TYPICAL INSTALLATION

SUCTION LIFT ARRANGEMENT

SCALE: N.T.S.

42"X 60" ASME STEEL TANK AIR RELEASE 11"X 15" MANWAY PORT \_\_\_\_\_\_ 20 CU. FT. ANTHRACITE TEST 14 CU. FT. GREENSAND PORT 11"X 15" MANWAY

> GREENSAND FILTER TANK DETAIL N.T.S.

Chemical Feed System	Distrilection System	Filter Regeneration
Component	Chlorine Solutions for Disinfection	Potasskim Permangenate Solution
1. Solution Metering Pump		
Series	Pulsatron/ Series E-Plus	Pulsatron Series E-Pkis
Model No.	LPA3, 12 GPD @ 100 pei	LPB 2, 5GPM @ 250 PSI
Operating Volts	115V	115V
Materials		
Pump Head / Fitting	PVC/PVC	PVC/PVC
Balls / Checks		Ceramic
Seats / O-rings		Teflon
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2. Operating Pressure	Actual: 30 pal; capacity 100 pal	Actual: 30 pel Capacity: 250 pel
3 Discharge Control Valve	Four (4) or five (5) function velve for anti-siphon	Four (4) or five (5) function valve for anti-elphon and be
	and back pressure control, pressure relief,	pressure control, pressure relief, priming and discharge
	priming and discharge drain; bleed valve	drain; bleed valve
4. Injector	Injection check valve required	Injection check valve required
5. Solution Tank Size	30-35 gallon tank and stand with top support	15 gallon, yellow polyethylene tank with shelf or brack
-	ring; with heavy duty lid.	mount for flooded suction arrangement.
	35 gal, tank with built in shelf for mounting pump	
	in flooded auction is acceptable.	
6. Solution Tank Mixer		None
	None	None
7. Mixer Control	1	NA
	N/A 3/8* scrylic body flow indicator; Pulsatron P/N	3/8" sorylic body flow indicator; Pulsatron P/N U70123
8. Flow indicator	U7012309	ore advant pody non success, i and some in the orest
9. Calibration Column	100 ml x 3/8 with shut-off valve	100 ml x 3/8" PVC column with shut-off valve
9. Calibration Column 10. Solution Tubing	3/8° suction and discharge tubing	0.375° or 3/8 ° O.D. suction and discharge tubing
11. Solution Systems	A A AMARAN MILE AMARINA MARINA	
Chemical basis	5% chlorine (Clorox)	Potessium Permanganete
% Solution	5 %; 4 mg/l residual	1.5%
Feed Rate	Design Capacity	Design Capacity
gpm	0.0015 gpm 0.0083 gpm	0.0012 gpm 0.0021 gpm
m/min	5.7 m/m 31.4 m/m	4.5 ml/m 8.0 ml/m
Usage, GPD of solution		
max, avg.	2.34 gpd	1.77 gpd
Solution Pump Settings		
stroke rate	44 %	60%
	44 %	59 %

Set chemical feed pump stroke length and rate adjustment controls to face interior of room for ease of operation and maintenance. In most cases ½ " and 3/8 " OD subing will be satisfactory. Adjust size of connections, fittings, flow indicators, etc. as needed. Stroke rate and stroke lengths are shown approximate. Field adjust per manufacturer's instruction to softened deed rate.

# Chemical Feed System Specifications

# 1.0 General

1.01 This specification covers the chlorine solution feed system for disinfection and the Potassium Permanganate feed system for filter regeneration.

The disinfection system is proposed as a future addition and is therefore not in the contract at this time.

# 2.0

- 2.01 Chemical feed system storage tanks shall be of polyethylene construction and shall have the storage capacity indicated on the drawings. The tanks shall be equipped with a removable, but rigid, heavy duty, polyethylene cover. Tank wall thickness shall be a minimum of 5/64 inch for 15-gallon tanks, 3/32 inch for 30 and 35 gallon tanks, and 5/16 inch for 50 gallon tanks and larger. Tanks shall be NSF approved or fda certified for food
- 2.02 Chemical Feed Pumps One (1) chemical feed pump shall be furnished for each chemical feed system. Either pulsafeeder or equal may be used. The pumps shall be of the series, model and capacity shown on the drawing or equal. Pumps shall be fitted with PVC or pvdf pump head, ceramic balls (check valve) and fittings. Seats and o-rings shall be tellon or other suitable material for an orthophesphate solution or chlorine solutions. Each chemical feed pump shall be equipped with a four (4) or five (5) function control valve for pressure relief, control of back pressure, anti-siphon, discharge drain and aid in priming the pump on the discharge side of the metering pump.
- 2.03 Mixers Not Applicable
- 2.04 Calibration Chambers A 100 ml calibration chamber shall be provided for each chemical feed system. The calibration chembers shall be sized for the chemical feed pumps specified for each system. The chamber of standard dimensions shall be constructed of PVC and graduated in milliliters. Each calibration chamber shall be securely (wall) mounted with a shut-off valve.
- 2.05 Chemical feed suction and discharge tubing shall be clear polyethylene flexible tubing of the diameter indicated on the drawing. Tubing shall be NSF approved or FDA food
- 2.06 Appurtenances all appurtenances included in each chemical feed system, including ball valves, check valves, bulkhead connections, fittings, etc. Shall be constructed of corrosion resistant materials.

# 2.07 Chemicals

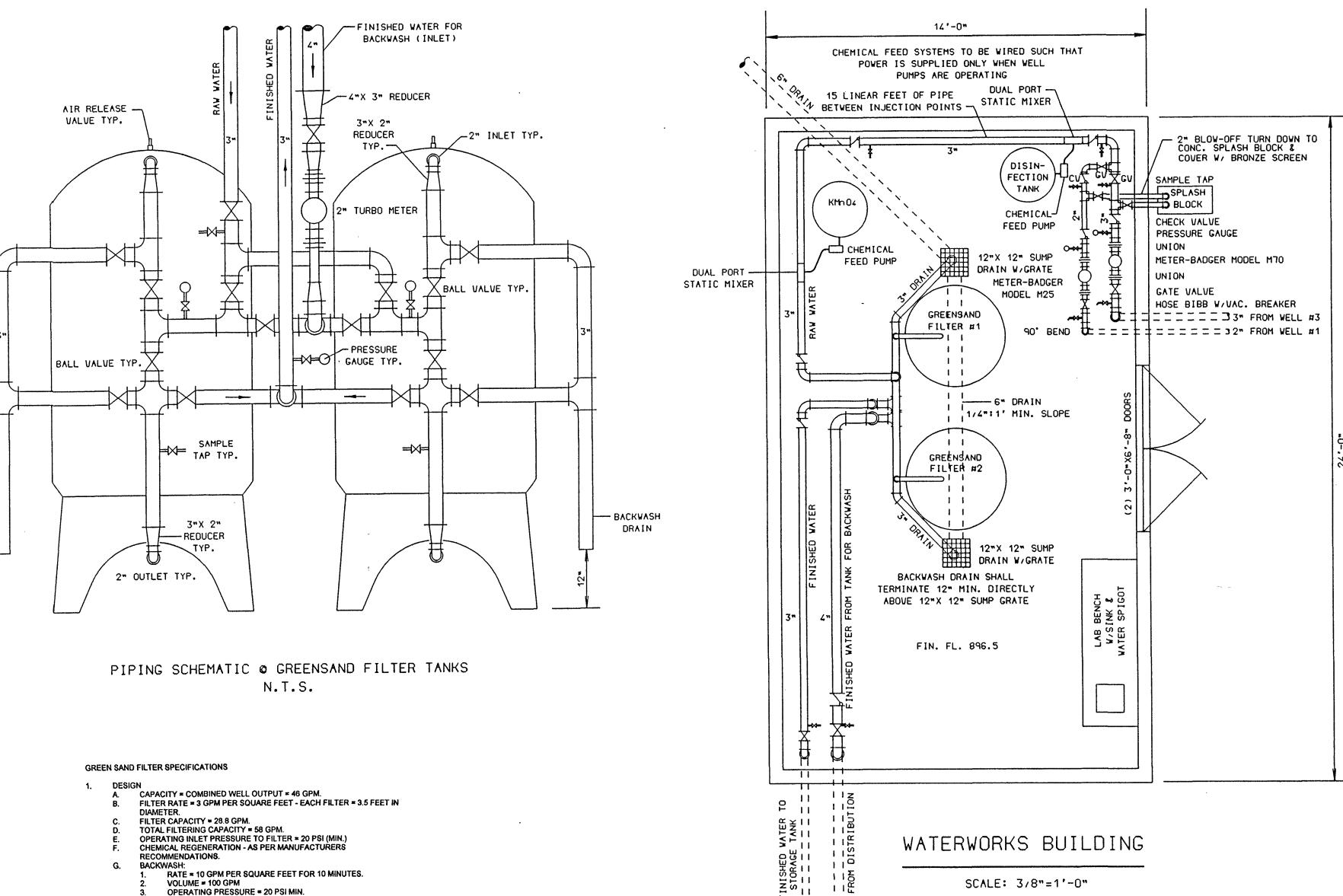
Chlorine Solutions - Solution percentages and chemical feed rates for "clorox" solutions shall be as specified on the drawings. All products used shall be certified by NSF 60 standards. Sodium hypochlorite solutions may be used in lieu of the 5%± chlorine solutions noted.

# 2.08 Laboratory Test Equipment

- Portable ph Meter The portable ph meter shall be a temperature compensated, combination ph electrode for ph and temperature. The unit shall include 4.0 and 7.0 buffers, three plastic beakers, a replaceable nine-volt battery. A durable hard plastic carrying case shall be furnished with the unit, capable of housing the entire unit including beakers and solutions. The meter shall be Model No.. 51700-11 as manufactured by Hach company or equal with conventional nh/temperature electrode.
- Chlorine Residual Test Kit The chlorine test kit shall be a digital chlorine analyzer, model 46700-00 as manufactured by Hach company or equal. The chlorine analyzer shall be a single wave length, direct-reading colorimeter type instrument. The unit shall have a range of 0 to 4.0 ppm of free and total chlorine and a three-digit lod readout. Readout stability shall be battery operated with a field replaceable nine-volt battery.
- Iron Test Kit The iron teet kit shall be a colorimeter catalog number 46700-22 Pocket Colorimeter by Hach with a range of 0-3.0 mg/l with a smallest increment of 0.01 mg/l or equal.
- Manganese Test Kit The manganese test kit shall be a colorimeter catalog number 46700-18 Pocket Colorimeter by Hach with a range of 0-0.7 mg/l with a smallest increment of 0.01 mg/l or equal.

- 3.01 Each chemical feed system shall be provided with a storage tank, a chemical metering pump, a calibration chamber, a flow indicator, a four (4) or five (5) function discharge valve, tubing and all other appurtenances and connections necessary to provide a complete workable chemical feed system.
- 3.02 Each solution pump shall be mounted on a shelf on the wall above the chemical storage
- 3.03 The system shall be installed at the locations shown on the drawing.
- 3.04 A chemical feed equipment shall be installed in accordance with manufacturer's instructions and the drawings.
- 3.05 The appropriate test kit for each chemical feed system shall be included in the project.

AIR RELEASE VALVES SHALL BE PROVIDED AT HIGH POINTS IN PIPING WITHIN THE WATERWORKS BUILDING.



RECOMMENDATIONS. EQUIPMENT SHALL BE NSF 61 APPROVED. PRESSURE FILTERS (2 REQUIRED) FILTERS SHALL BE MARLO MGA-42 MANGANESE GREEN SAND/ANTHROCITE FILTERS WITH 42"X60" STEEL PRESSURE VESSELS ASME CERTIFIED. SYSTEM SHALL INCLUDE AIR RELEASE, 2-11" X 15" MANWAYS, BACKWASH FLOW CONTROL AND MANUAL VALVING FOR NORMAL FILTRATION AND

ALL EQUIPMENT TO BE INSTALLED AS PER MANUFACTURERS

INTERVAL - FILTERS SHALL BE BACKWASHED INDIVIDUALLY, ONE PER DAY, AFTER 40 HOURS OF OPERATION (68,000 GAL).

BACKWASH OPERATION. ALL FILTERS SHALL HAVE A MINIMUM SIDE WALL DEPTH OF 5 FEET AND FILTER WASHWATER TROUGH LOCATED 18" (MIN.) ABOVE THE MEDIA.

FILTER MEDIA SHALL CONSIST OF A 20 CUBIC FEET LAYER OF GRADED ANTHROCITE COAL ON TOP OF 14 CUBIC FEET OF MANGANESE GREEN SAND (16.6 MESH). FORMULATED FROM A GLAUCONITE GREEN SAND WITH IRON REMOVAL CAPACITY OF 12,000 PPM PER CUBIC FOOT AND UNIFORMITY COEFFICIENT OF

EACH FILTER SHALL BE FITTED WITH SAMPLE TAPS AT THE TOP AND MIDPOINT OF THE GREEN SAND MEDIA.

# GENERAL DESCRIPTION OF OPERATION

# A. TREATMENT

2. EQUIPMENT

THE SYSTEM IS DESIGNED TO REMOVE IRON AND MANGANESE FROM THE WELLS RAW WATER BY THE USE OF PRESSURE FILTERS UTILIZING GREEN SAND. CHEMICAL FEEDERS ARE INCLUDED TO ADD CHLORINE AND POTASSIUM PERMANGANATE PRIOR TO FILTRATION. ALL CHEMICAL SOLUTIONS ARE TO BE PREPARED IN THE CHEMICAL TANKS USING ELECTRIC MIXERS. CHEMICALS ARE TO BE STORED IN THEIR ORIGINAL CONTAINERS IN THE SPACE PROVIDED AND PORTIONS ARE TO BE MEASURED BY WEIGHING. THE WELL PUMPS PROVIDE THE PRESSURE TO DELIVER THE WATER FROM THE WELL THROUGH THE TREATMENT SYSTEM AND DISCHARGE TO THE STORAGE TANK.

B. FILTER BACKWASH AND WASTEWATER DISPOSAL

BACKWASH WATER IS TO BE TAPPED FROM THE MAIN DISTRIBUTION LINE LEAVING THE STORAGE TANK. FILTERS ARE TO BE BACKWASHED INDIVIDUALLY ON A ROTATING SCHEDULE SUCH THAT NO MORE THAN ONE (1) FILTER IS BACKWASHED IN ANY TWENTY-FOUR (24) OUR PERIOD. FLOW METER ON THE INLET PIPE AT EACH FILTER AND PRESSURE GAUGES GRADUATED OVER A RANGE OF 0.30 FEET LOCATED ON BOTH THE INLET AND OUTLET PIPES ARE TO BE MONITORED DAILY FOR USE AS A BASIS FOR SCHEDULING FILTER BACKWASH, BACKWASH IS TO BE INITIATED MANUALLY BY VALVES ON EACH FILTER. THE RATE OF FLOW OF THE BACKWASH IS TO BE CONTROLLED BY A THROTTLING VALVE AND FLOW METER ON THE MAIN BACKWASH FEED LINE. THE BACKWASH WASTE WATER IS TO BE DISCHARGED INTO A SUMP IN THE FLOOR OF THE FILTER ROOM WHICH DRAINS TO THE BACKWASH WASTE WATER DISPOSAL SYSTEM.

# GENERAL SPECIFICATIONS - WATERWORKS BUILDING

# One (1) swing, eye wash system with push hands shall be wall mounted where indicated. Unit shall meet ANSI

Compliance criteria. Use Bradley Model \$19-270B or equal. PVC Pipe Inside Waterworks Building

Water line pipe and fittings used in the water treatment building shall be Schedule 80 PVC, meeting ASTM Standard D-1784 and D-1785 and NSF Standard 61. Standard fittings for Schedule 80 pipe shall also be used. Pipe shall be pressure rated at not less than 300 PSI.

Sample Tap 1/2" bronze angle stop valve copper to copper with 2" extension. Smooth bore with no threads. Valves by Nibco

Where gate valves or ball valves are noted, PVC ball valves shall be used for on/off control and blocking valves for downstream repair. Seals and O-rings shall be EPDM. Use True Union Ball (TUB) valves as manufactured by Nibco

# In-Line Check Valves

The in-line check valves shall be manufactured of PVC material with EPDM seals and seats. The connections shall be either flanged or threaded. The check valves shall be True Union Ball Check Valves (TUC) as manufactured by Nibco or equal.

# Pressure Gauge

Pressure gauges shall be liquid filled gauges, 1 1/2" diameter with a range of 0-200 psi. Install pressure gauge

Pressure guages shall be similar to Ashcroft Series 1009 Industrial gauges with a 1/2" NPT lower connection, stainless steel socket, polycarbonate window in a liquid filled polished stainless steel case; or equal. General

# All waterworks equipment shall be NSF 61 rated

One (1) - three (3) inch diameter in-line static mixer with dual injection points shall be provided on the combined well output line where indicated. The static mixer shall be raised for sixty (60) gpm with minimum head loss. Use Atlantic Screen Static Mixer # AIM 1015-3 or equal.

# Water Meters

Well # 1 Badges Model M25 Well # 3 Badges Model M70 Backwash Line - Badger 2" Recordall II Turbo Meter

# GENERAL NOTES - WATERWORKS BUILDING

- PIPING LAYOUT FOR SCHEMATIC AND SIZING PURPOSES ONLY, ACTUAL PIPE AND VALVE ARRANGEMENT MAY VARY
- ELECTRICAL PANELS AND CONTROLS SHALL BE AS REQUIRED FOR THE PROPOSED SERVICE. ALL ELECTRICAL WORK SHALL BE ACCOMPLISHED PER NEC.
- WELL PUMP CONTROLS SHALL BE INSTALLED TO OPERATE AS OUTLINED ON THE PUMP CONTROL SCHEMATIC DIAGRAM.
- SECURE ALL PUMP HOUSE PIPING TO WALL, CEILINGS OR FLOOR AS NECESSARY TO PROVIDE PIPE THRUST RESTRAINT AND SUPPORT. USE GRINNEL PIPE SUPPORTS OR EQUAL.
- WATERWORKS BUILDING PIPE AND FITTINGS:

ALL INTERIOR PIPE AND FITTINGS FOR WATER SHALL BE SCHEDULE 80 PVC, SOLVENT JOINTS, MARKED "NDF-PW" FOR DRINKING WATER. PIPE AND FITTINGS FOR WATER LINES THROUGH AND BELOW THE FLOOR SLAB SHALL BE SCHEDULE 80 PVC, "NSF-PW" FOR DRINKING WATER. ALL PIPE AND FITTINGS FOR THE WASTEWATER DISPOSAL SYSTEM SHALL BE SCHEDULE 40 PVC PIPING BELOW FLOOR. ALL PIPES BELOW FLOOR SHALL BE BEDDED IN MINIMUM 6"

TRE. SYST RE1 S. DATE: 10-1-02 TECHNICIAN: CHECKED BY: REVISIONS DATE 2-26-03 SCALES AS SHOWN PROJ. NO. DIV. 020097 SHEET NO. 11 OF 16 DRAWING NO. DETAIL1