDS AND THE MANUFACTURERS STANDARD EPOXY COATING. CHECK VALVES SHALL BE MANUFACTURED IN ACCORDANCE WITH AWWA C509, WITH FLANGED ENDS, THE MANUFACTURERS STANDARD EPOXY COATING AND OUTSIDE LEVER AND WEIGHT

WET WELL AND VALVE VAULT — THE WET WELL AND VALVE VAULT SHALL BE PRECAST CONCRETE IN ACCORDANCE WITH ASTM C478 WITH RUBBER GASKETED JOINTS IN ACCORDANCE WITH ASTM C443. PIPE CONNECTIONS BETWEEN CONCRETE AND PIPE SHALL BE IN ACCORDANCE WITH ASTM C923, AS MANUFACTURED BY KOR—N—SEAL, OR EQUAL. PROVIDE STAINLESS STEEL KORBAND, STAINLESS STEEL PIPE CLAMP, EPDM RUBBER CONNECTION AND REINFORCED NYLON WEDGE. CONNECTIONS SHALL BE CAST DIRECTLY INTO THE PRECAST CONCRETE. DESIGN OF LIFTING DEVICES FOR PRECAST STRUCTURES SHALL CONFORM TO ASTM C913. PROVIDE FORMED POLYPROPYLENE RUNGS WITH A NON—SLIP STEP, IN ACCORDANCE WITH ASTM D4101; 1/2 INCH DIAMETER STEEL REINFORCING BAR, GRADE 60, IN ACCORDANCE WITH ASTM A615. STEPS SHALL BE 12 INCHES WIDE, 16 INCHES ON CENTER VERTICALLY, SET INTO PREFORMED HOLES IN WALL UNLESS NOTED OTHERWISE ON DRAWINGS.

PRESSURE GAGE — PRESSURE GAGE SHALL BE 4-1/2 INCH DIAL PRESSURE GAGE WITH A GAGE COCK, AND HAVING 1% ACCURACY WITH A RANGE OF 0-160 PSI. GAGES SHALL BE PRESSURE OR COMPOUND AS REQUIRED AND SHALL BE AS MANUFACTURED BY WEISS, TRERICE OR ASHCROFT.

PUMP ELECTRICAL CONTROL SYSTEM — IT IS THE INTENTION THAT THIS SPECIFICATION SHALL COVER A COMPLETE ELECTRICAL PUMP CONTROL SYSTEM AS HEREINAFTER DESCRIBED AND ALL NECESSARY APPURTENANCES WHICH MIGHT NORMALLY BE CONSIDERED A PART OF THE COMPLETE ELECTRICAL SYSTEM OF THIS INSTALLATION. ALL OF THE AUTOMATIC CONTROL EQUIPMENT IS TO BE SUPPLIED BY ONE MANUFACTURER. IT SHALL BE FACTORY ASSEMBLED, WIRED, TESTED AND COVERED BY COMPLETE ELECTRICAL DRAWINGS AND INSTRUCTIONS.

THE "U-PACK" CONTROL SYSTEM DESCRIBED HEREIN IS A SYSTEM AS MANUFACTURED BY USEMCO, INC., TOMAH, WISCONSIN. THE NAMING OF A MANUFACTURER OF EQUIPMENT IN THIS SPECIFICATION IS NOT INTENDED TO ELIMINATE COMPETITION OR PROHIBIT QUALIFIED MANUFACTURERS FROM OFFERING EQUIPMENT, BUT IS TO ESTABLISH A STANDARD OF EXCELLENCE FOR THE MATERIAL USED, AND TO INDICATE A PRINCIPLE OF OPERATION DESIRED.

THE SERVICES OF A FACTORY TRAINED, QUALIFIED REPRESENTATIVE SHALL BE PROVIDED TO INSPECT THE COMPLETED INSTALLATION, MAKE ALL ADJUSTMENTS NECESSARY TO PLACE THE SYSTEM IN TROUBLE FREE OPERATION AND INSTRUCT THE OPERATING PERSONNEL IN THE PROPER CARE AND OPERATION OF THE EQUIPMENT.

ALL EQUIPMENT SHALL BE GUARANTEED AGAINST DEFECTS IN MATERIAL AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF OWNER'S FINAL INSPECTION AND ACCEPTANCE TO THE EFFECT THAT ANY DEFECTIVE EQUIPMENT SHALL BE REPAIRED OR REPLACED WITHOUT COST OR OBLIGATION TO THE OWNER.

ALL WIRING SHALL BE MINIMUM 600 VOLT (UL) TYPE MTW OR AWM AND HAVE A CURRENT CARRYING CAPACITY OF NOT LESS THAN 125% OF THE FULL LOAD CURRENT.

THE CONTROL SYSTEM SHALL BE DESIGNED TO OPERATE TWO 230 VOLT 3 PHASE PUMP MOTORS FROM A 230 VOLT 1 PHASE INPUT. THE CONTROLLER WILL USE VARIABLE FREQUENCY DRIVES THAT ARE DERATED FOR THE SINGLE PHASE INPUT AND SHALL BE AS DESCRIBED LATER.

THE DESCRIBED EQUIPMENT SHALL BE HOUSED IN A NEMA 3R STAINLESS STEEL ENCLOSURE ARRANGED FOR MOUNTING AS SHOWN ON THE DRAWINGS. THE ENCLOSURE SHALL BE CONSTRUCTED OF NOT LESS THAN 14 GAUGE #304 STAINLESS STEEL.

THIS WEATHER PROOF, TAMPER PROOF, RAIN-TIGHT ENCLOSURE SHALL BE DESIGNED SPECIFICALLY FOR MOUNTING IN AN UNPROTECTED OUTDOOR LOCATION. IT SHALL BE A GASKETED, HINGED FRONT WEATHER DOOR WITH 3 POINT PADLOCKING CAPABILITY AND AN INTERNALLY MOUNTED HINGED ALUMINUM INNER PANEL SO THAT ALL THE COMPONENTS NORMALLY ACTUATED BY OPERATING PERSONNEL ARE ACCESSIBLE WITHOUT OPENING THE DEAD FRONT AND YET ARE NOT EXPOSED TO THE ELEMENTS OR TO UNAUTHORIZED PERSONNEL.

ALL FIELD INSTALLED CONDUITS, FITTINGS OR CONNECTIONS SHALL ENTER THE ENCLOSURE THROUGH THE BOTTOM ONLY FOR ANY OUTDOOR ENCLOSURE.

ALL MAJOR COMPONENTS AND SUB-ASSEMBLIES SHALL BE IDENTIFIED AS TO FUNCTION WITH LAMINATED, ENGRAVED BAKELITE NAMEPLATES OR SIMILAR APPROVED MEANS.

THE INCOMING SERVICE TO THE PUMP CONTROL PANEL SHALL BE 230 VOLTS, 1 PHASE, 3 WIRE, 60 CYCLE. THE CONTRACTOR IN ACCORDANCE WITH NEC AND LOCAL REQUIREMENTS SHALL INSTALL THE A 200 AMP MAIN SERVICE DISCONNECT IN GAMBRO'S POWER SERVICE AFTER THE EXISTING POWER COMPANY METER.

THE CONTROL SHALL OPERATE THE 10 HP MOTORS ON A PUMP DOWN MODE, AND INCLUDE ITEMS AS SPECIFIED HEREINAFTER.

AN INCOMING MAIN POWER DISTRIBUTION BLOCK SHALL BE PROVIDED AS THE MAIN CONNECTION POINT FOR THE CONTROL PANEL.

A LIGHTNING ARRESTOR SHALL BE SUPPLIED IN THE CONTROL PANEL AND CONNECTED TO EACH LINE OF THE INCOMING SIDE OF MAIN THE POWER INPUT TERMINALS. THE ARRESTOR SHALL PROTECT THE CONTROL AGAINST DAMAGE DUE TO LIGHTNING STRIKES ON THE INCOMING POWER LINE.

A THERMAL MAGNETIC CIRCUIT BREAKER SHALL BE SUPPLIED AS BRANCH CIRCUIT PROTECTION FOR EACH PUMP MOTOR. THE CIRCUIT BREAKER MUST HAVE A MINIMUM AMPERE INTERRUPTING CAPACITY OF 10,000 SYMMETRICAL RMS AMPS. THE CIRCUIT BREAKERS SHALL BE OPERABLE THROUGH THE OPERATOR'S DOOR OF THE ENCLOSURE.

THE CIRCUIT BREAKER SHALL BE PROPERLY SIZED TO PROTECT THE CONTROL CIRCUIT CONDUCTORS, MOTOR STARTER AND THE MOTOR AGAINST OVERCURRENT DUE TO SHORT CIRCUIT OR GROUNDS.

A VARIABLE FREQUENCY DRIVE SHALL BE SUPPLIED. THE DRIVE SHALL BE CAPABLE OF OPERATING A NEMA DESIGN B SQUIRREL CAGE INDUCTION MOTOR WITH A FULL LOAD CURRENT EQUAL TO OR LESS THAN THE CONTINUOUS OUTPUT RANGE OF THE DRIVE. AT BASE SPEED (60 HERTZ) AND BELOW, THE DRIVE SHALL OPERATE IN CONSTANT VOLTS PER HERTZ MODE. ABOVE BASE SPEED (60 HERTZ), THE DRIVE MAY SELECTIVELY OPERATE IN EITHER A CONSTANT VOLT PER HERTZ OR A CONSTANT VOLTAGE EXTENDED FREQUENCY MODE.

THE ADJUSTABLE FREQUENCY DRIVE SHALL BE SINUSOIDAL PWM TYPE DRIVE WITH SENSOR-LESS DYNAMIC TORQUE VECTOR CONTROL CAPABILITY. THE DRIVE SHALL BE PROVIDED IN A NEMA 1 ENCLOSURE AT ALL RATINGS, THE DRIVE SHALL BE OF MODULAR CONSTRUCTION FOR EASE OF ACCESS TO CONTROL AND POWER WIRING, AND MAINTENANCE. IT SHALL CONSIST OF THE FOLLOWING GENERAL COMPONENTS: * FULL WAVE DIODE RECTIFIER TO CONVERT SUPPLY AC TO A FIXED DC VOLTAGE * DC LINK CAPACITORS

* INSULATED GATE BIPOLAR TRANSISTOR (IGBT) POWER SECTION, FOR VARIABLE TORQUE APPLICATIONS. THE POWER SECTION SHALL USE VECTOR DISPERSAL PULSE WIDTH MODULATED (PWM) CONTROL AND SOFT SWITCHING IGBTS TO REDUCE NOISE AND ALLOW LONGER CABLE LENGTH FROM DRIVE TO MOTOR.

* THE DRIVE SHALL BE MICROPROCESSOR BASED WITH AN LED AND LCD DISPLAY TO MONITOR OPERATING CONDITIONS. THE DRIVE DISPLAY SECTION SHALL ALLOW FOR LOCAL OPERATION AND SETTING OF DRIVE FUNCTION CODES AND DISPLAY FAULT INDICATION AND REASONS ASSOCIATED WITH THE FAULT. THE LED DISPLAY SHALL OFFER NINE (9) DIFFERENT SETTINGS AND THE LCD SHALL HAVE THE CAPACITY TO DISPLAY FIVE (5) LINES OF INFORMATION AT A TIME.

* SEPARATE CONTROL AND POWER TERMINAL BOARDS, WITH OPTION PLUG SHALL

BE PROVIDED BY THE DRIVE TO ALLOW FOR REMOTE OPERATION.

* THE DRIVE SHALL HAVE AN RS485 PORT AS A STANDARD AND OPTIONS FOR COMMUNICATING WITH RECOGNIZED INDUSTRY STANDARD DEVICE LEVEL NETWORKS SUCH AS DEVICENET, ITERBUS—S, PROFIBUS, MODBUS PLUS, LONWORKS, AND METASYS N2.

* THE KEYPAD SHALL BE CAPABLE OF COPYING, UPLOADING, AND DOWNLOADING DRIVE FUNCTION CODES.

OPERATING CONDITIONS

519-1992.

* THE DRIVE'S OPERATING AMBIENT TEMPERATURE RANGE SHALL BE -10°C TO 50°C. STORAGE TEMPERATURES SHALL BE BETWEEN -25°C TO 65°C.

* THE RELATIVE HUMIDITY RANGE SHALL BE 5-95% NON-CONDENSING.

* THE DRIVE SHALL BE SUITABLE FOR OPERATION AT ALTITUDES UP TO 3300 FEET WITHOUT DE-RATING.

* THE DRIVE SHALL MEET IEC 61200-2 FOR VIBRATION LEVELS.

* THE DRIVE SHALL BE CAPABLE OF SIDE-BY-SIDE INSULATION WITH ZERO

CLEARANCE AT 30 HP AND BELOW.

* THE DRIVE SHALL BE UL AND CUL LISTED AND NOT REQUIRE EXTERNAL FUSES. THE DRIVE SHALL ALSO BE CE LABELED AND COMPLY WITH STANDARDS EN

61800-3 FOR EMC COMPLIANCE AND EN 61800-2 FOR LOW VOLTAGE

* THE DRIVE SHALL BE DESIGNED IN ACCORDANCE WITH APPLICABLE PORTIONS OF NEMA STANDARDS.

* THE DRIVE SHALL BE COMPATIBLE WITH THE INSTALLATION REQUIREMENTS OF

INTERPRETIVE CODES SUCH AS NATIONAL ELECTRIC CODE (NEC) AND OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)

* THE DRIVE SHALL BE CAPABLE OF OPERATING IN COMPLIANCE WITH IEEE

DRIVE FEATURES

* THE DRIVE SHALL HAVE A GRAPHIC BACK-LIT LIQUID CRYSTAL DISPLAY (LCD) WHICH CAN BE CONFIGURED TO DISPLAY FREQUENCY, CURRENT, FUNCTION CODE SET POINTS, OR DRIVE STATUS AND FAULT CODES. IT SHALL DISPLAY 4 LINES WITH 13 CHARACTERS OF TEXT.

* THE DRIVE SHALL HAVE FOUR DIGITAL LED READOUTS, PROVIDING DISPLAY OF: OUTPUT CURRENT, OUTPUT VOLTAGE, OUTPUT FREQUENCY, FREQUENCY REFERENCE, MOTOR SYNCHRONOUS SPEED (ADJUSTABLE FOR 2 TO 12 POLE MOTORS), LINE SPEED (CALIBRATION ADJUSTABLE FROM 0 TO 200% OF FREQUENCY, WITH 0.01% RESOLUTION), KW POWER CONSUMPTION, PID SETTING VALUE, PID REMOTE SET VALUE, PID FEEDBACK VALUE, AND TORQUE CALCULATIONS VALUE. * THE DRIVE SHALL BE ABLE TO OPERATE WITH ITS OUTPUT DISCONNECTED FOR TROUBLESHOOTING AND STARTUP.

* THE DRIVE SHALL HAVE A REFERENCE FILTER THAT ELIMINATES THE EFFECTS OF NOISE THAT MAY BE PRESENT IN THE ANALOG SIGNALS.

* THE DRIVE SHALL BE ABLE TO RESET ITSELF UP TO TEN (10) TIMES (ADJUSTABLE WITH ADJUSTABLE INTERVALS OF 2-20 SECONDS) AFTER OVER-CURRENT, OVER-VOLTAGE, OVERHEATING, AND OVERLOAD FAULTS.

* THE DRIVE SHALL BE ABLE TO OPERATE AFTER A VOLTAGE DIP BELOW 175 VAC ON 230 VAC INPUT POWER AND 310 VAC ON 460 VAC INPUT POWER FOR 15 MILLISECONDS AT 85% FULL LOAD CURRENT WITHOUT ANY DISTURBANCES IN OUTPUT POWER DELIVERED TO THE LOAD. IF POWER EXCEEDS THIS LEVEL, SIX (6) DIFFERENT MODES OR ACTIVE AND INACTIVE RESTART MODES WILL BE AVAILABLE. THE DECREASE IN MOTOR SPEED WILL BE ADJUSTABLE IN THE EVENT OF A MOMENTARY POWER OUTAGE.

* THE DRIVE SHALL HAVE IGBT SOFT SWITCHING AND A LOW NOISE CONTROL POWER SUPPLY SYSTEM TO REDUCE THE NOISE FROM THE DRIVE.

SPEED CONTROL

* THE DRIVE SHALL BE CAPABLE OF STARTING INTO A ROTATING LOAD (FORWARD AND REVERSE) AND SHALL SMOOTHLY ACCELERATE OR DECELERATE TO THE SET POINT WITHOUT EXPERIENCING COMPONENT DAMAGE.

* THE DRIVE SHALL PROVIDE AT LEAST THREE SELECTABLE SKIP FREQUENCIES WITH PROGRAMMABLE BANDWIDTHS, ADJUSTABLE 0 TO 30 HZ, WHICH WILL NOW ALLOW OPERATION AT OR NEAR MECHANICAL RESONANCE SPEEDS.

WHEN A FAULT OCCURS, THE DRIVE SHALL HAVE A CONTROLLED SHUT DOWN SEQUENCE. THE REASON FOR THE FAULT CONDITIONS SHALL BE ENUNCIATED ON THE LED DISPLAY, AND THE LCD GRAPHIC SCREEN SHALL DISPLAY THE CURRENT, TEMPERATURE, FREQUENCY, AND VOLTAGE AT THE TIME OF THE FAULT AS WELL AS POTENTIAL REASONS FOR THE CONDITION. THE DRIVE SHALL MONITOR, SENSE, AND DISPLAY THE FOLLOWING FAULT CONDITIONS:

* OVER-CURRENT DURING ACCELERATION
* OVER-CURRENT DURING DECELERATION

* OVER-CURRENT DURING CONSTANT SPEED OPERATION

* GROUND FAULT * INPUT PHASE LOSS

* FUSE BLOWN

* OVER-VOLTAGE DURING ACCELERATION

* OVER-VOLTAGE DURING DECELERATION
* OVER-VOLTAGE DURING CONSTANT SPEED OPERATION

* UNDER-VOLTAGE

* OVERHEATING OF HEAT SINK

* EXTERNAL THERMAL RELAY
* OVER-TEMPERATURE OF INTERNAL AIR

* OVERHEATING AT DYNAMIC BRAKING CIRCUIT

* MOTOR 1 OVERLOAD * MOTOR 2 OVERLOAD

* INVERTER UNIT OVERLOAD

* OVER-SPEED
* MEMORY FRROR

* MEMORY ERROR

* KEYPAD PANEL COMMUNICATION ERROR

* KEYPAD PANEL COMMUNICA * CPU ERROR

* OPTION ERROR (QUANTITY 2)

* OPERATIONAL PROCEDURE ERROR

* OUTPUT WIRING ERROR/IMPEDANCE IMBALANCE * MODBUS-RTU ERROR

THE DRIVE SHALL HAVE A SELECTABLE ELECTRONIC INVERSE TIME THERMAL OVERLOAD FUNCTION AS REQUIRED BY NEC AND UL STANDARD 991 FOR AN AS INDUCTION MOTOR (REFER TO APPLICABLE CODES FOR SPECIFIC INSTALLATION REQUIREMENTS). THE OVERLOAD SHALL BE PROGRAMMABLE FROM 20-135% OF DRIVE RATED CURRENT.

THE DRIVE SHALL HAVE AN OVER-VOLTAGE PROTECTION FUNCTION THAT OPERATES IF SUPPLY VOLTAGE RISES ABOVE RATED VALUE OR BY MOTOR'S REGENERATION.

THE DRIVE SHALL TREAT SHOT CIRCUITS IN EITHER THE OUTPUT LOAD OR THE OUTPUT MODULE AS AN OVER-CURRENT.

IF THE DRIVE HEAT SINK TEMPERATURE EXCEEDS APPROXIMATELY 100°C, THE DRIVE WILL SHUT DOWN ON OVER TEMPERATURE FAULT.

THE DRIVE SHALL PROVIDE OUTPUT GROUND FAULT PROTECTION.

THE DRIVE SHALL PROVIDE LED INDICATION OF DC BUS VOLTAGE, WHICH, WHEN LIT, WILL SIGNIFY TO MAINTENANCE PEOPLE THE PRESENCE OF POTENTIALLY DANGEROUS VOLTAGE.

INCLUDE COVER FILTER AND EXHAUST FANS AS REQUIRED TO MAINTAIN VFD TEMPERATURE REQUIREMENTS.

THE PANEL SHALL BE SUPPLIED WITH A PROPERLY SIZED CONTROL POWER CIRCUIT BREAKER. THE BREAKER SHALL BE OPERATOR DOOR MOUNTED AND SHALL SUPPLY POWER TO ALL CONTROL WIRING WITHIN THE ENCLOSURE.

A WETWELL LEVEL—RESPONSIVE AUTOMATIC PUMP CONTROLLER/ALTERNATOR AND ABNORMAL LEVEL ALARM MODULE SHALL BE FURNISHED TO CONTROL TWO PUMPS IN RESPONSE TO DIRECT—ACTING LIQUID LEVEL SENSORS IN THE WETWELL. THE CONTROLLER/ALTERNATOR SHALL HAVE FLOAT OPERATION LED INDICATORS AND TERMINALS FOR CONNECTION OF A THREE POSITION ALTERNATOR OVERRIDE SWITCH. THE CONTROLLER SHALL PROVIDE INDEPENDENT ON, COMMON OFF OPERATION OF 2 PUMPS WITH HIGH LEVEL ALARM. AN INTERNAL SOLID STATE ALTERNATOR SHALL CHANGE THE PUMP SEQUENCE AFTER EACH CYCLE OF OPERATION. THE CONTROLLER/ALTERNATOR/ALARM MODULE SHALL BE A STANDARD STOCKED UNIT AND BE UL 913 LISTED INTRINSICALLY SAFE.

THREE FLOATS WILL BE PROVIDED TO CONTROL THE OPERATION OF THE DUPLEX PUMPS. AS THE LIQUID LEVEL RISES IN THE WETWELL THE PUMPS STOP FLOAT ENERGIZES FIRST. AS THE LEVEL INCREASES THE START FLOAT ENERGIZES AND STARTS THE PUMP. WITH THE PUMP RUNNING, THE LEVEL DECREASES TO THE PUMP STOP FLOAT, AND TURNS THE PUMP OFF. WHEN THE PUMP STOPS, THE ALTERNATOR SHALL INDEX SO THAT THE OTHER PUMP STARTS ON THE NEXT RISE IN LEVEL, IF THE LEVEL CONTINUES TO RISE WITH THE LEAD PUMP RUNNING, THE LAG START FLOAT WILL ENERGIZE AND START THE LAG PUMP. BOTH LEAD AND LAG PUMPS SHALL OPERATE TOGETHER UNTIL THE STOP FLOAT IS DE-ENERGIZED.

A FLOAT SHALL BE PROVIDED TO SIGNAL THE HIGH LEVEL ALARM IF THE LEVEL CONTINUES TO RISE WITH THE PUMP(S) RUNNING.

AN ADJUSTABLE DELAY TIMER SHALL BE PROVIDED TO PREVENT SIMULTANEOUS STARTING OF THE PUMPS AFTER A POWER FAIL.

A NON-RESETTABLE RUNNING TIME METER MEASURING HOURS AND TENTHS OF HOURS OF OPERATION UP TO 99999.9 HOURS SHALL BE FLUSH-MOUNTED ON THE OPERATOR'S DOOR OF THE CONTROL PANEL FOR EACH PUMP MOTOR INDICATED. THIS SHALL BE A 120 VAC DEVICE OPERATING FROM THE CONTROL VOLTAGE BY AN AUXILIARY CONTACT OF THE MOTOR STARTER OR OTHER RUN CONTACT.

A 22 MM OIL TIGHT, THREE-POSITION, "HAND-OFF-AUTOMATIC" SELECTOR SWITCH SHALL BE FLUSH-MOUNTED ON THE OPERATOR'S DOOR OF THE CONTROL PANEL FOR THE OPERATION OF EACH MAGNETIC MOTOR STARTER. THIS SELECTOR SWITCH SHALL OPERATE THE STARTER WHEN IT IS IN EITHER THE "HAND" POSITION OR THE "AUTOMATIC" POSITION, AND THE AUTOMATIC CONTROL SYSTEM IS CALLING FOR THE OPERATION OF THE EQUIPMENT IN THE MANNER AS HEREIN DESCRIBED.

A 22 MM OIL TIGHT GREEN "PUMP RUNNING" PILOT LIGHT SHALL BE FLUSH-MOUNTED ON THE OPERATOR'S DOOR OF THE CONTROL PANEL. THIS PILOT LIGHT SHALL BE OPERATED FROM A RESPECTIVE STARTER AUXILIARY CONTACT. THE PILOT LIGHT SHALL HAVE A REPLACEABLE BULB.

A 22 MM OIL TIGHT RED "HIGH LEVEL" PILOT LIGHT SHALL BE FLUSH-MOUNTED ON THE OPERATOR'S DOOR OF THE CONTROL PANEL. THIS PILOT LIGHT WILL INDICATE A HIGH WETWELL CONDITION. THE PILOT LIGHT SHALL HAVE A REPLACEABLE BULB.

A 22 MM OIL TIGHT RED "SEAL FAIL" PILOT LIGHT SHALL BE FLUSH-MOUNTED ON THE OPERATOR'S DOOR OF THE CONTROL PANEL, TO INDICATE A PUMP SEAL FAILURE ALARM CONDITION OF EACH SEWAGE PUMP. THIS LIGHT SHALL BE OPERATED BY A SOLID-STATE RESISTANCE CONTROL RELAY DESIGNED FOR CONNECTION TO THE MOISTURE PROBE IN EACH PUMP MOTOR. THE PILOT LIGHT SHALL HAVE A REPLACEABLE BULB.

A 100-WATT, 120 VAC CONDENSATION PROTECTIVE HEATER AND HIGH TEMPERATURE CUTOUT THERMO SWITCH SHALL BE SUPPLIED IN THE CONTROL PANEL.

A WEATHERPROOF HIGH WATER, 40—WATT ALARM LIGHT ASSEMBLY INCLUDING A HIGH IMPACT RESISTANT LEXAN RED LENS SHALL BE INCLUDED, FOR PANEL MOUNTING ONLY. THE ALARM LIGHT BULB SHALL BE REPLACEABLE FROM INSIDE THE CONTROL PANEL WITHOUT HAVING TO REMOVE THE WEATHERPROOF RED LENS FROM THE PANEL. A SOLID—STATE FLASHER SHALL BE INCLUDED TO STROBE THE ALARM LIGHT FOR ANY OF THE SPECIFIED ALARM CONDITIONS.

EACH FLOAT SHALL HAVE MOLDED POLYETHYLENE BODY, INTERNAL REDUNDANT POLYURETHANE FOAM FLOATATION, POTTED SWITCH/CABLE CONNECTIONS AND FINE STRANDED AWG #18 CABLE WITH HEAVY-DUTY SYNTHETIC RUBBER JACKET IN LENGTHS AS REQUIRED TO RUN UNSPLICED TO THE CONTROL PANEL.

THE CONTRACTOR SHALL FURNISH, INSTALL AND WIRE THE FLOAT SWITCHES AS SHOWN ON THE DRAWINGS. THE FLOAT SWITCHES SHALL BE INDIVIDUALLY SUSPENDED IN THE WETWELL WITH WEIGHT KITS. THE FLOAT SWITCH CABLES SHALL BE SUSPENDED FROM A CABLE RACK MOUNTED TO THE TOP OF THE WETWELL.

A COMPLETE SET OF DRAWINGS SHALL BE SUPPLIED TO ENSURE SUCCESSFUL INSTALLATION AND OPERATION OF THE CONTROL SYSTEM. THE SHOP DRAWINGS SHALL CONSIST OF ALL OF THE FOLLOWING:

* SUFFICIENT DETAIL TO EVALUATE COMPLIANCE WITH THESE SPECIFICATIONS.

* A DETAILED COMPONENT LIST INCLUDING MANUFACTURER AND CATALOG NUMBER. * A CUSTOM WIRING DIAGRAM FOR THIS SPECIFIC APPLICATION TO FACILITATE AND

ENSURE ACCURATE FIELD CONNECTIONS TO THE CONTROL PANEL BY ELECTRICAL INSTALLATION PERSONNEL.

* A DESCRIPTION OF OPERATION FOR THE CONTROL SYSTEM.
* AN ENCLOSURE DIMENSION PRINT.

URS

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DATE ISSUED FOR BIDDING:

ADDENDUM REVISIONS

No. DESCRIPTION

DATE BY

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DATE BY

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DATE BY

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DATE ISSUED FOR RECORD DRAWINGS:

GAMBRO HEALTHCARE
LIFT STATION & FORCE MAIN

PUMPS GENERAL NOTES

DATE	October 2003
JOB No.	14572464
DRAWN	MAL
CHECKED	FJS
SCALE	NONE

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