RIVERBEND RIVERBANK WATER DISTRICT

OPERATIONS MANUAL

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revised 10-19-2022

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Section 2

Illustrations

Chlorine Analyzer - controls chlorine level

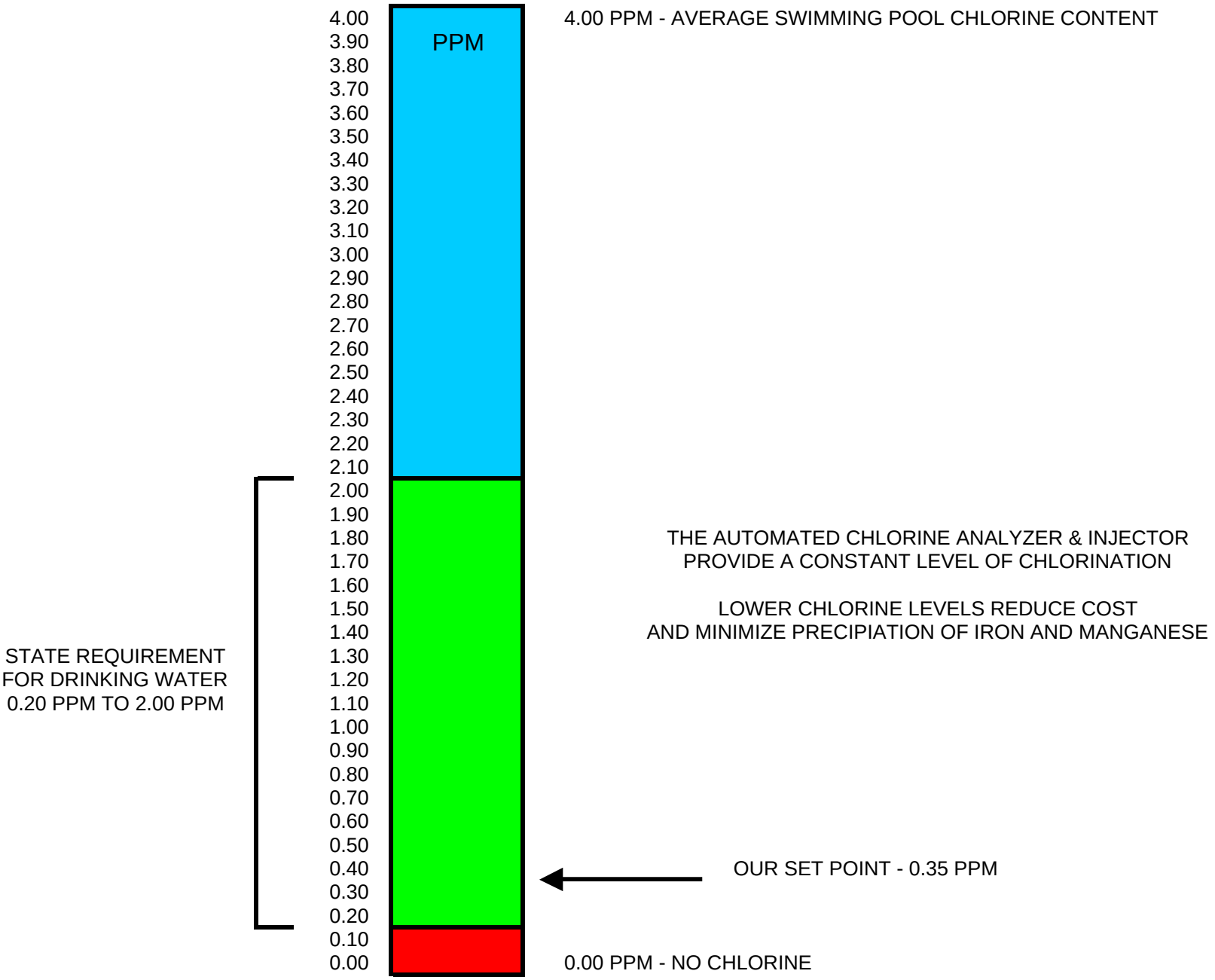
SAMPLE TAKEN FROM RECIRCULATING LINE
PASSES THROUGH DC1 CHLORINE ANALYZER

WELL CYCLE CHLORINE
INJECTION POINT - BRINGS
INCOMING WELL WATER
TO 0.34 PPM CHLORINE

CONTROL LINE TO
GAMMA CHLORINE
INJECTION PUMP

DULCOMETER DC1 CHLORINE ANALYZER READS CHLORINE LEVEL FROM RECIRCULATING LINE
SENDS INJECTION PULSES TO GAMMA PUMP - ADJUSTS TO PRESET POINT OF 0.40 PPM CHLORINE
CHLORINE LEVEL IS READ CONSTANTLY FROM RECIRCULATING LINE AND POSTED ONLINE HOURLY
PRESET LIMITS AT MISSION COMMUNICATIONS WILL SEND ALARM MESSAGE IF OUT OF RANGE

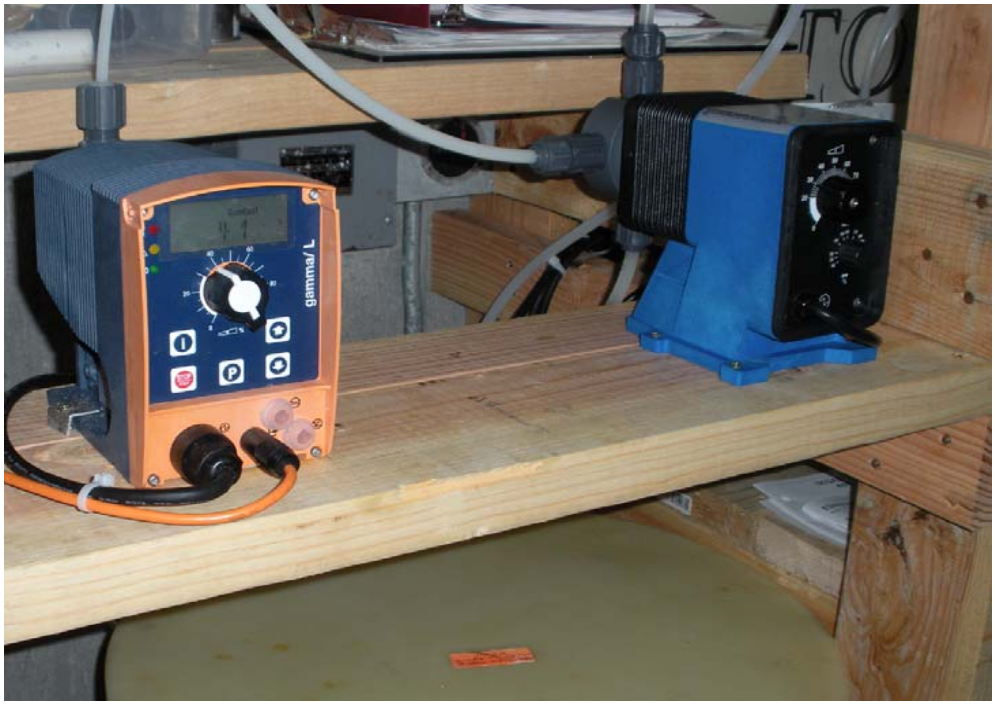
Chlorine Analyzer - Chlorine Level Set Point



Chlorine Injection Pumps

NEW GAMMA CHLORINE PUMP
AUTOMATICALLY CONTROLLED
BY DC1 CHLORINE ANALYZER
SET POINT IS 0.40 PPM

NEW PULSATRON CHLORINE PUMP
RUNS ONLY WHEN RESERVOIR IS FILLING
CONTROLLED BY WELL-ON CYCLE
PRE-CHLORINATES TO APPROX 0.34 PPM



THESE INJECTION PUMPS
COMBINE TO PROVIDE 0.40 PPM
(0.20 - 2.00 PPM REQUIRED)

IF EITHER PUMP FAILS,
THE OTHER WILL KEEP THE
LEVEL ABOVE THE MINIMUM

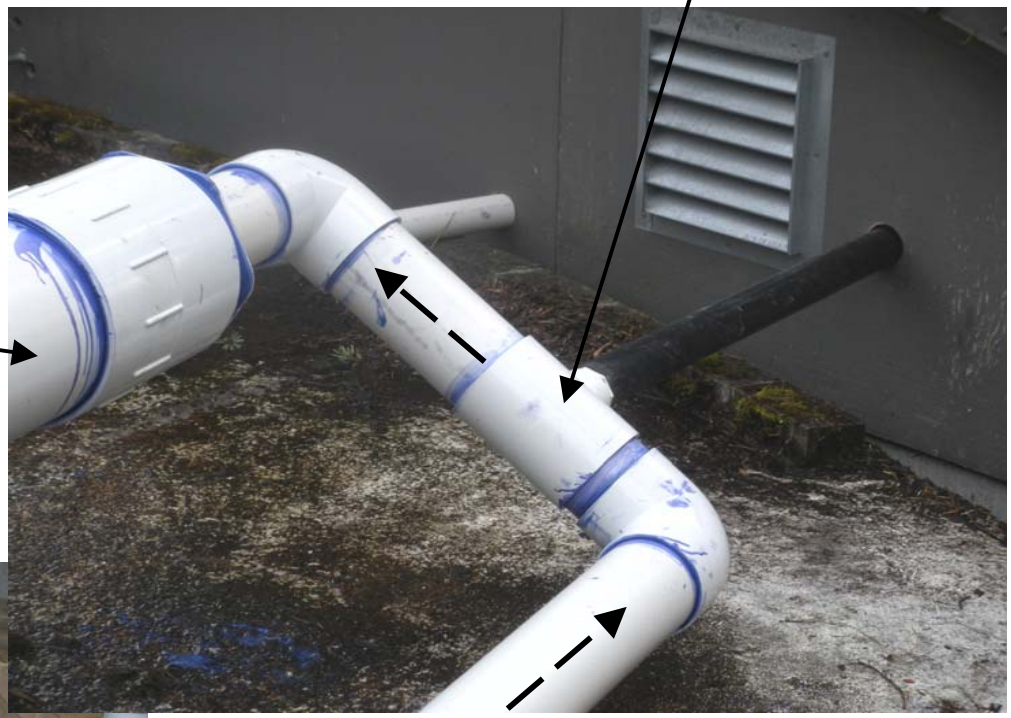
WE ARE NOW RUNNING 0.40 PPM.
THIS IS BELOW OUR PREVIOUS
CHLORINATION AVERAGE

ORIGINAL CHLORINE PUMP
HAS BEEN IN USE SINCE 1997
NO LONGER USED FOR CHLORINE
AVAILABLE FOR FUTURE PROJECT

Polyphosphate Injection System

THE INJECTION PUMP RUNS ONLY WHEN THE WELL CIRCUIT IS ON, AND ONLY WHEN A FLOW SWITCH SENSES THAT WATER IS FLOWING INTO THE RESERVOIR. THIS IS THE SAME CONTROL THAT PREVENTS THE SYSTEM FROM OVER-CLORINATING WHEN THE WELLS ARE NOT DELIVERING WATER.

POLYPHOSPHATE INJECTION POINT



MIXING MANIFOLD

CASCHEM 5C 30-GALLON POLYPHOSPHATE DRUM

STENNER PUMP

FROM WELLS

THE POLYPHOSPHATE IS PUMPED FROM THE 30-GAL BARREL TO THE INJECTION POINT ON TOP OF THE RESERVOIR. THE SOLUTION MOVES VERY SLOWLY AND ONLY WHEN A WELL PUMP IS ON, REQUIRING INSULATION TO PREVENT FREEZING.

Transducer-Controlled Well Circuit

THE RESERVOIR FLOAT SWITCHES HAVE BEEN REPLACED BY TRANSDUCER

A TRANSDUCER PRESSURE UNIT IS USED TO CONTROL THE WELL CIRCUIT, PREVIOUSLY DONE WITH A FLOAT SWITCH IN THE RESERVOIR.

WITH THE OLD SHELVING REMOVED, PRESSURE LINES FOR THE CONTROLS HAVE BEEN REPLACED..

THE CONTROL MEASURES WATER LEVEL IN THE RESERVOIR, AND IS SET TO ANY TURN-ON AND TURN-OFF POINTS DESIRED. THE TRANSDUCER HAS DIGITAL READOUT.

WITH THIS CONTROL, THE LEVEL OF THE RESERVOIR CAN BE SET TO A HIGH RANGE IN THE SUMMER OR A LOWER RANGE IN WINTER, FOR MORE EFFECTIVE USE OF THE CHLORINE AND POLYPHOSPHATE.

Pumphouse Recirculating Line

RESERVOIR CIRCULATION LINE

35 GPM RECIRCULATING PUMP
PROVIDES CONSTANT FLOW
FOR CHLORINE ANALYSIS

NEW GATE VALVE, CHECK VALVE & PUMP
RECIRCULATES RESERVOIR 35 GPM - RUNS 24/7

INJECTION POINT FOR
AUTOMATED CHLORINE SYSTEM

3-phase Variable Speed Motor Controls

VARIABLE SPEED CONTROLLERS FOR PUMPS #1 & #2

START/STOP CONTROLLER #3

ON THE LEFT - THE VARIABLE CONTROLLERS FOR PUMPS #1 & #2

THE LEFT TWO CONTROLLERS ARE FOR THE 3-PHASE MOTORS.
THEY CONVERT 240V SINGLE PHASE INPUT TO 3-PHASE OUTPUT.
THE MOTOR SPEED IS FREQUENCY CONTROLLED, 0 TO 60 HZ.

THE RIGHT CONTROLLER IS FOR THE SINGLE PHASE MOTOR #3.
THIS IS THE STANDARD START/STOP RELAY-SWITCHED CONTROL.
PUMP #3 RUNS ON HEAVY DEMAND OR AS BACKUP FOR #1 & #2.

THE PRESSURE TRANSDUCERS BELOW PROVIDE THE
VARIABLE INPUT TO THE CONTROLLERS, WHICH REGULATE
THE SPEED OF THE 3-PHASE MOTORS FOR CONSTANT PRESSURE.

ON THE RIGHT - UPDATED PRESSURE MANIFOLD

PRESSURE TRANSDUCERS FOR #1 & #2 CONTROLLERS

PRESSURE SWITCH FOR BACKUP MOTOR #3

PRESSURE SWITCH FOR 15 PSI WARNING

3-Phase Variable Speed Motors - Distribution Flow Meter

#1 AND #2 MOTORS ARE FREQUENCY CONTROLLED,
VARIABLE SPEED - ON/OFF CYCLING IS ELIMINATED.
THE SPEED VARIES DEPENDING ON DEMAND, AND
THE PRESSURE STAYS CONSTANT AT 58-60 PSI.

THE SINGLE PHASE #3 START/STOP MOTOR/PUMP WAS
REPOSITIONED TO THE BACK, USED AS BACKUP ONLY.

TWO 3-PHASE VARIABLE SPEED MOTOR/PUMPS

BOTH MOTOR/PUMPS REPLACED SEPT 2022

B2TPMS BERKELEY 5.63" IMP TRIM
5HP 3PH MOTOR 3600 RPM

INLINE DISTRIBUTION FLOW METER

WITH THE SCADA ONLINE SYSTEM,
TABULATES ALL WATER FLOW INTO THE SYSTEM

Master Water Meter

The master meter records the total amount of water pumped from the wells to the reservoir.

The original water meter was installed in 1995, and in 2011 accuray had detiorated to an error reading of 23% higher than the actual water use. The meter was replaced, and the 2011 annual reporting to the State Water Resources Department was corrected.

The replacement water meter reads gallons x 100, has a sweep flow meter, and is accurate to 1%.

A check valve was installed above the meter. This has eliminated the water-hammering that was occurring when the well circuit switched off.

Replaced meter 6-22-2019 - tested:
Well #1 flow - 102 gpm
Well #2 flow - 108 gpm
the pumps alternate - aveage flow is 105 pgm
Both pumps on - 177 gpm - for testing only

System Water Meter

A system water meter was installed between the pressurized line and the distribution system. This mid-range meter is rated at 70 gallons/minute. With 2 valve changes, all water used in the system is routed through this meter. By isolating varous sectors and comparing flow rates, excess water use can be located by sector.

This method can be used either late at night or during the day when water use is low.

This same method can be used to isolate a specific property of high use, once it has been determined that a given sector has high use.

A pressure gauge is positioned on the distribution side of the meter, to indicate any loss of pressure when this meter is in use, which would be due to the 70 gpm meter restriction.

Chlorine Delivery - 12.5% Sodium Hypochlorite

CEILING WINCH
LIFTS 150-LB CONTAINERS
FROM DOORWAY TO SHELF

THE 'CARBOY' CONTAINERS
CARRY 15 GALLONS OF
12.5% SODIUM HYPOCHLORITE

THE 15-GALLON CONTAINERS ARE LIFTED TO A LEVEL
ABOVE THE CHLORINE TANK AND GRAVITY-FED
FROM THE SHELF TO THE 55-GALLON STORAGE TANK

WINTER USE IS ABOUT 1 CONTAINER PER MONTH
SUMMER USE WILL BE 4 OR 5 CONTAINERS PER MONTH

PUMPING THE CHLORINE IS NOT AN OPTION, DUE TO
A SPECIALIZED TYPE OF PUMP THAT WOULD BE NEEDED

12.5% SODIUM HYPOCHLORITE IS MORE COST-EFFECTIVE
THAN THE PREVIOUS USE OF 6% HOUSEHOLD BLEACH
(6% BLEACH IS COMMONLY USED FOR SMALL SYSTEMS)

New Pumphouse Shelving

BEFORE REMOVAL OF THE OLD SHELVING

REMOVAL OF THE OLD SHELVING OPENS UP THE AREA AROUND THE CONTROLS, PROVIDING FOR OTHER EQUIPMENT, INCLUDING THE TRANSDUCER CONTROLLED RESERVOIR SWITCH WHICH WILL BE INSTALLED TO THE RIGHT OF THE PANELS.

NEW SHELVING - 24" X 42"

THE COPPER TUBE PRESSURE CONTROL LINE HAS BEEN REPLACED WITH MORE RIGID PVC.

MOST OF THIS STORAGE AREA IS FOR THE ROMAC AND DRESSER COUPLINGS, USED FOR WATER LINE REPAIRS AND REPLACEMENTS.

Emergency Light - Fire Extinguisher

AUTOMATIC EMERGENCY LIGHT

LIGHTS COME ON
WHEN POWER IS LOST

BATTERY RECHARGES
WHEN POWER IS ON

OPERATING INSTRUCTIONS
FOR AUXILIARY GENERATOR

CLEAN GUARD FIRE EXTINGUISHER

CLEAN GUARD IS THE
REPLACEMENT PRODUCT
FOR HALON FIRE SUPPRESSION

THIS IS A SPECIAL CHEMICAL
FOR USE AROUND ELECTRICAL
EQUIPMENT (NOT A-B-C)

Reservoir line from wells

FLOW SWITCH MOVED FURTHER FROM RESERVOIR INLET
PROVIDES FOR FUTURE DEVELOPMENT

RESERVOIR INLET & CHLORINE RECIRCULATING LINE

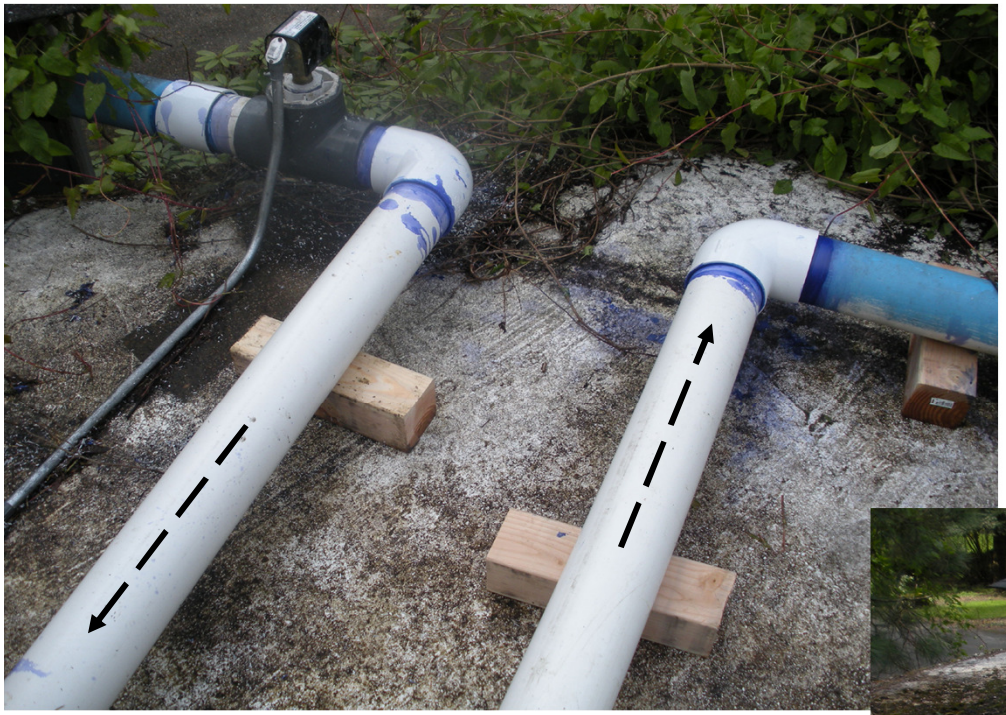
SEE
BELOW

2-INCH RECIRCULATING LINE
RUNS 35 GPM 24/7 - CHLORINATED LINE
CONSTANTLY TESTED BY ANALYZER

RESERVOIR VENT UPDATE
INSTALLED DEC 2017

Polyphosphate Mixing Manifold

THE MIXING MANIFOLD MIXES THE POLYPHOSPHATE BEFORE THE WATER ENTERS RESERVOIR

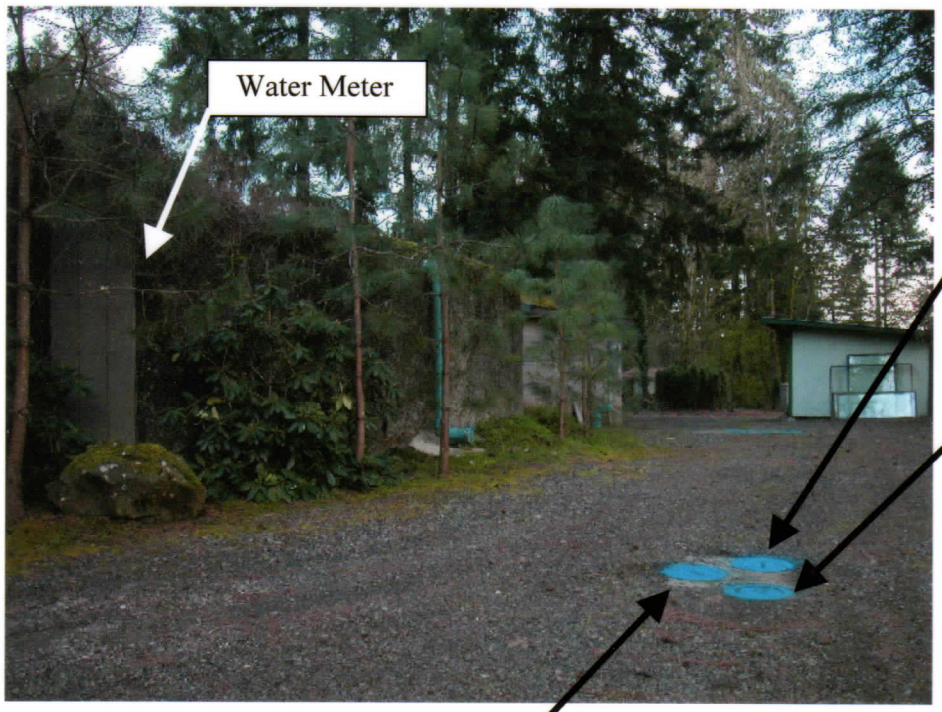


FROM THE WELLS TO THE RESERVOIR

THE FLOW FROM THE WELLS TO THE RESERVOIR IS DIVERTED THROUGH THE MIXING MANIFOLD, WHERE THE POLYPHOSPHATE IS INJECTED AND MIXED. THE MIXING OCCURS PRIOR TO THE WELL WATER ENTERING THE RESERVOIR. THE CLORINE INJECTION TAKES PLACE AT THE RESERVOIR INLET.

THIS SYSTEM OPERATES STATICALLY WITH WATER PRESSURE FROM THE WELL PUMP. NO ADDITIONAL PUMPS OR MECHANICAL PARTS ARE USED.

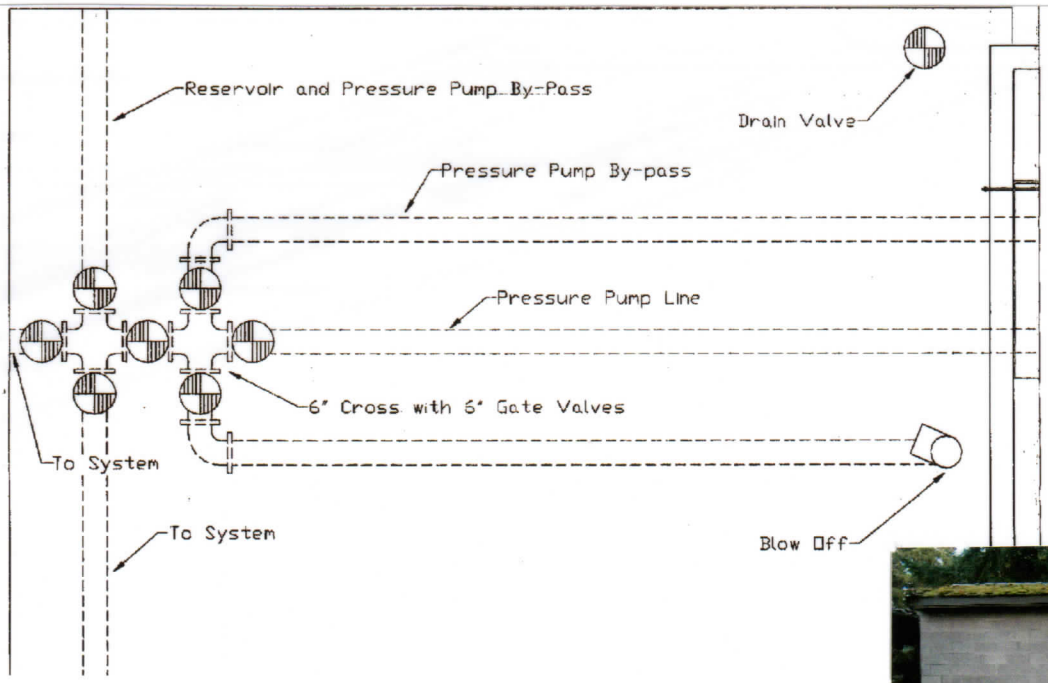
THE MIXING MANIFOLD IS ASSEMBLED USING A 4" INNER PIPE WHICH HAS JETTING TO FORCE THE MIXING. THE OUTER PIPE IS 8" PVC, AND THE WATER GRAVITY-FLOWS TO THE RESERVOIR.



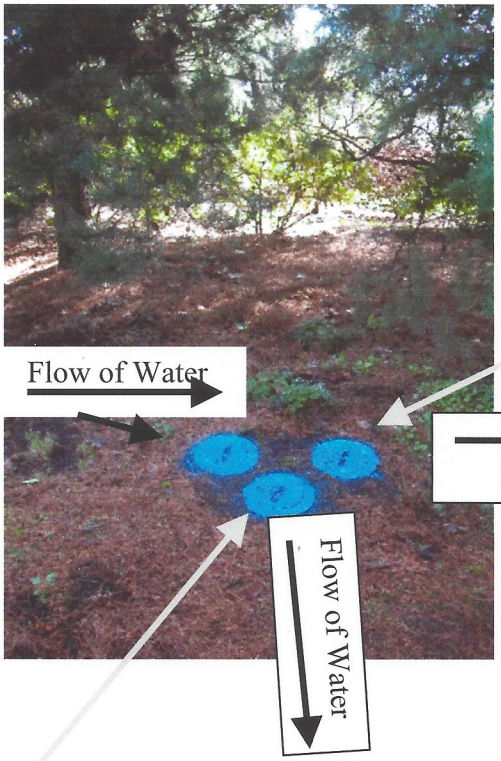
This valve normally closed. When open, it allows water from the wellheads to go straight to the system. No chlorination of water takes place if this valve is open.

This valve is normally open. This valve controls water flow to the wellheads.

This valve is normally open.
Controls water flow to the storage tank. You must close this valve if your want to bypass the storage tank.



Valve Group at Riverlane Road Loop Intersection

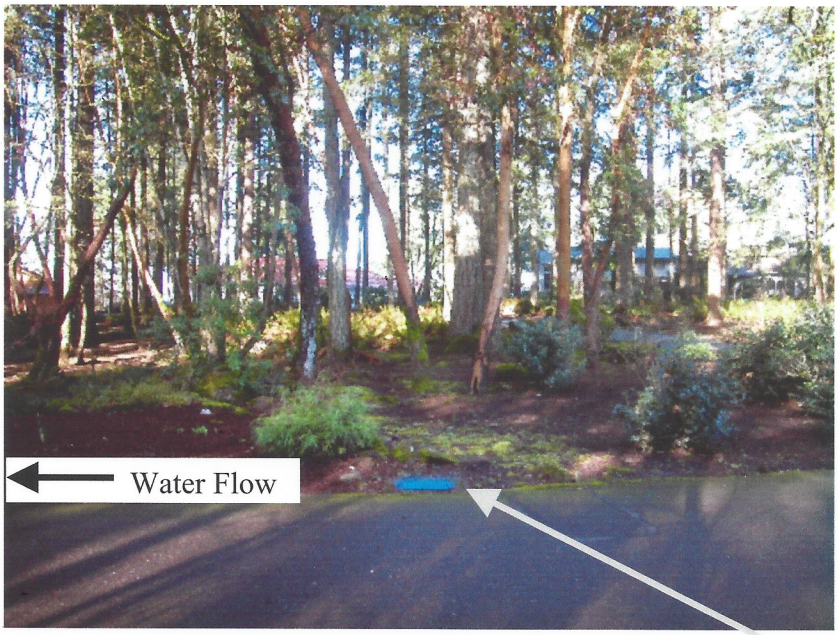


Isolates pipe servicing 30830 Riverlane Road to 30930 Riverlane Road.

Blow-off for this line is left of driveway at property line - 30940 Riverlane Rd

Controls water on Riverlane Rd toward tennis court and Riverbend Dr

These valves are normally open



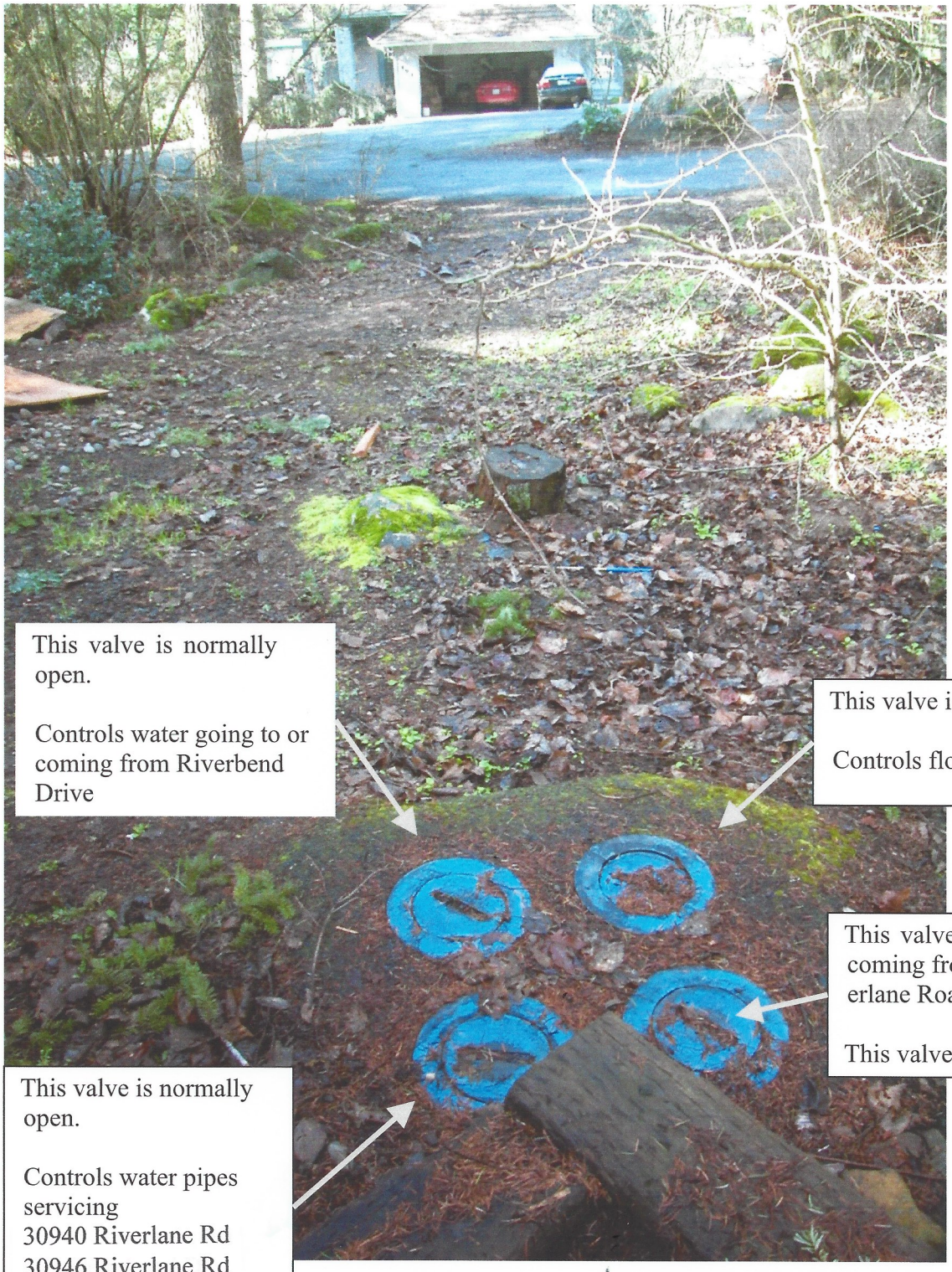
This valve is normally Open.

Located in front of 31138 Riverlane Road.

This valve is located at 31010 Riverlane Road.

This valve is normally open.

Valve Group in side yard of 30946 Riverlane Road



This valve is normally open.

Controls water going to or coming from Riverbend Drive

This valve is normally closed.

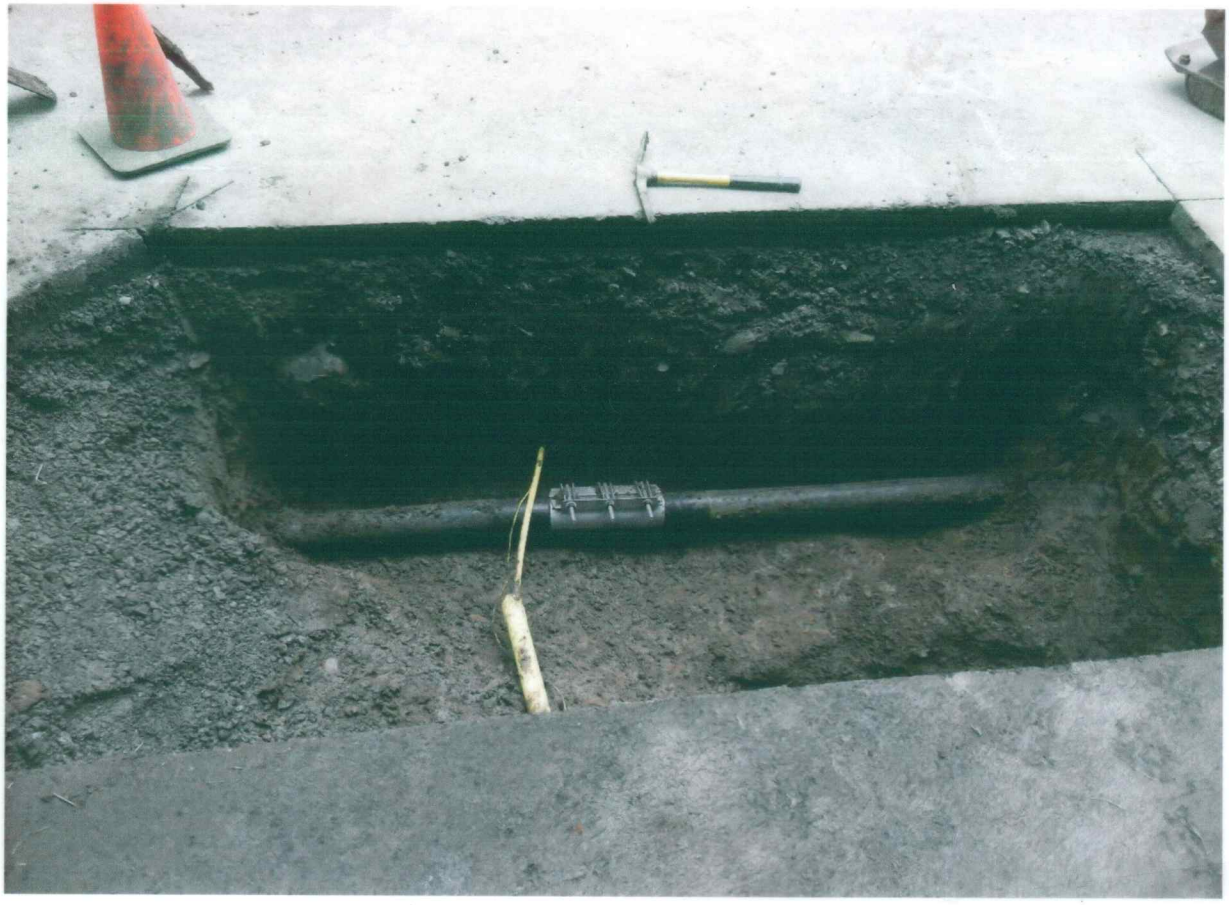
Controls flow to blow-off.

This valve isolates water coming from or going to Riverlane Road.

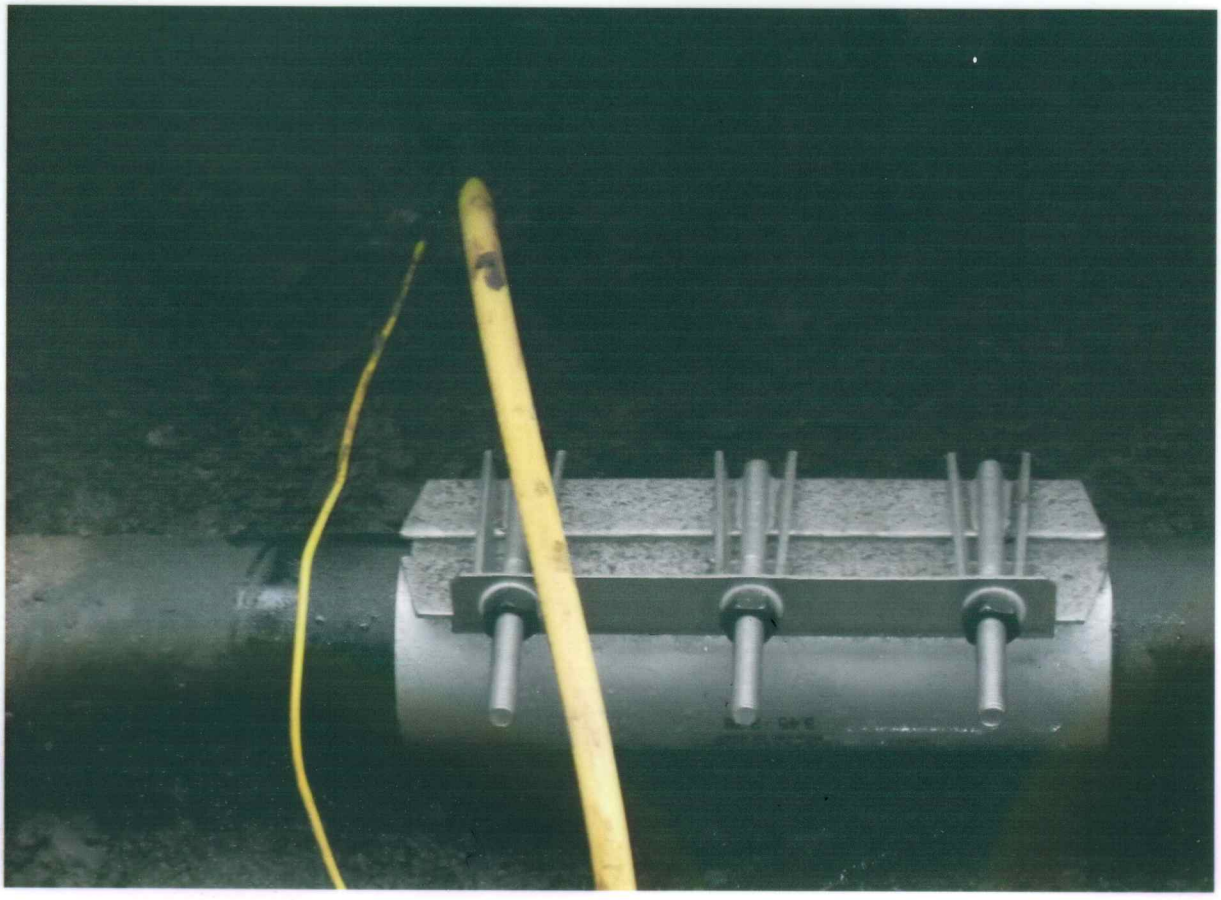
This valve is normally open.

This valve is normally open.

Controls water pipes servicing
30940 Riverlane Rd
30946 Riverlane Rd
483 Riverbend Dr



Riverbend Dr - Aug 2014 - water pipe nicked when gas installed - eventually cracked



Riverbend Dr - Aug 2014 - used a strap repair kit - Gas company came out

Riverlane Rd - Nov 2014 - growth of tree root broke Customer line in wind storm

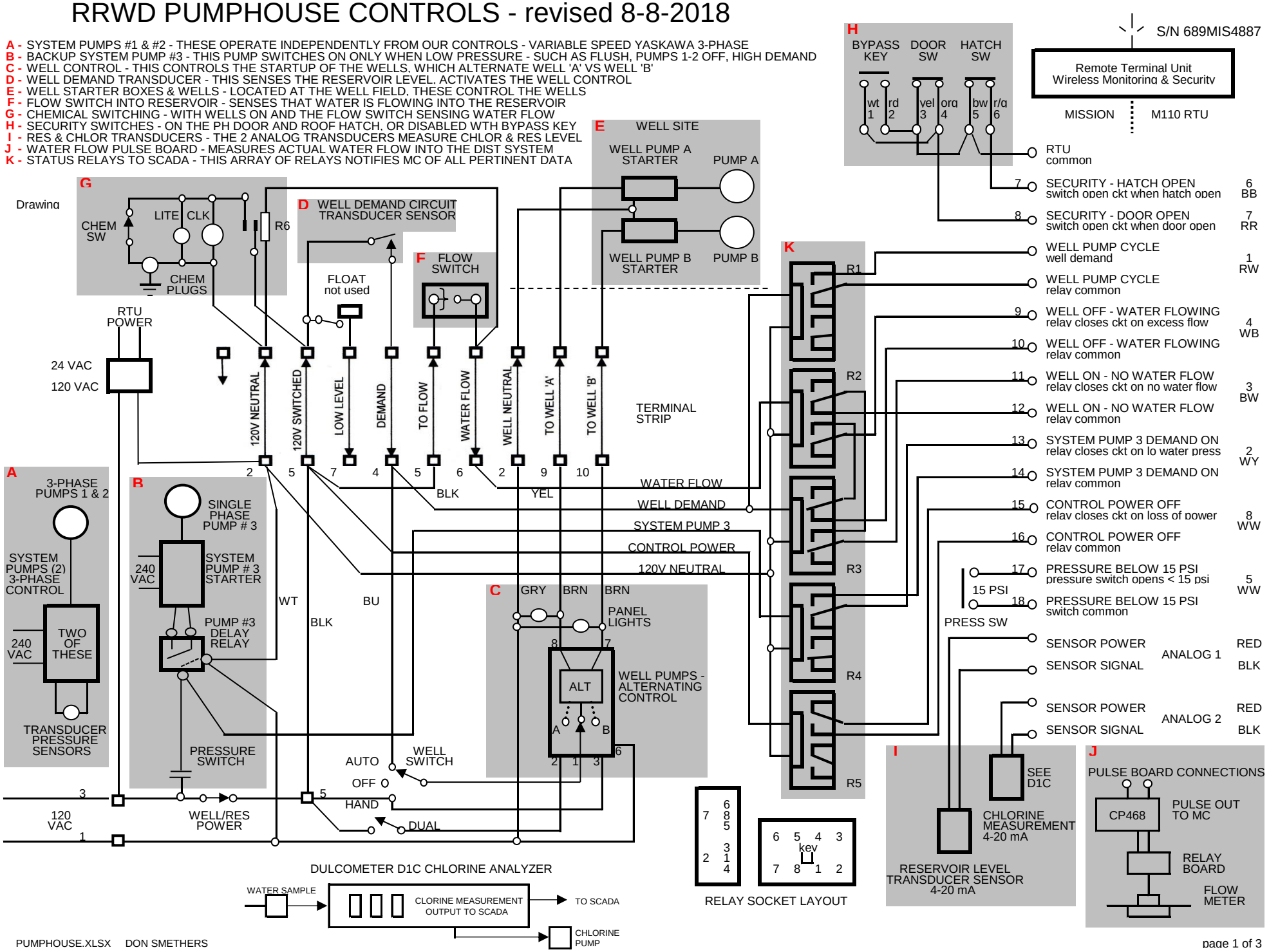
Riverlane Rd - Nov 2014 - pipe was enclosed in root - cut/removed root, re-routed line

Section 3

System Drawings

RRWD PUMPHOUSE CONTROLS - revised 8-8-2018

A - SYSTEM PUMPS #1 & #2 - THESE OPERATE INDEPENDENTLY FROM OUR CONTROLS - VARIABLE SPEED YASKAWA 3-PHASE
B - BACKUP SYSTEM PUMP #3 - THIS PUMP SWITCHES ON ONLY WHEN LOW PRESSURE - SUCH AS FLUSH, PUMPS 1-2 OFF, HIGH DEMAND
C - WELL CONTROL - THIS CONTROLS THE STARTUP OF THE WELLS, WHICH ALTERNATE WELL 'A' VS WELL 'B'
D - WELL DEMAND TRANSDUCER - THIS SENSES THE RESERVOIR LEVEL, ACTIVATES THE WELL CONTROL
E - WELL STARTER BOXES & WELLS - LOCATED AT THE WELL FIELD, THESE CONTROL THE WELLS
F - FLOW SWITCH INTO RESERVOIR - SENSES THAT WATER IS FLOWING INTO THE RESERVOIR
G - CHEMICAL SWITCHING - WITH WELLS ON AND THE FLOW SWITCH SENSING WATER FLOW
H - SECURITY SWITCHES - ON THE PH DOOR AND ROOF HATCH, OR DISABLED WTH BYPASS KEY
I - RES & CHLOR TRANSDUCERS - THE 2 ANALOG TRANSDUCERS MEASURE CHLOR & RES LEVEL
J - WATER FLOW PULSE BOARD - MEASURES ACTUAL WATER FLOW INTO THE DIST SYSTEM
K - STATUS RELAYS TO SCADA - THIS ARRAY OF RELAYS NOTIFIES MC OF ALL PERTINENT DATA



RRWD PUMPHOUSE CONTROLS - CIRCUIT DESCRIPTION

8/8/2018

A - SYSTEM PUMPS #1 & #2 - THESE OPERATE INDEPENDENTLY FROM OUR CONTROLS - VARIABLE SPEED YASKAWA 3-PHASE

The Yaskawa controls and system pumps provide consant pressure to the system. The controls convert 240VAC single phase to 209VAC 3-phase. With 3-phase power, the Yaskawas control the variable speed of the system pump motors, hence pressure, based on the readings of the pressure transducers. The programmable pressure is set to 60 PSI. This does away with the old start/stop switching, and reduces the need for pressure tanks.

B - BACKUP SYSTEM PUMP #3 - THIS PUMP SWITCHES ON ONLY WHEN LOW PRESSURE - SUCH AS FLUSH, PUMPS 1-2 OFF, HIGH DEMAND

System pump #3 was retained as a backup to the Yaskawa pumps. This is the old style strart/stop switching. This pump turns on when the water pressure drops to 45 PSI, which would be the case if the Yaskawa's were off, or when the system pressure drops such as on flush day. The pressure switch activates a 'time delay pn break' relay, which is typically set to run 60 min, regardless of the pressure increase, then off.

C - WELL CONTROL - THIS CONTROLS THE STARTUP OF THE WELLS, WHICH ALTERNATE WELL 'A' VS WELL 'B'

The well control is an alternating relay, which is switched on by the well demand transducer sensing the reservoir water level. With each cycle of the reservoir fill, the relay alternates between well A and well B, when swiched to ALT mode. Should there be a failure with one of the wells, the relay can be switched to A or B, in which case there would be no alternating. The outputs are provided via an underground conduit to the well control panel, where the well relays and starter circuits are located. The well circuit can be operated manually with the front panel manual switch, but note that the manual switching does not signal 'well demand' to the SCADA system as does the reservoir demand transducer.

D - WELL DEMAND TRANSDUCER - THIS SENSES THE RESERVOIR LEVEL, ACTIVATES THE WELL CONTROL

The well demand transducer provides switching of the well control, based on the preset on/off levels of the transducer. Both the on and off switch points are set at the transducer. Normallly, these on/off switch points are set to about 6 inches difference in the reservoir level.

E - WELL STARTER BOXES & WELLS - LOCATED AT THE WELL FIELD, THESE CONTROL THE WELLS

The well control panel is located at the well field. All of the heavy current load switching is done at the well control panel. This includes a separate metered power source from PGE, 240VAC switching relays, and well motor starter boxes. The starter boxes are wired underground to the wells, through pitless adapters near the top of the well casings. In general, if one of the wells fails to start, this is usually due to a failure within the control box for that well - provided that there is not a PGE power failure to the well field.

F - FLOW SWITCH INTO RESERVOIR - SENSES THAT WATER IS FLOWING INTO THE RESERVOIR

The water flow switch is located on the top of the reservoir, near the vertical pipe coming from the wells. The flow switch indicates that there is water flow, after the well demand has switched on. This ensures that the chemical pumps cannot run unless there is water flow, and also sends the water flow signal to the SCADA.

G - CHEMICAL SWITCHING - WITH WELLS ON AND THE FLOW SWITCH SENSING WATER FLOW

Wih the well circuit on and water flowing, relay R6 closes to provide power to the 2 chemical pumps, the blue fixed rate chlorine pump, and the polyhosphate pump. This circuitry ensures that the chemical pumps cannot run if the well circuit is on but no water is flowing.

H - SECURITY SWITCHES - ON THE PH DOOR AND ROOF HATCH, OR DISABLED WTH BYPASS KEY

There are magnetic switches on both the pumphouse entry door and on the roof hatch on top of the reservoir. With the bypass key enabled, opening the entry door or the hatch indicates to the SCADA that there has been a security breach. SCADA connections #6 & #7.

I - RES & CHLOR TRANSDUCERS - THE 2 ANALOG TRANSDUCERS MEASURE CHLOR & RES LEVEL

There are 2 analog transducers which connect directly to the SCADA, and are not otherwise a part of the control panel. One is the reservoir level sensor (not to be confused with the well demand transducer), and the other is the chlorine measurement from the D1C chlorine control. These are 4-20 mA analog transducers. Power is provided by the SCADA Remote Terminl Unit. SCADA connections Analog #1 & #2.

J - WATER FLOW PULSE BOARD - MEASURES ACTUAL WATER FLOW INTO THE DIST SYSTEM

The water flow board receives pulse signals from the distribution line flow meter and sends to the SCADA. The Mission system counts the pulses and provides an online report of actual water flow by the gallon into the distribution system. SCADA connection pulse board CP468.

K - STATUS RELAYS TO SCADA - THIS ARRAY OF RELAYS NOTIFIES MC OF ALL PERTINENT DATA

The bank of relays R1 thru R5 provide the various status information to the SCADA. Note that nothing in the relay bank, or in fact in the SCADA system control anything on our control panel. The SCADA system is totally informational, providing information to tabulate activity in the system, . including any notifications that we have set up.

SCADA CONNECTIONS, IN ADDITION TO H-I-J ABOVE

R1 - Well demand is on, as activated by well demand transducer sensor. SCADA connection #1.
R2 & R3 - These 2 relays work together to tell SCADA the water flow conditions:
With R3 activated (well demand on) and R2 not activated (no water flow), SCADA connection #3 is closed.
If this condition continues for more than the 1-minute delay, message 'WELL ON - NO WATER FLOW' is transmitted by Mission.
If water flows within 1-minute, no message is transmitted.
With R2 activated (water flow) but R3 not activated (no demand), SCADA connection #4 is closed.
This is a rarity, usually due to manually swtching the well cIrcuit on. Message 'WELL OFF - WATER FLOWING' is transmitted by Mission.
R4 - This relay is activated only when system pump #3 turns on, having system pressure below 45 PSI - at high demand, typically during flush.
R5 - This relay is normally activated, by 120VAC power applied to the control panel. When power is lost, SCADA conntction #8 is closed.
The message 'CONTROL POWER OFF' is immediately transmitted by Mission.
With Control Power Off, all distribution pumps turn off and pressure drops as pressure tanks empty down to low pressure.
The pressure switch opens, opening the SCADA connnection #5. Message 'PRESSURE BELOW 15 PSI' is transmitted.

It is common to lose power at both the pumphouse and well panel. When the message 'CONTROL POWER OFF' is received, we go to the pumphouse and start the axilliary generator. This provides power to the control panel and the distrubution pumps, but not to the wells. The system will operate normally on auxilliary power, given that there is ample water in the reservoir.

We also occasionally lose power at the well panel but continue with power to the pumphouse. In this case, if the well circuit is on, the message WELL ON - NO WATER FLOW' is transmitted by Mission. The amount of water in the reservoir dictates whether we ask the neighbors to reduce water use, or in extreme cases bring in auxilliary power for the wells to replenish the reservoir.

RRWD - ALARM CONDITIONS
11-20-17 (rev)

The Remote Terminal Unit has inputs for eight alarm or notification conditions, and two analog inputs, and a pulse meter counter. These are the conditions:

1. **WELL PUMP CYCLE –** controlled by reservoir level transducer.
   The well control circuit is on – used to log pump times at MC.

2. **SYSTEM PUMP 3 – PUMP STARTS –** This tabulates the number of starts per day for the backup system pump – controlled by system pressure.

3. **WELL ON – NO WATER FLOW**
   The well control circuit is on but there is no water flow into the reservoir.

4. **WELL OFF – WATER STILL FLOWING**
   The well control circuit is off but water flow continues into the reservoir.

5. **PRESSURE BELOW 15 PSI**
   Low distribution system pressure – pump failure or major system leak.

6. **SECURITY – HATCH OPEN**
   The reservoir hatch has been opened with the security system active.

7. **SECURITY – DOOR OPEN**
   The pump house door has been opened with the security system active.

8. **CONTROL POWER OFF**
   Power to the control panel is off – need to start the power generator.

ANALOG 1. WATER LEVEL IN RESERVOIR
Sends water level analog reading to MC – used for online reservoir level.

ANALOG 2. CHLORINE CONTENT MEASURED BY ANALYZER
Sends chlorine PPM level to MC – as read by DC1 chlorine analyzer.

FLOW METER. PULSE BOARD TO MC
Sends pulse signal to MC to log water flow to the distribution system.

When the various switches and relays in and around the pumphouse detect any alarm conditions, the Remote Terminal Unit sends the appropriate digital signal by way of a wireless connection to an automatic monitoring system at “Mission Communications” in Atlanta. These signals convert to the various messages we have set up, and are sent to our sequence of phone numbers, e-mails, and posted on the website. The notification sequence continues until one of the recipients keys in an acceptance.

RRWD Website Instructions – Mission Communications
10/19/2022 (rev)

These instructions are a supplement to the Mission Communications instruction manual. All contacts are set up on the website, with the notice instructions. We are set up for simultaneous notification as shown below – can be easily changed.

Contacts (set up on the Mission Communications website – menu 'schedules')

Notification #1		Notification #2	
Bob cell phone	971-207-5147	Jeff cell phone	503-849-8550
Bob e-mail	bob@smethers.com	Jeff e-mail	JDickson@nwearthmovers.com

Notification #1 (phones and e-mails) are sent simultaneously. If the contact does not enter the acknowledgment (press 1), Notification #2 is sent. This cycle is repeated after 3 min. These conditions are also logged onto our website on the Data/Alarms page.

Key in one of these codes when receiving a phone message:

1 Message accepted – others will be notified that you accepted
5 Repeat the message – does not indicate to others that you accepted
9 Decline the message – allows others to know message not accepted

Website Access

Mission Communications Website		~~www.123mc.com~~	www.123scada.com
	User ID	~~rrwdmel~~	bob@smethers.com
	Password	~~passmel~~	smethers

This brings up a menu, to input changes to contact list, and view alarms.

Data/Alarms	brings up 'This Week's Alarms' to view activity
Setup/Destinations	to input contact names, phones, e-mails
Setup/Schedules	shows current settings for notification, method

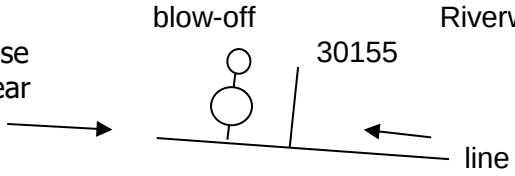
There are many other selections on the web, as there are many other features that can be programmed into the RTU – but these are the essentials.

RRWD - Blow-Off Valves & Procedure

rrwd-blowoffs.xls 09-21-12

1. 30155 Riverwood Dr – in the woods on the left past the house – 30113-30155 Riverwood Dr.

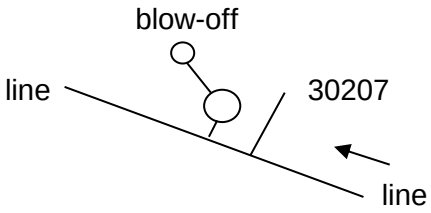
Big Drive in the driveway
Walk into the woods 100 ft past house
Remove cap, open valve, flush to clear
- the old line to 30113 is capped



Riverwood Dr has no lines in street

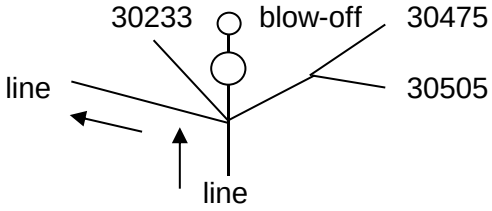
2. 30221 Riverwood Dr – in the woods on fence line behind shop bldg – 30207-30221 Riverwood Dr.

Big Drive in driveway – gate combo nnnn
Walk into woods past bldg on right
Note – 2 shutoffs for 30221 are elsewhere:
- in the driveway island
- under the deck behind the house
Remove cap, open valve under rock, flush to clear



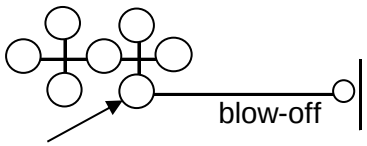
3. 471 Hebb Park Rd – in the woods 60-ft past Wilson's shelter – 30233-30475-30505 Riverwood Dr.

Big Walk into woods left past shelter
Remove cap
Open valve, flush to clear



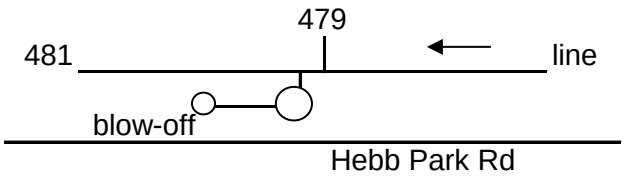
4. At Pumphouse – NE valve in the cluster – flushes the pumphouse & pressure tanks.

Big-Hook Remove cap, put down board
Remove cover to NE valve in 7-valve cluster
Open this valve only, flush to clear
This will send 'low pressure' signal to MC



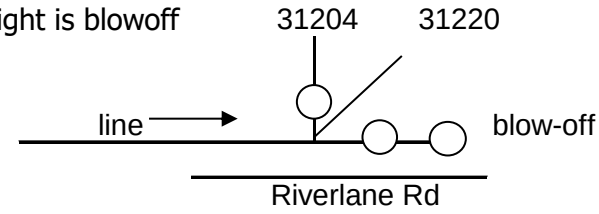
5. 479 Hebb Park Rd – N edge of the street – flushes near end of the Hebb Park Rd line.

Big-Hook Remove cap
Open valve, flush to clear



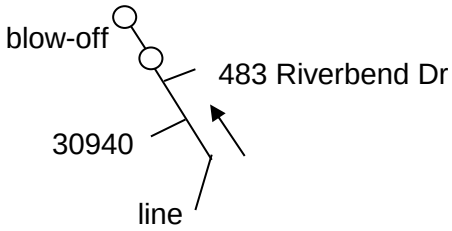
6. 31204 Riverlane Rd – on street right side of driveway – flushes upper Riverlane Rd.

Big-Hook Remove 2 covers on right
Middle is valve, right is blowoff
Flush to clear



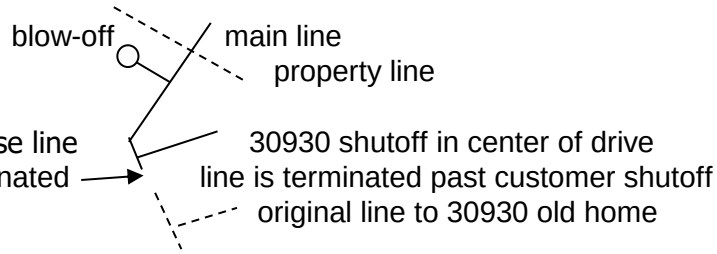
7. 30940 Riverlane Rd – end of right side lane – flushes 4 homes near corner of Riverlane Rd.

Small-Hook Walk down lane to the right of 30940
Small blow-off valve is at the end, before the fence
Note – shutoffs for 2 homes:
- 483 Riverbend Dr – right of blow-off
- 30940 Riverlane Rd – 25 before blow-off



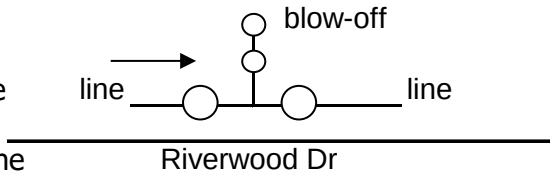
8. 30930 Riverlane Rd – left of driveway near property line – flushes East side of Riverlane Rd loop.

Big-Hook Valve is left of the driveway
Connect the 'fire hose' to the blowoff
Blow-off waste goes out to street to grade
In July 2015 a leak developed in the original house line
That shutoff could not be located - line was terminated



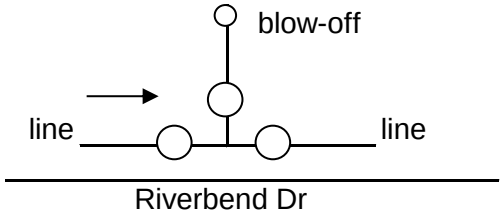
9. 30920 Riverwood Dr – on the East side of the street – dual-flush for low point on Riverwood Dr.

Big-Hook Valves are on East side of street
Remove box cover, use pipe & deflector board
Close lower main valve, open flush for upper line
Close flush valve, open lower main valve
Do not turn the upper valve or flush the lower line

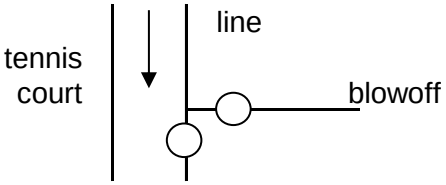


10. 471 Riverbend Dr – on the North side of the street – dual-flush for upper and lower lines.

Big-Hook Valves are on North side of street
Remove cap from blow-off pipe, use board
Close lower main valve, open flush for upper line
Close flush valve, open lower main valve
Do not turn the upper valve or flush lower line

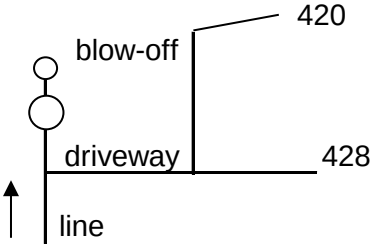


11. Big-Hook-Special Handle Valves behind tennis ct
Close main line valve to shut off lower sector
Remove cap from blow-off pipe
Use special handle to open 1/4-turn PVC valve
Flush Riverwood line, close flush, open lower valve



12. 420 Riverbend Dr – left of the driveway – flushes the lower lines.

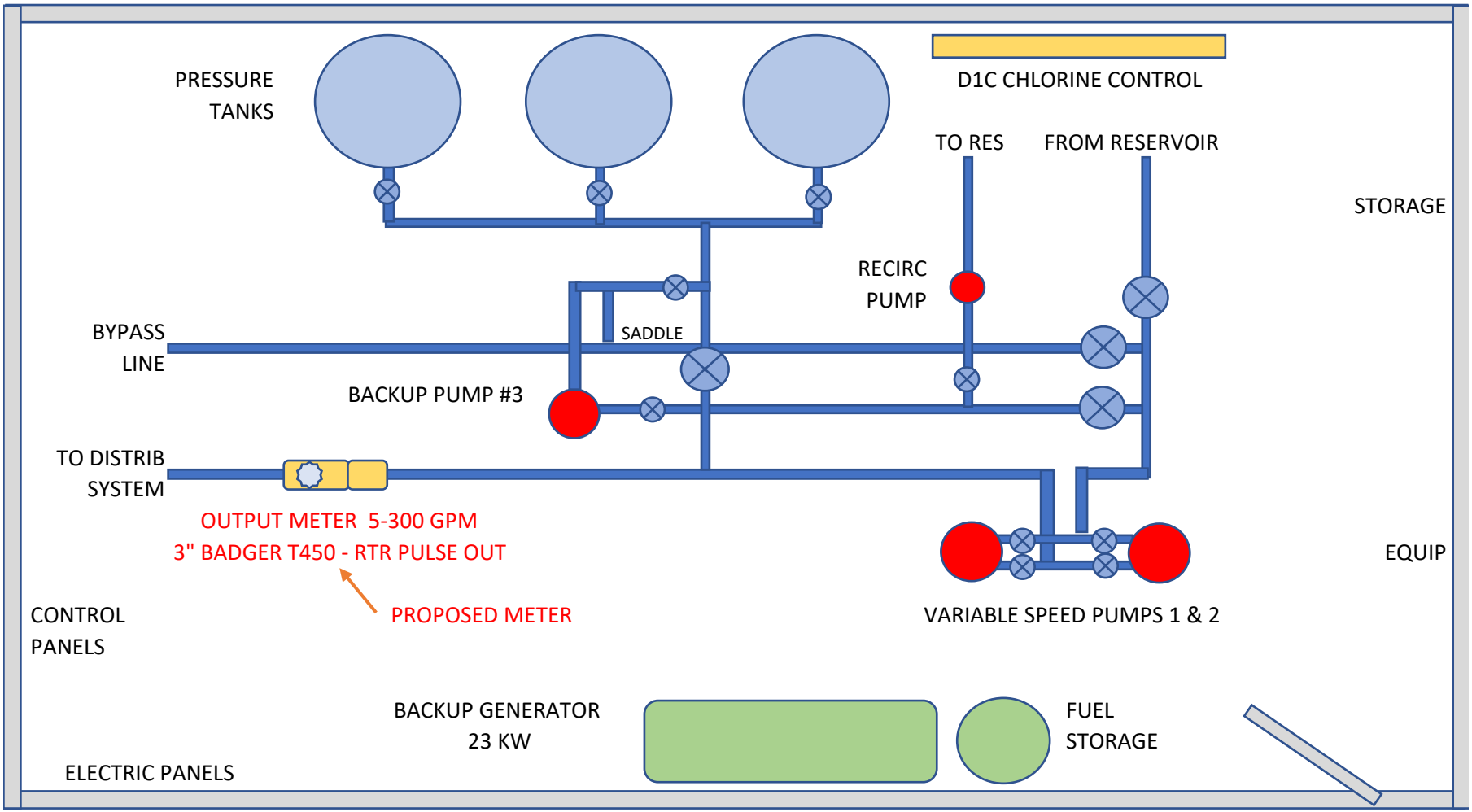
Big-Hook Remove cover & screw in blow-off pipe
Use cover as deflector - open valve & flush
Note – service shutoff is 5-ft before blow-off:
- shuts off both 420 & 428
- additional shutoffs are near homes



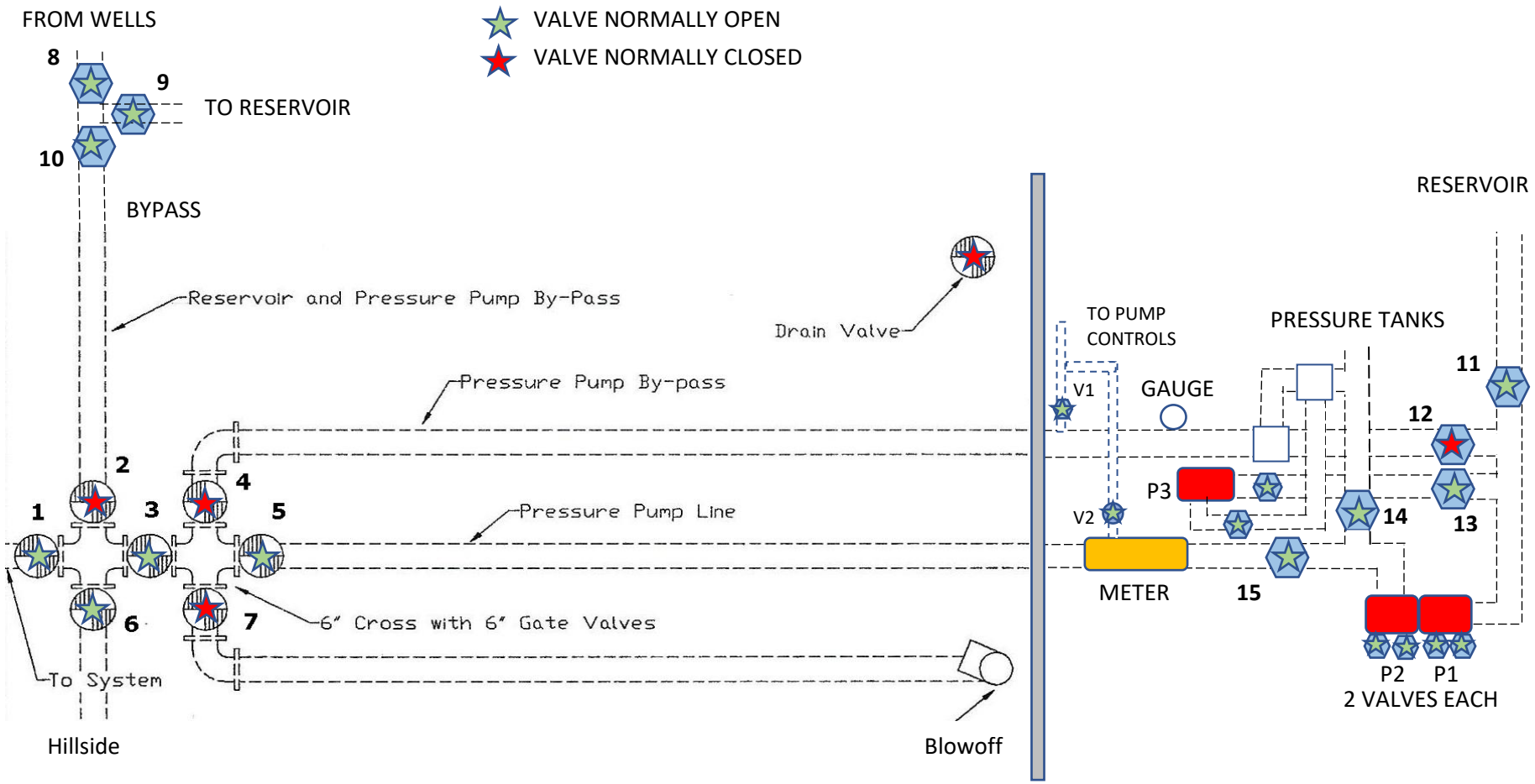
Note that the following blow-off is not used:
- at the top of Riverbend Dr, near the corner of Riverlane Rd – due to erosion

RIVERBEND
RIVERBANK
WATER DISTRICT

70,000 GALLON
RESERVOIR
44' DIA X 8' HT



pumphouse - valves insIde.xlsx

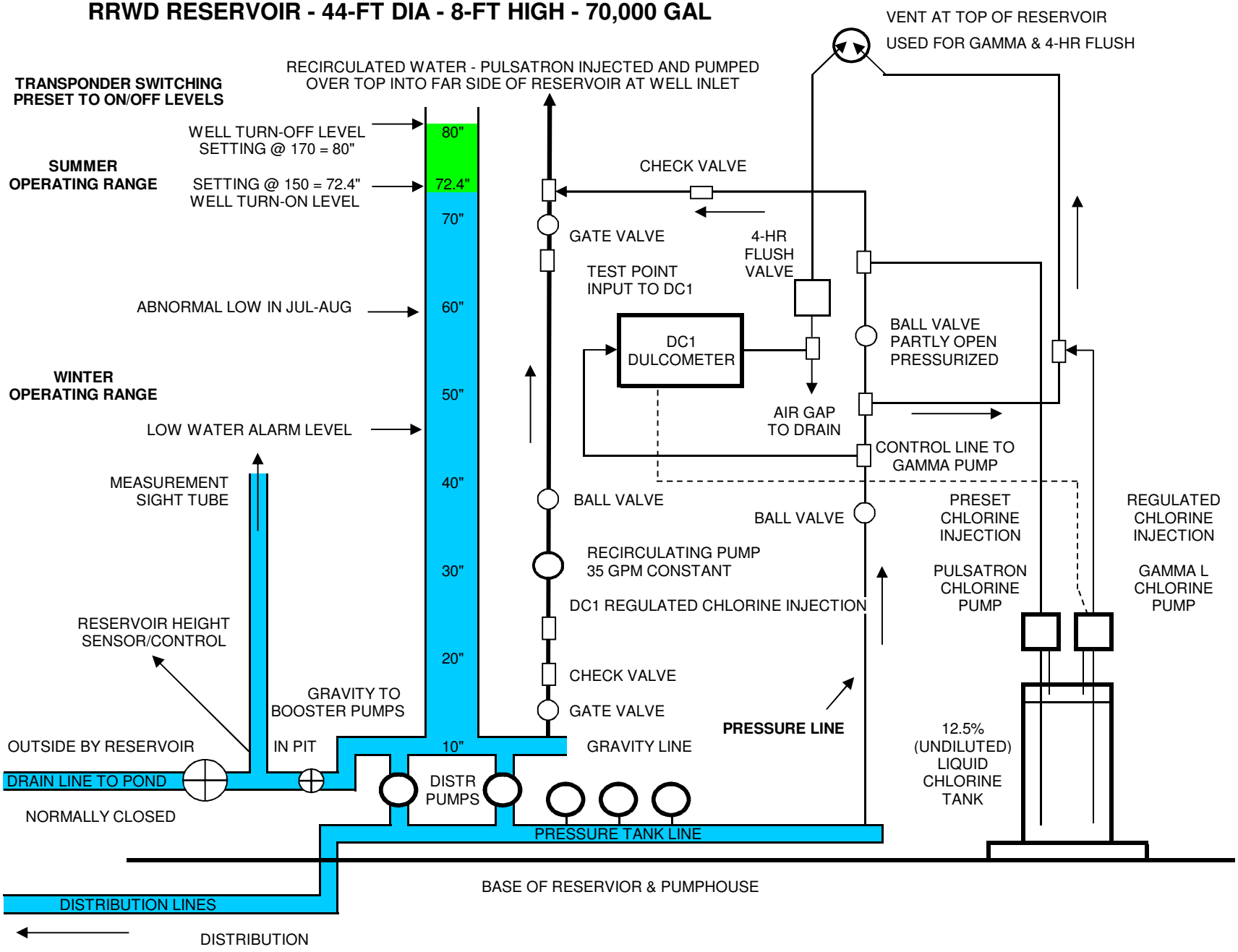


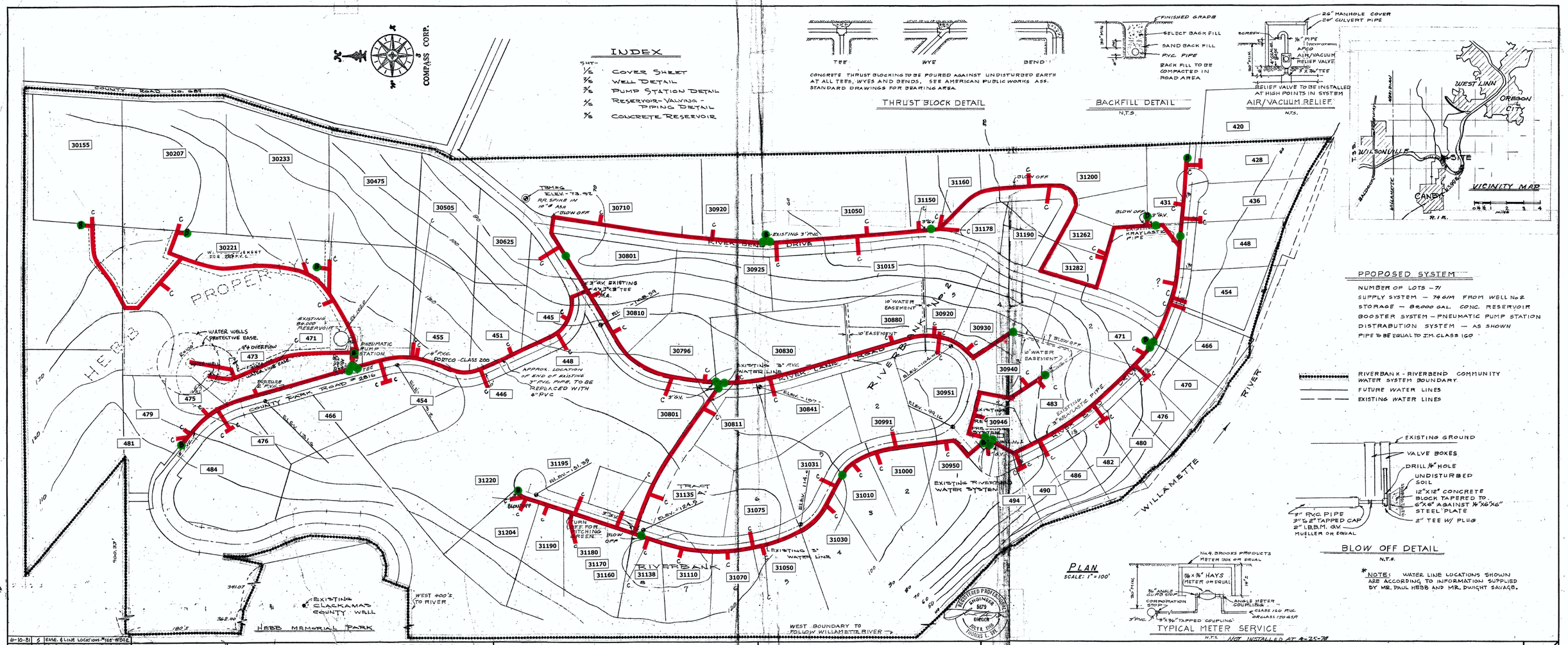
Normal Operation

1	-	OPEN	TO SYSTEM	11	-	OPEN	FROM RESERVOIR
2	-	CLOSED	RES BYPASS	12	-	CLOSED	TO BYPASS
3	-	OPEN	CENTER	13	-	OPEN	TO PUMP #3
4	-	CLOSED	PH BYPASS	14	-	OPEN	CROSSOVER
5	-	OPEN	PH TO MAIN	15	-	OPEN	TO METER & MAIN
6	-	OPEN	TO HILLSIDE				
7	-	CLOSED	BLOWOFF	P1		OPEN	PUMP #1 - 2 VALVES
8	-	OPEN	FROM WELLS	P2		OPEN	PUMP #2 - 2 VALVES
9	-	OPEN	TO RESERVOIR	P3		OPEN	PUMP #3 - 2 VALVES
10	-	OPEN	RES BYPASS	V1-2		OPEN	TO PRESSURE SWITCHES

pumphouse - all dist valves.xlsx

RRWD RESERVOIR - 44-FT DIA - 8-FT HIGH - 70,000 GAL





DATE	NO.	REVISION
6-10-81	5	EASE. & LINE LOCATIONS - SEE NOTE
4-26-78	4	AS BUILT EXCEPT 4" MAIN
5-18-73	3	ADD EASEMENT & DETAILS
3-20-73	2	REV. LOT LOCATION & SYSTEM
3-11-73	1	BOUNDARY, DIS. SYSTEM

campbell-weiss reprographics

DRAWN M. L. J.
SCALE as shown
DATE OCT., 73
FILE 73-354-731-E-1

COMPASS CORPORATION
ENGINEERING - SURVEYING - PLANNING
PORTLAND, OREGON, 97202

PAUL HEBB
P. O. BOX 524
LAKE OSWEGO, OREGON 97034

WATER IMPROVEMENTS

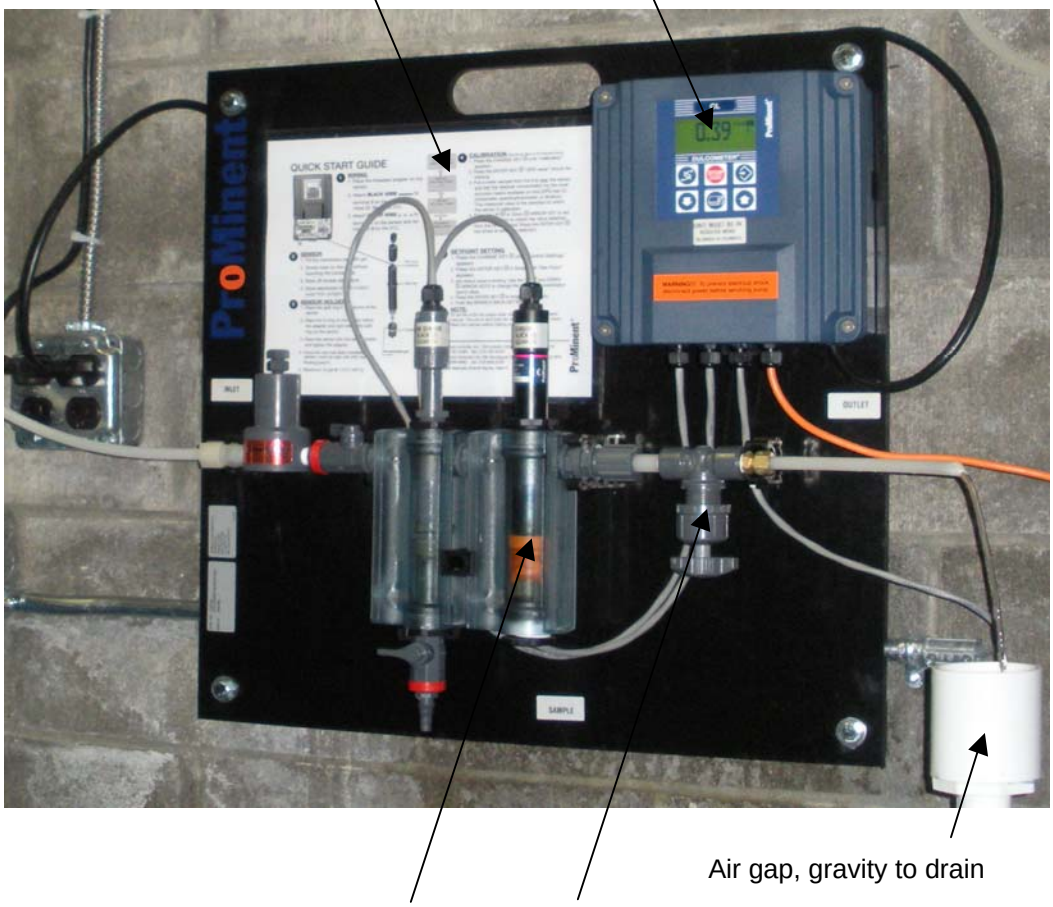
"RIVERBANK — RIVERBEND — WATER SYSTEM"

1/5

Section 4

System Operation

Dulcometer D1C by ProMinent



The Dulcometer D1C is the controller for the automatic chlorine injection system.
- a sampling of water passes through the D1C sensor, which measures chlorine content.
- the 2 primary functions of the D1C are:
    1. to send the chlorine readings to Mission Control for online display on their website.
    2. to control the amount of chlorine sent to the reservoir through the Gamma pump.

To set up the D1C, the procedure is as follows:
1 - determine the Free Available Chlorine (FAC) set point, for example, 0.35 ppm.
2 - unplug the Gamma pump power temporarily, to disable the automatic chlorine injection.
3 - manually set the Pulsatron pump to reach a lower chlorine level, for example 0.30 ppm.
    - this will take a day or more to reach the desired level, using the D1C readout.
    - refer to the Pulsatron Pump instruction page for setup procedure.
4 - once the initial chlorine level is reached manually using the Pulsatron pump, continue:
    - program the FAC set point into the D1C, and plug the Gamma pump power back in.
    - the D1C will send pulses to the Gamma pump and automatically meter the chlorine.

Calibrate the D1C periodically, comparing to a known standard.
- use a known standard chlorine measurement device such as a LaMotte or Hach reader.
- if the measurement standard differs from the D1C ppm readout, recalibrate as indicated.

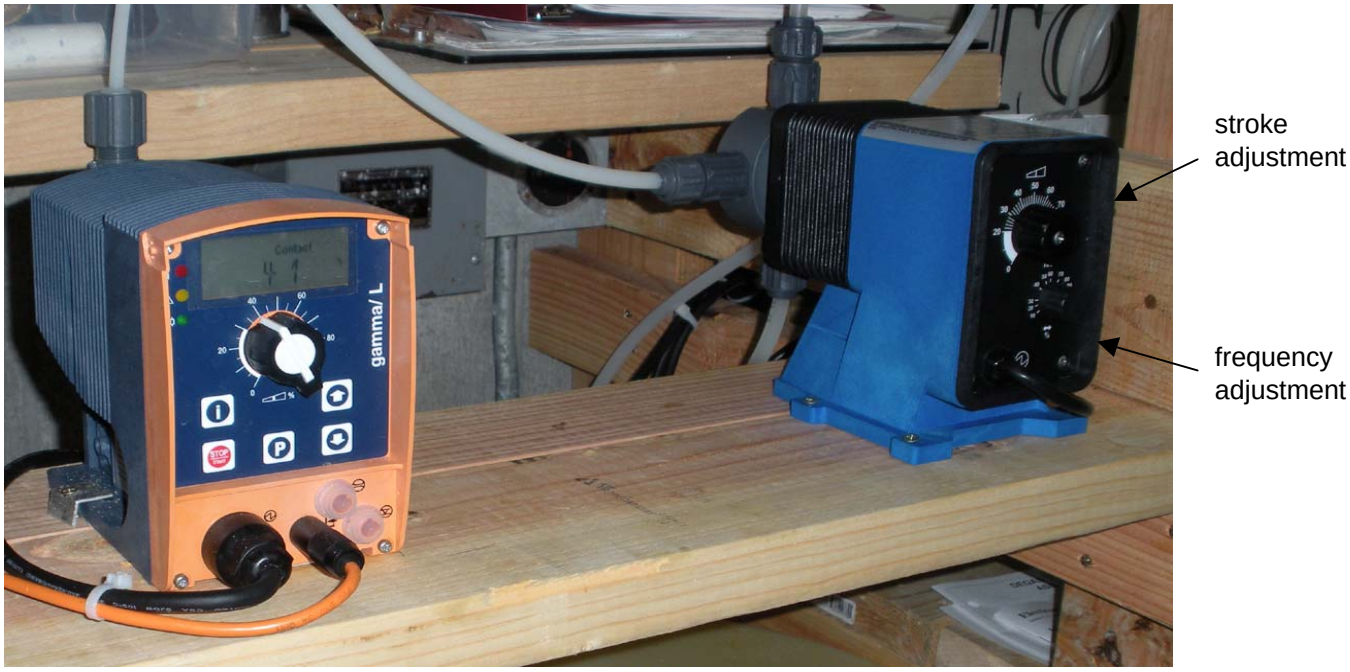
Chlorine Injection Pumps

The Dulcometer D1C is the automatic controller for the Gamma Injection Pump

The Pulsatron Pump is set manually to reach approximately .05 ppm below the set point.

Gamma Pump

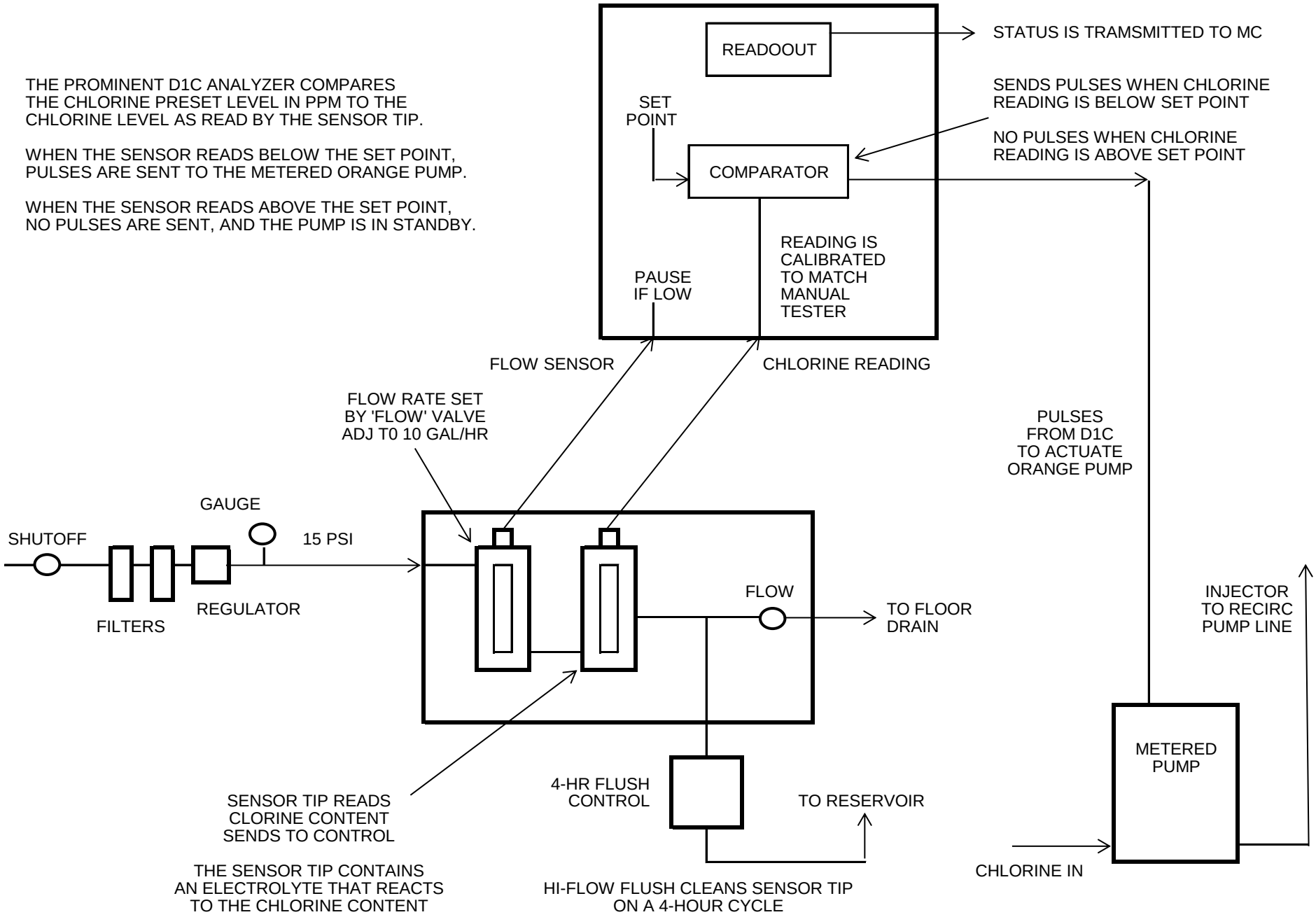
Pulsatron Pump



1 - determine the Free Available Chlorine (FAC) set point, for example, 0.35 ppm.
2 - unplug the Gamma pump power temporarily, to disable the automatic chlorine injection.
3 - manually set the Pulsatron pump to reach a lower chlorine level, for example 0.30 ppm.
    - adjust the Pulsatron Stroke and Frequency to reach the desired chlorinr content.
    - this will take a day or more to reach the desired level, using the D1C readout.
4 - once the initial chlorine level is reached manually using the Pulsatron pump, continue:
    - program the FAC set point into the D1C, and plug the Gamma pump power back in.
    - the D1C will send pulses to the Gamma pump and automatically meter the chlorine.

ProMinent D1C Analyzer

D1C Flow Chart.xlsx 4-14-14



Polyphosphate Injection System

Stenner Pump - 30-gallon Caschem C-5 Polyphosphate

A side effect of chlorination is precipitation of iron and manganese, causing discoloration.
The purpose of the Polyphosphate is to reduce the visible iron and manganese in the system.
This is accomplished by sequestering those minerals, offsetting the chlorination action.

Caschem C-5 Polyphosphate is introduced into the well water, prior to the reservoir inlet.
The polyphosphate is mixed into the well water, using a Stenner paristaltic metering pump.
The injection point is atop the reservoir, by way of a mixing manifold, then into the reservoir.
No pumps or moving parts are used, only the Stenner pump in the pumphouse.
The injection rate is measured to be approximately 2 ppm; the exact amount is not critical.
There is no regular maintenance, other than to ensure that the pump is operating.

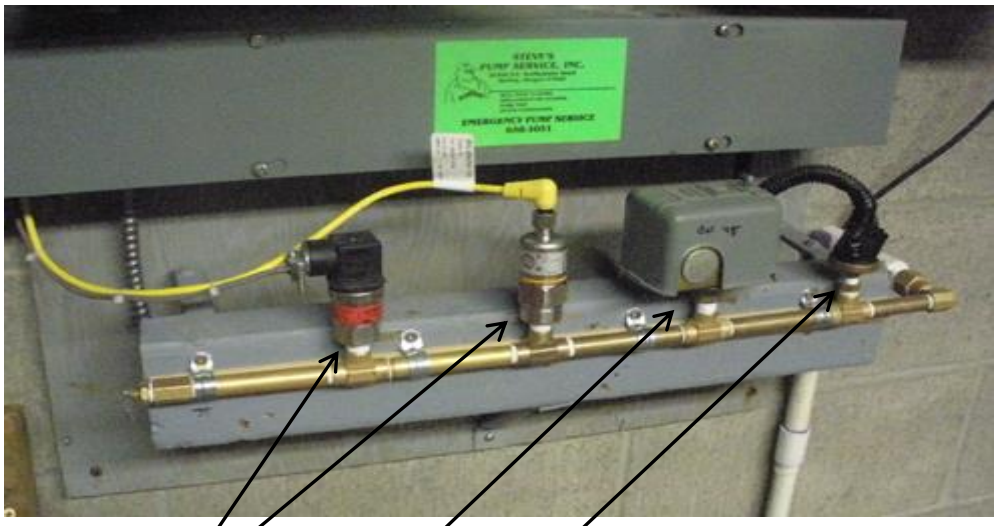
The Stenner pump is: MODEL 45MHP2 ITEM 45M1-1H

Pump Controls

Yaskawa 3-phase pump controls for distribution system pumps 1 & 2

converts 240V single phase to 3-phase variable speed motor

Pressure Manifold



transducers for 3-phase pump controls #1 and #2

pressure switch for 240V single phase distribution pump #3

15 psi low pressure alarm switch

Well Control Transducer

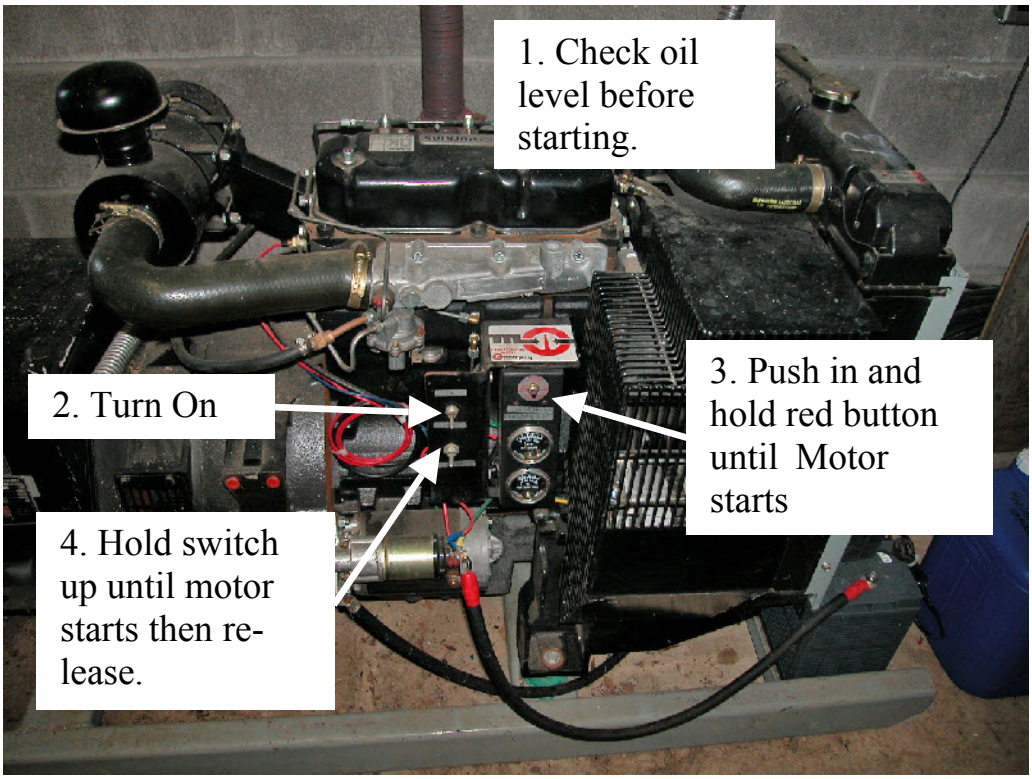
Transducer for well pump switching - digital readout on/off settings for reservoir level

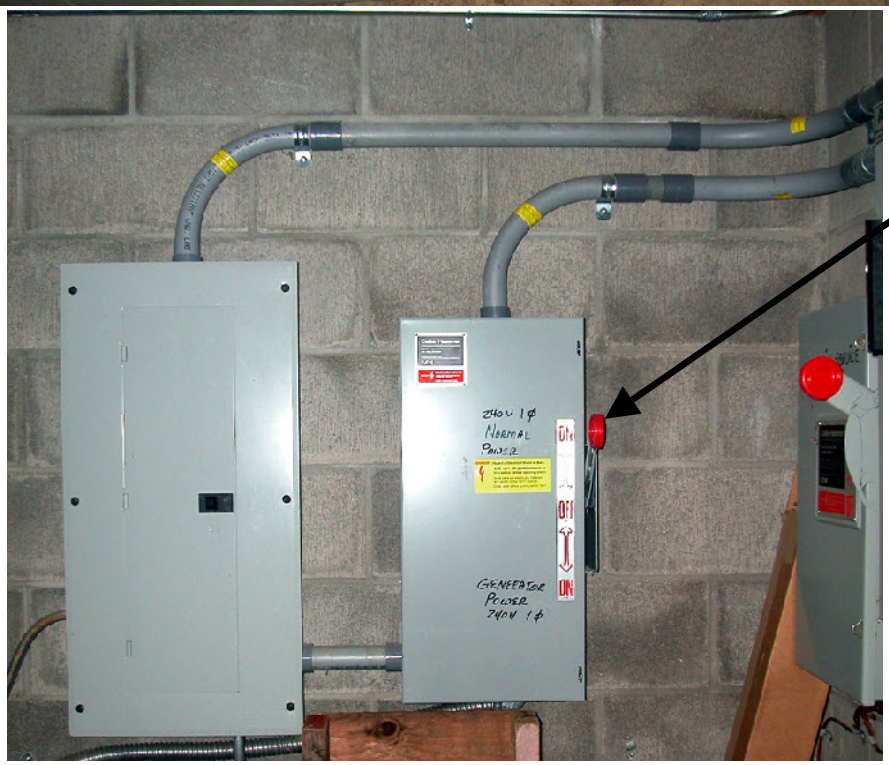
EMERGENCY EQUIPMENT & WATER SUPPLIES

EMERGENCY POWER

TO MAINTAIN SYSTEM PRESSURE IN CASE OF LOSS OF POWER

Generator located in Pump House – To switch to emergency power the following procedures should be followed:





DISINFECTION PROCEDURE

Disinfection is a procedure that uses chlorine to eliminate microorganisms that may have entered the water system. A chlorine solution is introduced into the well and throughout the entire distribution system. This solution stands in the system for at least 12 hours; it is then removed by thoroughly flushing. The disinfection procedure is considered successful when a representative sample of the water tests "absent" for coliform bacteria. The water system should not be used as a source of potable until it has an "absent" coliform test result. The disinfection procedure consists of the following steps:

1. Notify all customers that you will be disinfecting the water system. They should use an alternate water source until you notify them that the system has resolved the microbiological contamination problem.
2. Determine the amount of chlorine needed:

You need to know the depth and diameter of your well:

Well 1	*Well 2*
Depth: 221 feet	Depth: 250 feet
Casing: 10 inch	Casing 8 inch

Well Diameter	*Factor*
8 inch	1.5
10 inch	1.0

Use the following formula to determine the amount of chlorine solution to add to the well:

Depth of well = _____ feet divided by (factor) = _____ ounces of chlorine solution to use.

For example, an 8 inch, 250 foot deep well needs 250/1.5 = 167 oz of bleach. If the well is 10 inches, 221 feet, it would need 221 oz of chlorine solution (bleach) to disinfect.

3. Dilute the chlorine in 5 gallons of water and pour the bleach mixture into the well.
4. Circulate this mixture through the well and pressure tanks until thoroughly mixed. To do this attach food-grade hose to a hose bib just downstream from the pressure tanks, place the hose end in the well casing and re-circulate the water for at least 30 minutes. Be sure to wash down the wall of the casing.

5. Open all faucets in the distribution system until you can smell the chlorinated water. Be sure the entire distribution system including any dead end lines have been chlorinated. Use your chlorine test kit to ensure that the water in the pipes has a minimum chlorine residual of 25 ppm.

6. Turn off the faucets and let the water sit undisturbed in the distribution system for 12 hours.

7. Open all faucets (including any blow-offs for dead end lines) and flush all the chlorinated water out of the system. Let the water flow until you have flushed all of the chlorinated water out of the distribution system. You can check this with your chlorine test kit.

8. Wait 3-5 days, and then collect a representative water sample in the distribution system and test for coliform bacteria.

9. The water system is considered free of bacterial contamination when the water sample test indicates that the no coliform bacteria was found. Notify your water users that the bacterial contamination problem has been resolved.

Appendix A

Template on Reverse (next page)

Since exceeding the fecal coliform or *E. coli* maximum contaminant level is a Tier 1 violation, you must provide public notice to persons served as soon as practical but within 24 hours after you learn of the violation (141.202(b)). During this time, you must also contact your primacy agency. You should also coordinate with your local health department. You may also have to modify the template if you also have high nitrate levels or other coliform MCL violations. You must use one or more of the following methods to deliver the notice to consumers (141.202(c)):

- Radio
- Television
- Hand or direct delivery
- Posting in conspicuous locations

You may need to use additional methods (e.g., newspaper, delivery of multiple copies to hospitals, clinics, or apartment buildings), since notice must be provided in a manner reasonably calculated to reach all persons served.

The notice on the reverse is appropriate for hand delivery or a newspaper notice. However, you may wish to modify it before using it for a radio or TV notice. If you do, you must still include all required elements and leave the health effects language in italics unchanged. This language is mandatory (141.205(d)). See Chapter 8 for a notice designed for posting. If you post or hand deliver, print your notice on letterhead, if you have it.

Population Served

Make sure it is clear who is served by your water system--you may need to list the areas you serve.

Corrective Action

In your notice, describe corrective actions you are taking. Listed below are some steps commonly taken by water systems with fecal coliform or *E. coli* violations. Use one or more of the following actions, if appropriate, or develop your own:

- We are chlorinating and flushing the water system.
- We are switching to an alternate drinking water source.
- We are increasing sampling for coliform bacteria to determine the source of the contamination.
- We are repairing the wellhead seal.
- We are repairing the storage tank.
- We are restricting water intake from the river/lake/reservoir to prevent additional bacteria from entering the water system and restricting water use to emergencies.

After Issuing the Notice

Send a copy of each type of notice and a certification that you have met all the public notice requirements to your primacy agency within ten days from the time you issue the notice (141.31(d)). It is recommended that you notify health professionals in the area of the violation. People may call their doctors with questions about how the violation may affect their health, and the doctors should have the information they need to respond appropriately. In addition, health professionals, including dentists, use tap water during their procedures and need to know of

contamination so they can use bottled water. It is a good idea to issue a 'problem corrected' notice when the violation is resolved.

DRINKING WATER WARNING

[Date]
[System] water is contaminated with [fecal coliform] or [*E. coli*]

BOIL YOUR WATER BEFORE USING

Fecal coliform [or *E. coli*] bacteria were found in the water supply on [date]. These bacteria can make you sick, and are a particular concern for people with weakened immune systems.

What should I do?

- **DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.** Bring all water to a boil, let it boil for one minute, and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and food preparation **until further notice**. Boiling kills bacteria and other organisms in the water.

- *Fecal coliforms and E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, and people with severely compromised immune systems.*

- The symptoms above are not caused only by organisms in drinking water. If you experience any of these symptoms and they persist, you may want to seek medical advice. People at increased risk should seek advice about drinking water from their health care providers.

What happened? What is being done?

Bacterial contamination can occur when increased run-off enters the drinking water source (for example, following heavy rains). It can also happen due to a break in the distribution system (pipes) or a failure in the water treatment process.

[Describe corrective action.] We will inform you when tests show no bacteria and you no longer need to boil your water. We anticipate resolving the problem within [estimated time frame].

For more information, please contact [name of contact] at [phone number] or [mailing address]. General guidelines on ways to lessen the risk of infection by microbes are available from the EPA Safe Drinking Water Hotline at 1(800) 426-4791.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by [system]. State Water System ID#: _____

Appendix B

Template on Reverse (next Page)

If your primacy agency has designated this turbidity single exceedance as a Tier 1 violation (141.202(a)), you must provide public notice to persons served within 24 hours after it has been designated Tier 1 (141.202(b)). Turbidity violations are Tier 2 by default, but may frequently be elevated to Tier 1 by your primacy agency. In addition, violations are automatically elevated if you are unable to consult with your primacy agency within 24 hours. **In such cases, you must issue a notice within the next 24 hours.** You may elevate the violation to Tier 1 yourself as well. You should also coordinate with your local health department. One or both agencies should tell you whether to instruct consumers to boil water. You must use one or more of the following methods to deliver the notice to consumers (141.202(c)):

- Radio
- Television
- Hand or direct delivery
- Posting in conspicuous locations

You may need to use additional methods (e.g., newspaper, delivery of multiple copies to hospitals, clinics, or apartment buildings), since notice must be provided in a manner reasonably calculated to reach all persons served. If you post or hand deliver, print your notice on letterhead, if you have it.

The notice on the reverse is appropriate for hand delivery or a newspaper notice. However, you may wish to modify it before using it for a radio or TV notice or posting. If you modify the notice, you must leave the health effects language in italics unchanged. This language is mandatory (141.205(d)).

Population Served

Make sure it is clear who is served by your water system--you may need to list the areas you serve.

Corrective Action

In your notice, describe corrective actions you are taking. Listed below are some steps commonly taken by water systems with turbidity single exceedance. Use one or more of the following actions, if appropriate, or develop your own:

- We are adding chemicals that reduce turbidity.
- We are sampling both untreated and treated water for the presence of coliform bacteria.
- We are monitoring chlorine levels and will adjust them as needed to compensate for filtration problems.
- We are inspecting and cleaning the filters.

Source of the Problem

If you know why the turbidity is high, explain it in your notice. For instance, unusual conditions, such as heavy rains and flooding, can overburden the water plant, and treated water may therefore not meet the standards. In addition, run-off from parts of the watershed could contain increased concentrations of sediment and animal waste.

After Issuing the Notice

Send a copy of each type of notice and a certification that you have met public notice requirements to your primacy agency within ten days after you issue the notice (141.31(d)). It is a good idea to issue a problem corrected notice when the violation is resolved. It recommended that you notify health professionals in the area of the violation. People may call their doctors with questions about how the violation may affect their health, and the doctors should have the information they need to respond appropriately. In addition, health professionals, including dentists, use tap water during their procedures and need to know of potential microbiological contamination so they can use bottled water.

DRINKING WATER WARNING

[system] has high turbidity levels

BOIL YOUR WATER BEFORE USING

We routinely monitor your water for turbidity (cloudiness). This tells us whether we are effectively filtering the water supply. A water sample taken [date] showed turbidity levels of [number] turbidity units. This is above the standard of [standard] turbidity units. Because of these high levels of turbidity, there is an increased chance that the water may contain disease-causing organisms.

What should I do?

- **DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.** Bring all water to a boil, let it boil for one minute, and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, washing dishes, brushing teeth, and food preparation until further notice.
- *Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease causing organisms. These organisms include bacteria, viruses, and parasites, which can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.* People with severely compromised immune systems, infants, and some elderly may be at increased risk. These people should seek advice about drinking water from their health care providers.
- The symptoms above are not caused only by organisms in drinking water. If you experience any of these symptoms and they persist, you may want to seek medical advice.

What happened? What is being done?

[Describe reason for the high turbidity, corrective action, and when the system expects to return to compliance.]

We will inform you when turbidity returns to appropriate levels and when you no longer need to boil your water.

For more information, please contact [name of contact] at [phone number] or [mailing address]. General guidelines on ways to lessen the risk of infection by microbes are available from the EPA Safe Drinking Water Hotline at 1(800) 426-4791.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by [system]. State Water System ID#: _____
Date distributed: _____

Appendix C

Template on Reverse (next page)

Since a waterborne disease outbreak is a Tier 1 situation, you must provide public notice to persons served as soon as practical but within 24 hours after you learn of the situation (141.202(b)). You must also contact your primacy agency during this time. You should coordinate with your local health department as well. **You must issue a public notice if you are experiencing a waterborne emergency other than a waterborne disease outbreak, such as one caused by flooding or treatment failure. In such cases, you may be able to modify this template to apply to your situation.** Check with your primacy agency for more direction. More information on waterborne disease outbreaks and emergencies is available from the Centers for Disease Control and Prevention (www.cdc.gov/health/diseases.htm 1 (800) 311-3435). For a waterborne disease outbreak or other emergency, you must use one or more of the following methods to deliver the notice to consumers (141.202(c)):

- ☐ Radio
- ☐ Television
- ☐ Hand or direct delivery
- ☐ Posting in conspicuous locations

You may need to use additional methods (e.g., newspaper, delivery of multiple copies to hospitals, clinics, or apartment buildings), since notice must be provided in a manner reasonably calculated to reach all persons served. If you post or hand deliver, print your notice on letterhead, if available. The notice on the reverse is appropriate for hand delivery or a newspaper notice. However, you may wish to modify it before using it for a radio, TV notice, or posting

Describing the Outbreak

If known, list any organisms detected, the number of affected people, any water treatment problems contributing to the waterborne disease outbreak, and any sources of contamination, such as flooding.

Potential Health Effects

No mandatory health effects language exists for waterborne disease outbreaks. You may wish to use the sentence below, if appropriate, or contact your primacy agency or health department. These symptoms are common to many diseases caused by microscopic organisms:

- ☐ Symptoms may include nausea, cramps, diarrhea, jaundice, and associated headaches and fatigue.

Population at Risk

Some people who contract waterborne diseases can be affected more severely than others, as described on the reverse page. The specific language on the reverse is not mandatory, but you must provide information on the population at risk. In addition, make sure it is clear who is served by your water system--you may need to list the areas you serve.

Corrective Action

In your notice, describe the corrective actions you are taking. Listed below are some steps commonly taken by water systems with waterborne disease outbreaks. Use one or more of the following actions, if appropriate, or develop your own:

- ☐ We are repairing our filtration system.
- ☐ We are increasing sampling for disease-causing organisms

Make sure to send a copy of each type of notice and a statement certifying that you've met all public notification requirements to your primacy agency within ten days after issuing the notice (141.31(d)). It is a good idea to issue a 'problem corrected' notice when the waterborne disease outbreak is under control.

It is recommended that you notify health professionals in the area of the outbreak. People may call their doctors with questions about how the situation may affect their health, and the doctors should have the information they need to respond appropriately. In addition, health professionals, including dentists, use tap water during their procedures and need to know of contamination so they can use bottled water.

DRINKING WATER WARNING

BOIL YOUR WATER BEFORE USING

Disease-causing organisms have entered [system's] water supply.

These organisms are causing illness in people served by [system]. We learned of a waterborne disease outbreak from [agency] on [date].

What should I do?

- **DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.** Bring all water to a boil, let it boil for one minute, and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and food preparation until further notice. Boiling kills bacteria and other organisms in the water.

- [Describe symptoms of the waterborne disease.] If you experience one or more of these symptoms and they persist, contact your doctor. People with severely compromised immune systems, infants, and some elderly may be at increased risk. These people should seek advice about drinking water from their health care providers.

What happened? What is being done?

[Describe the outbreak, corrective action, and when the outbreak might end.]

We will inform you when you no longer need to boil your water.

For more information, please contact [name of contact] at [phone number] or [mailing address]. General guidelines on ways to lessen the risk of infection by microbes are available from the EPA Safe Drinking Water Hotline at 1(800) 426-4791.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by [system]. State Water System ID#: _____

Date distributed: _____

ANNUAL SYSTEM SECURITY ASSESSMENT

Riverbend Riverbank Water Improvement District
PWS#4100458

Well-Spring/Intake Protective Structures	**Yes-No-Comments**
Pump Houses & Treatment Plants	**Yes**
Locks on all Doors	**Yes**
All Windows Secured	**N/A No Windows**
Adequate Alarms	**Yes**
Video Cameras	**No**
Adequate Security Lighting	**Yes**
Entry restricted to authorized personnel	**Yes**
"Employee Only" signs posted	**Yes**
Reservoirs	
Fenced area around reservoir	**No**
Locked gate	**No**
Ladder guard locked	**No**
Access hatches locked	**Yes**
Adequate security lighting	**Yes**
"Employee Only" signs posted	**Yes**
Distribution System	
Hydrants & other access points	**Yes**
Procedures	
All facilities locked and alarms set during prescribed times	**Yes**
Access restricted to authorized persons	**Yes**
Visitors and contractors checking in and out	**Yes**
Keys never stored in equipment or vehicles	**Yes**
Employees training	**Yes**
Cross Connection Program in place	**Yes**

ANNUAL SYSTEM HAZARD REVIEW

Riverbend Riverbank Water Improvement District
PWS#4100458

Source	Yes-No-Comments
Uncorrected sanitary survey deficiencies	No
Minimum 100 ft. control Zone	Yes
Chemical storage within 100 ft	No
Pesticide application within 100 ft.	No
Sewage system within 100 ft.	No
Fuel tanks within 100 ft.	No
Animal grazing/housing	No
Risk of flooding	No
Roads/Driveways	Yes
Solid waste storage/disposal	No
Earthquake vulnerability	No
Reservoir (water storage tank)	
Uncorrected sanitary survey deficiencies	No
Zone of control around reservoir	No (do not own property around storage tank)
Earthquake vulnerability	No
Distribution System	
Uncorrected sanitary survey deficiencies	No
Adequate valving provided	Yes
Valves exercised annually	Yes
Blow offs/hydrants provided	Yes
Blow offs/hydrants exercised	Yes
Cross-Connection Program current	Yes

Section 5

Scheduled Activities

Scheduled Activities - pg 1

	Description	Cycle
1.	**Chlorine Analyzer - Readings** post the daily readings in the log from the D1C online readings or testing have records available for inspection	daily
2.	**Chlorine Analyzer - Settings** compare the D1C calibration use LaMotte or Hach manual tester calibrate the D1C as necessary to match	as needed
3.	**Chlorine Replenishing** replenish the sodium hypochlorite as needed purchase in 15-gallon carboy containers return deposits - 2 per purchase in summer	as needed
4.	**Chlorine Manual Testing** each week, manually test the chlorine compare the manual test to the D1C reading calibrate the D1C as necessary	weekly
5.	**Chlorine Test Point Water Filter** check the water flow in the tester at 10 gph through the D1C, 1 filter per week purchase the filters by the case of 24	weekly
6.	**System Purging** refer to the purging map and sequence open and close the valves slowly blow the lines until water runs clear	monthly
7.	**Master Water Meter** the master water meter is at the reservoir inlet log the reading each month for reporting maintain the monthly log for annual reporting	monthly
8.	**Generator Testing** start and run the generator each month simulate a power failure using the transfer switch test the generator output cycling system pumps	monthly

System Operator Activities - pg 2

Description	Cycle	Criteria

1. Chlorine - Daily Readings	day	must be between 0.20 & 2.00 ppm - target is 0.35

A daily record of the chlorine level is required, using either online data or manual testing done at the pumphouse.
Post the daily readings in the log from the D1C online readings or testing - can retrieve online if not checked daily.
Place each month's record in the Operations Manual. Have records available in pumhouse for inspection.

2. Chlorine - WeeklyTesting	week	calibrate D1C - check filters to the analyzer

Each week, manually test the chlorine and post as above. Use the LaMotte Colorimeter manual tester. If needed, recalbrate the D1C chlorine analyzer.. Note that the D1C readings vary with flow, and flow is affected by filters.
To test the filters, manually run the D1C flush control. If the input pressure drops more than 8 lbs, change filters.

3. Chlorine & Polyphosphate on hand	week	order by phone - pick up from vendor as needed

Replenish the chlorine (12.5% sodium hypochlorite) and polyphosphate sequestering (Caschem 5C) as needed.
Purchase from Cascade Columbia in Sherwood. Chlorine is supplied in 15-gallon carboy containers (exchange jug), use approx 1/mon in winter, 2/mon in summer. Polyphosphate in 30-gallon plastic barrels (no exhange), approx 2/yr.

4. System Purging	month	complete purging, record water use, generator check

The blowoffs around the distribution system are purged monthly to remove sediment. Refer to the purging map and sequence. Open and close the valves slowly without causing water hammering. Blow the lines until water runs clear.

5. Master Water Meter	month	the District is required to record & report water use

The Water Right for the District is 105 gal/min, resulting in a maximum of 4.5 million gal/month (105 x 60 x 24 x 30).
Water use is recorded monthly from the master water meter at the reservoir inlet, and logged for reporting to the State.

6. Equipment Testing	month	monthly testing of generator and equipment

Check the operation of the pumphouse generator and switching. Start and run the generator each month for 5 minutes.
Simulate a power failure by using the transfer switch to change the power source from line power to the generator.

7. Consumer Confidence Report	annual	annual report to district members - done in June

Each year, the State requires that the District provide a report to each of the members, identifying the members of the Board of Directors, giving the general status of the District, and reporting the results of various chemical testing done.
The report is sent to all District members in June, with completion reported to the State. See latest at: www.rrwd.org

8. Backflow Testing	annual	Cross Connection program requires annual testing

As a part of the State Cross Connection program, all backflow control devices must be tested annually and reported.
Any property that has irrigation, ponds, or connections other than the home must have a backflow device. Testing is done in September, and involves contracting for the testing with a firm such as Womak, arranging the date, notifying District members, supervising testing/repair, billing, and reporting on a form sent to the State in the following January.

9. Water Use Reporting	annual	water use is reported to the State - done in October

The water year ends September 30. Annual usage that has been logged by the month is reported online to the State Water Resources Dept in October at: www.oregon.gov/owrd 'Water Use Reporting' - login is 1579, password xxxx

Online Access

Mission Communications - provides system data - ID: rrwdmel pass: passmel	https://www.123mc.com/123mc/main.asp
Water Resources Dept - water use reporting - ID: 1529 pass: xxxx	http://www.oregon.gov/owrd/
DHS Drinking Water Program - reports, chemical testing - PWS# OR41 00458	http://170.104.63.9/inventory.php
RRWD website - all District records, history, procedures, BOD members	http://www.rrwd.org/

Section 6

Periodic Reporting

Periodic Reporting

	Description	Cycle
1.	**Chlorine levels** recorded on a daily basis (manual tests weekly, automated daily) records available for inspection	daily Sys Operator
2.	**Coliform bacteria testing** done monthly by Alexin Labs - they report to State	monthly Sys Operator
3.	**Payroll and Expense reporting** end of the month - advise Paychex of payroll hours submit payroll and expense reports to accountant - copy to BOD	monthly Sys Operator
4.	**Water use tabulating** readings recorded monthly for use with annual water use report	monthly Sys Operator
5.	**Water use reporting** done annually after September 30 - reported online	annually Sys Operator
6.	**Consumer Confidence Report** due to all District members by July 1 send by email or US mail to all members	annually Sys Operator
7.	**Consumer Confidence Report - Certification** form and copy due to State by Oct 1 certifying that the CCR was done	annually Sys Operator
8.	**Cross Connection testing and reporting** testing done annually in Sept - each home with backflow device report to OHA completed between Jan and Mar of next year	annually Sys Operator
9.	**SDAO renewal application** Special Districts Association of Oregon - done annually in June determines District status	annually Secretary
10.	**USI insurance coverage review** done in November for coming year payment due Dec-Jan	annually Secretary
11.	**Periodic testing 1-3-9 year cycles** lab needs to be reminded on the 1-3-9 year tests - to test and to post with State 1-year - Source Assessment, lab tests for eColi, test each well individually 1-year - Nitrate 3-year - lead & copper at 5 homes 3-year - major list of chemicals, including HAA5's, TTHM's, VOC's 9-year - Arsenic, IOC, Nitrite, RAD	annually Sys Operator
12.	**Emergency Response Plan** kept current on a regular basis available for inspection - post on RRWD website	annually Sys Operator
13.	**Operations Manual** kept current on a regular basis available for inspection - post on RRWD website	annually Sys Operator
14.	**Oregon Corporation Division filing** Annual Report - due by Feb 7 - pay $50 fee maintains record of Registered Agent, officers, addresses	annually Treasurer
15.	**IRS tax filing** IRS tax Form 990 - due by Feb 15 required to maintain tax exempt status	annually Treasurer
16.	**Annual Meeting** Annual meeting of all District Members - due by Feb 28 - includes electing BOD activites and financials reported - after this meeting, the BOD elects the officers	annually President
17.	**RRWD website maintenance** keep all information current - officers, water use, reports maintain host account - pay fees www.rrwd.prg	ongoing Webmaster

Section 7

Rules & Regulations

RULES AND REGULATIONS OF RIVERBEND-RIVERBANK WATER IMPROVEMENT DISTRICT

Modified: January, 2017

1.0 Definition

1.1 District: Riverbend Riverbank Water Improvement District.

1.2 Levy: A computation of the whole amount of money to be raised by the District for the ensuing year through assessments and fees.

1.3 System Development Charge: A charge for a new home to be added to the system, which takes into account previous system improvements.

1.4 System Maintenance Charge: A charge made to a new owner when a home changes ownership, for the purpose of the new owner buying into the existing maintenance fund managed by the District.

1.5 Special Assessment: A charge to cover an unplanned, major expense.

1.6 Water Service Fee: The bi-monthly fee for water service.

1.7 Lien: A legal claim of right over the property of another until some claim or due is satisfied.

2.0 These Rules and Regulations set forth the policies and procedures of the Riverbend-Riverbank Water Improvement District and have been established and shall be enforced in accordance with the Articles of Incorporation of the District, the Bylaws of the District, the covenants and provisions of any duly recorded Landowners' Notice, and the laws of the State of Oregon.

3.0 All words used in these Rules and Regulations shall have the meaning as so defined in the Bylaws of the District, or as defined in 1.0, unless otherwise required in accordance with the context of this document.

4.0 LEVY: The Board of Directors shall, on or before September 30 of each year, make a computation of the whole amount of money to be raised by the District through assessments for the ensuing year for any purposes whatsoever, including maintenance and operation, estimated delinquencies on assessments, principal and interest of indebtedness maturing, and such reserves as the Board deems necessary.

5.0 EXPENSES: The amount of expenses determined by the Board shall be apportioned and/or assessed as follows:

5.1 Normal operating expenses, including maintenance, repair, and any capital replacement expense shall be assessed solely against the lots within the boundaries of the District or as provided in section 12.0.

5.2 Capital improvement expenses, including but not limited to connection charges and System Development Charge, shall be apportioned and assessed solely to those areas benefited by such improvement.

5.3 Neither assessments nor service charges shall be made against the land held, or to be held, as common areas for the benefit of the entire development. The District shall absorb the expense of providing water for such land.

6.0 ASSESSMENTS: Assessments may include a one time System Development Charge for new home construction, a System Maintenance Charge for a change in ownership, and any Special Assessments that may become necessary due to an unplanned expense. All charges, fees, and assessments are subject to change by resolution of the Board to reflect changes in costs and expenses associated with the water delivery, collection, and capital improvement services provided by the District.

6.1 The System Development Charge is $1,650. This is a charge for a new home to be added to the system, which takes into account previous improvements made to the system. The System Development Charge does not include the actual cost of connecting the new home to the existing water system. Such costs will be assessed in addition to the System Development Charge. Full payment is required prior to the initial turn-on of water service, including water for construction.

6.2 The System Maintenance Charge is $150. This is a charge made to a new owner when a home changes ownership, which takes into account cash reserves in the existing maintenance fund.

6.3 In addition, and if necessary, a Special Assessment may be made to all property owners of the District to cover any unplanned major expense incurred by the District.

7.0 CHANGE OF OWNERSHIP:

7.1 When a residence changes ownership and there has been no break in service, in order to ensure continuous service, the new owner will be responsible for all District fees, charges, and assessments made to the property and on the new owner from the date of transfer in ownership. The previous

owner will be responsible for all District fees, charges, and assessments made to the property and on the previous owner prior to the date of transfer in ownership.

7.2 When a residence changes ownership the new owner must pay the $150.00 System Maintenance Charge to establish a new account.

8.0 SERVICE CHARGES & COLLECTIONS: The Board shall adopt a schedule of charges and make the same available to all Homeowners. The amount of the Water Service Fee is evaluated annually. All fees and charges shall be made payable to Riverbend-Riverbank Water Improvement District.

8.1 The Water Service Fee shall be billed and become due and payable in bi-monthly installments upon receipt of the bill.

8.2 The District accounting service will mail the billings on a cycle to be established by the Board of Directors.

8.3 If a Homeowner is over 60 days late paying the account, a letter informing the Homeowner of the amount past due will be sent to the Homeowner by regular mail with the next bill.

8.4 If a Homeowner's account remains unpaid over 120 days, a registered mail notice will be sent to the Homeowner informing them of the past-due status of their account. This letter will include a warning that if the Homeowner does not bring the account to a current status within 30 days, the District will charge interest on the outstanding balance from the day it became due until it is paid at the interest rate of 1.5% per month. In addition, a $100.00 processing fee will be added to the amount due for all accounts unpaid not brought to current status within 30 days of this 120-day notice letter. Any expense incurred by the district in the process of collecting delinquent payments will be added to what is owed by the Homeowner in addition to the regular fees for the water and any interest, penalties.

8.5 If the Homeowner's water bill is unpaid in an amount equivalent to 180 days of service, the district will notify the Homeowner by registered mail that the District will be shutting off water service until the past due balance, including the interest and processing fees and any other expenses incurred by the District, are paid in full, or an alternative payment plan is established and approved by the Board.

The 180-day notice will also notify the Homeowner that the Board reserves the right to file a Notice of Claim of Lien in Clackamas County in accordance with ORS 554.135.

8.6 If the district shuts off a Homeowner's water supply for failure to pay a past-due account, the Homeowner must pay a service fee in addition to the regular bi-monthly water fees due, the interest on the water fees, and the processing fees. The additional fee to resume regular service will be determined by the costs incurred in locating, possibly modifying, and securing the service connection, and shall be a minimum of $100.

8.7 Any Homeowner who has received a 180-day delinquency notice as provided above, and who does not pay the account in full and bring the account to current status within 10 days thereof, will be required to pay a deposit of up to $1000, at the Board's discretion, to be held in that Homeowner's account for application to any future past-due payments or other charges or fees not kept current by the Homeowner. The remainder of any such deposit shall be returned to the Homeowner upon a change in ownership or Homeownership status.

8.8 In the event that water service has been reduced or terminated due to lack of payment, the Homeowner is not authorized to access or tamper with the service connection to the Homeowner's property, or to tamper with any other District facilities, without first complying with the repayment conditions specified in this section and bring the account to current status and obtaining the permission of a Board Member. Any Homeowner who violates this provision may be charged a fine of $1000. Any unauthorized tampering with a service connection or other District facility will be dealt with in the manner provided by law, and may result in no further service being provided to the Homeowner's property by the District.

8.9 If a Homeowner rents, leases, or otherwise does not occupy the home, the Homeowner remains responsible for payment of all fees due to the District and remains bound by the Provisions of these Rules and Regulations. The District shall bill the Homeowner for all water billing fees.

8.9.1 In instances whereby new renters become tenants, the Homeowner will not be subject to any additional System Maintenance Charges as outlined in Section 6.2 of these Rules and Regulations.

8.9.2 The Homeowner shall provide the District with their current billing address and notify the District at any time of a change of the Homeowners address.

9.0 LIEN AND FORECLOSURE: Any unpaid assessment or fees and the lien thereof shall be delinquent after the date of maturity of the last installment thereof and may be enforced and foreclosed. Upon the sale of any lands on such foreclosure, the District or any Homeowner thereof or any Homeowner of the District or other persons may be bidder and purchaser. The Board of Directors shall institute proceedings to enforce the lien of any assessment when the last installment of such assessment is delinquent for more than three months, as provided above.

10.0 CERTIFICATION OF ASSESSMENTS AND FEES TO COUNTY ASSESSOR:

10.1 Notwithstanding any other Rule or Regulations, the Board of Directors may certify the assessments or fees including any interest thereon to the County Assessor for Clackamas County for collection as other taxes are collected.

10.2 The Treasurer shall keep the proceeds of the assessments or fees in appropriate accounts depending upon the purpose of the assessments, and disbursements for the expenses of the District shall be paid out of the appropriate account.

11.0 CERTIFICATE OF PAYMENT: The District shall, upon demand at any time, furnish to any Homeowner liable for an assessment or fee a certificate in writing setting forth whether the assessments and fees on the lot(s) owned by such Homeowner have been paid.

12.0 LOTS SERVED BY THE DISTRICT:

12.1 No agreement shall be made to deliver water for irrigation or domestic use on lands outside of the boundaries of the District, with one exception. The District will provide service to one residence at 420 Riverbend Drive, being outside the District, and the owner of that residence shall be considered to be a voting member of the District.

12.2 No agreement shall be made to deliver water for irrigation, domestic, or commercial use on any lot or land subdivided or partitioned after March 1, 2007. The district will deliver water only to those lots already in existence as of that date. Further, no water service can be diverted from any existing lot to serve any other lot or multiple dwelling building. The District will deny any request from a

member, a representative of a member, or from any governing body to provide water service in support of any subdividing, partitioning, multiple dwelling, or rezoning activity.

13.0 UNAUTHORIZED USE OF DISTRICT FACILITIES: No Homeowner of the District may operate any valve, switch, or electrical connection that is part of the District except for the service connection to each Homeowner's own property without the approval of our Certified Operator, or any member of the Board of Directors. If this rule is breached, the first occurrence will result in a written warning. If the same Homeowner breaks the rule for a second time a fine of $1000.00 will be levied. If at anytime District Equipment is damaged and must be replaced or repaired, the Board of Directors will determine if the Homeowner must pay for the repair or replacement, and shall assess charges to the responsible Homeowner(s) accordingly.

14.0 SUMMERTIME WATER CONSERVATION MEASURES: If it is determined necessary by the Board of Directors to limit outdoor water use during the time between June 1 and October 1, the Homeowners will be notified of the water conservation requirements by flyer and followed up by letter through US Mail. During this time period, outdoor use of water for irrigation, cleaning of sidewalks, use of pressure washers, filling of hot tubs or swimming pools may be limited to the schedule below:

14.1 Even-numbered properties water on even number days, odd-numbered on odd number days.

14.2 As an option, properties with automatic watering systems can water on alternating days.

14.3 If exceptions to these rules are necessary, a Board Member shall be contacted and may grant approval for the requested exception.

14.4 Failure to comply with these regulations can result in a fine of not less than $100.00 for each occurrence.

15.0 CROSS CONNECTION PROGRAM:

15.1 The objective of this program is to outline the procedures and practices for the Riverbend-Riverbank Water Improvement District to manage a cross connection program intended to reduce the risk to the potable water supply from contamination by potential hazards commonly found in the vicinity of water systems distribution lines.

15.2 Jurisdiction:

15.2.1 Federal – The federal government, under the Safe Drinking Water Act (SDWA), has jurisdiction over the public health aspects of the supply of drinking water.

15.2.2 State – The State of Oregon has responsibility for the enforcement of the federal government regulations, and has set forth a timetable for all municipal and community water systems to define and approve their policies and ordinances, and implement testing programs.

15.2.3 District – To comply with Federal and State regulations, the Riverbend/Riverbank Water Improvement District will define the cross connection policies, obtain continued State approval of the plan, distribute and assist with educational information, and implement the Cross Connection Program.

15.2.4 Validity – If any provisions of the cross connection program or its application is found to be unenforceable, the validity of the remaining portions are not affected.

15.3 Cross Connection Definitions:

15.3.1 Cross Connection – A cross connection is any actual or potential physical connection between a potable water line and any pipe, vessel, or machine containing a non-potable fluid or having the possibility of containing a non-potable fluid, solid or gas, such that it is possible for the non-potable fluid, solid, or gas to enter the water system by backflow.

15.3.2 Backflow – Backflow is a flow in reverse of the normal direction of the flow in a piping system. It occurs due to a difference in pressure existing between points; fluid of higher pressure flowing to a fluid of lower pressure.

Example 1: The most common example of potential backflow in our District is that of lawn and garden irrigation systems. A combination of circumstances, such as the loss of system pressure during a watering cycle and the lack of a functioning backflow device, has the potential of siphoning lawn or garden chemicals into the water lines which at that time may have negative pressure. Professionally installed irrigation systems are normally equipped with backflow or “anti-siphon” devices to prevent this from occurring. These devices must be of the correct type, and must be periodically tested for proper operation.

Example 2: Also common in our District and of equal concern are landscape ponds, fishponds and livestock watering troughs. These must be isolated from the water system either by the use of backflow devices, or with "air-gap" water connections.

15.3.3 Air-Gap – An Air-Gap connection is simply any method of supplying water without using a closed–pipe connection; or, supply where the water must pass through the air, thus not being possible to siphon back into the system. The most common household examples are sinks, basins, and toilets, where there is an Air-Gap between the supply and the use. Outside of the home, ponds or containers that are manually filled with a water hose should have an air space between the hose and the highest water level of the container. The hose end should not be submerged. The following definition is per the Oregon State Health Division: An approved air gap is a vertical separation of at least twice the inside diameter of the supply line, never less than one inch, measured between the supply line and the top rim of the vessel being filled.

15.4 Cross Connection Regulations:

15.4.1 Timetable – It is the goal of the District to have all cross connection hazards resolved, to have a regularly scheduled testing program by a Certified Backflow Assembly Tester in place, and to have the Cross Connection Program fully operational beginning January 1, 2000.

15.4.2 Backflow Devices – Every location where a cross connection hazard exists must have an approved cross connection device installed. The Oregon Health Division maintains a list of approved and testable backflow devices. This list of devices is available from the District.

15.4.3 Previous Devices – Previously installed Atmospheric Vacuum Breaker devices will be allowed unless it is determined that they are not operating properly. At that time, such devices must be replaced with approved testable devices at the Homeowner's expense.

15.4.4 Testing – Each cross connection device must be tested at installation and annually thereafter by a Certified Backflow Assembly Tester. The results of those tests are to be recorded in the District files. For devices that are not testable, no test is required.

15.4.5 Reporting – The District Secretary will maintain all records regarding inspection and testing of cross-connection devices, and submit all required reports to the State in a timely manner.

15.5 Cross Connection Priorities:

15.5.1 Initially, each cross connection hazard will be given a hazard rating, with the most hazardous being given the highest priority for correction. The type of device required will be determined by the severity of the hazard, according to State guidelines.

15.5.2 After determination has been made that a cross connection hazard exists, as verified by a Certified Cross Connection Inspector, the District Secretary will notify the property owner. After written notification, the property owner will have 60 days to repair or complete the installation of an appropriate cross connection device. In some cases, an agreement may be reached between the property owner and the District for the District to proceed with the necessary upgrades.

15.6 Cross Connection Costs:

15.6.1 General – In keeping with the District policy that all connections and devices beyond the property line shutoff valves are the responsibility of the property owner, the ownership, maintenance and installation of backflow devices are also the responsibility of the property owner.

15.6.2 Pre-Existing – Regarding irrigation systems that were installed prior to November 1, 1996 in compliance with standards existing at the time of installation, but that do not comply with current requirements, all costs to upgrade the system are the responsibility of the property owner.

15.6.3 Current Standards – All non-irrigation uses, and all irrigation systems installed after November 1, 1996, must be in compliance with current standards or must be upgraded at the cost of the property owner when the backflow device is determined not to be operating correctly.

15.6.4 Inspections – All inspections required by the District, such as those that must be completed by a Certified Cross Connection Inspector, will be paid for by the District. All testing and maintenance of Cross Connection Devices is the responsibility of the property owner.

15.6.5 Maintenance – If a Certified Cross Connection Tester determines that a backflow device is not operating properly, or if the device does not meet current requirements for testing or correct operation, the costs to repair or upgrade that device are to be paid by the property owner.

15.6.6 Shutoff Valves – If a residence shutoff valve has not been installed between the main service and a residence, or if such shutoff valve cannot be located, the District may elect to install a shutoff valve. In such cases, the district will pay the shutoff valve costs.

15.7 Cross Connection Penalties:

15.7.1 Time Periods – In all cases where cross connection hazards have been determined to exist, or where deficiencies have been found in backflow devices, the District Secretary will provide written notice to the property owner. If there is an immediate threat to the water supply the property owner must disconnect the cross connection hazard immediately. If there is a potential threat to the water system the property owner will have 60 days to complete the work and correct the problem, or as an alternative, permanently disconnect the problem area from the system.

15.7.2 Non-Compliance – Failure of the property owner to correct a reported problem within the timetable set up by the District will necessitate the revocation of the property owner's rights to water from the Riverbend-Riverbank Water Improvement District. The property owner's water service will be disconnected until such time that the cross connection device is installed and approved, or the problem area is disconnected from the system. The property owner will be responsible for all expenses related to disconnecting and reconnecting the water supply.

Section 8

Bylaws

BYLAWS OF RIVERBEND-RIVERBANK WATER IMPROVEMENT DISTRICT

February 25, 2002

ARTICLE 1

DEFINITIONS

The following terms when used herein shall have the following meanings unless a different meaning is plainly required by the context.

1.1. "District" shall mean RIVERBEND-RIVERBANK WATER IMPROVEMENT DISTRICT, a corporation formed in accordance with the provisions of Chapter 554 of the Oregon Revised Statutes, and having all the powers authorized therein.

1.2. "Homeowner" shall mean the record owner of any Properties, whether one or more persons or entities, of the fee simple title to any Lot, including contract purchasers, but excluding those having such interest merely as security for the performance of any obligation.

1.3. "Lot" shall mean any plot of land shown upon any recorded subdivision plat or partition of the Properties or any condominium unit as shown upon any recorded condominium plat, for which a System Development Charge has been paid.

1.4. "Properties" shall mean all the properties in the District described in Exhibit "A" of the Articles of Incorporation, and any amendments thereto.

1.5. "System Development Charge" shall mean the charge set forth in the District Rules and Regulations for developing new service to any property.

1.6 "Secretary" shall mean the Secretary of the Board of Directors of the District, unless stated otherwise.

1.7. "President" shall mean the President of the Board of Directors of the District.

1.8. "Member" shall mean a member of the District who shall be entitled to vote as provided herein and in the Articles of Incorporation.

1.9. "Board" shall mean the Board of Directors of the District.

1.10. "Director" shall mean a member of the Board of Directors of the District.

ARTICLE II

MEMBERSHIP AND VOTING RIGHTS

2.1. Membership. Every Homeowner is a Member of the District. Membership is lost or gained, as the case may be through a sale or purchase by which legal title to any of said land is transferred.

2.2. Voting Rights. At all meetings of the Members, each Member who attends in person, or by proxy appointed in writing, shall be entitled to vote on the basis of one vote for each Lot owned. In any case in which two or more persons share legal title to

a Lot, the vote of any one or more of them shall constitute the vote of the entire ownership interest; provided, however, that in the event such persons disagree among themselves as to the manner in which any vote held by them shall be exercised, any such person may deliver written notice of such disagreement to the Secretary, and the vote shall then not be counted until all persons entitled shall agree in a writing filed with the Secretary upon the exercise of the vote.

2.3. Proxies. Every Member entitled to vote or to execute any waiver may do so either in person or by written proxy duly executed and filed with the Secretary. Members may also join in a voting trust, or give proxy power or power of attorney to vote such membership for a term of years, or until the happening or performance of a named contingency or condition.

2.4. Assignment of Rights. If a Homeowner rents or leases their Lot to a tenant who resides on the Lot, the Homeowner may assign membership rights and obligations in the District to the tenant upon written notice of the assignment to the Secretary. Upon such written assignment, the tenant shall be responsible for payment of all charges billed. Assignment of membership rights to a tenant shall not relieve the Homeowner from responsibility for payment of all charges levied upon such Lot(s). The Homeowner will be notified of any delinquencies prior to any liens being filed against such Lot(s).

ARTICLE III

MEETINGS OF MEMBERS

3.1. Annual Meeting. The annual meeting of the Members shall be held in West Linn, Oregon, at such hour and on such day during the month of January or February of each year as the President may designate, or if the President fails to designate a date by the first day of February, then the annual meeting shall occur at 10:00 AM on the fourth Saturday in February.

3.2. Special Meetings. Special meetings of the Members may be called at any time by the Board of Directors, for any purpose or purposes, and shall be called by the Secretary at the request of any Director, or upon receipt of a written request from one or more Members representing at least 20 percent ownership of the number of Lots included in the District. The written request shall state the purpose of the requested meeting and the proposed date and time.

3.3. Notice of Meetings.

3.3.1. Written or printed notice stating the place, day and hour of the meeting and, in case of a special meeting, the purpose or purposes for which the meeting is called, shall be delivered to each Member entitled to vote at such meeting not less than seven nor more than 50 days before the date of the meeting, either personally or by mail, by or at the direction of the President, the Secretary or the other person(s) calling the meeting. If mailed, such notice shall be deemed to be delivered when deposited in the United States mail, with postage fully paid thereon, addressed to the Member at their address as it appears on the records of the District. Attendance at a meeting shall constitute a waiver

of notice of such meeting except where a person attends a meeting for the express purpose of objecting to the transaction of any business because the meeting is not lawfully called or convened.

3.3.2. The persons entitled to receive notice of a meeting shall be determined from the current membership of records of the District. Each Member shall be responsible to provide to the Secretary accurate and up-to-date contact information for inclusion in such records.

3.3.3. When a meeting is adjourned for 30 days or more, notice of the adjourned meeting shall be given as for an original meeting. In all other cases no notice of the adjournment or of the business to be transacted at the adjourned meeting need be given other than announcement at the meeting at which such adjournment is taken.

3.4. Quorum – Majority Vote.

3.4.1. The presence in person or by proxy of Members owning a majority of the number of Lots shall be necessary to constitute a quorum for the transaction of the business at all membership meetings. The Members present either in person or by proxy at a duly organized meeting may continue to transact business until adjournment, notwithstanding the withdrawal of Members sufficient to equal less than a quorum. Further, in the absence of a quorum, the Members present may deliberate upon and pass any written resolution by majority vote of Members present. Any such written resolution that is passed will then be tabled and voted on at the next membership meeting at which a quorum is present. In the absence of a quorum, a majority of Members present may adjourn the meeting from time to time until a quorum shall attend. Any business that might have been transacted at the original meeting may be transacted at the adjourned meeting if a quorum exists. When a quorum cannot be had at the regular annual meeting of the Members, the Directors may call another meeting within 60 days. At the subsequent annual meeting the presence in person or by proxy of Members representing ownership of at least 25% of the number of Lots shall constitute a quorum for the transaction of business.

3.4.2. A majority vote shall govern in all cases, except as otherwise specially provided by law.

3.4.3. Any business transacted at a membership meeting shall be binding on all Members of the District.

ARTICLE IV

BOARD OF DIRECTORS

4.1. Number. The business and affairs of the District shall be managed by a Board of five (5) Directors.

4.2. Qualification. Directors must be Members of the District.

4.3. Election and Tenure. At the annual meeting of the Members the Directors shall be elected by the Members to hold office until their respective qualified successors are elected and take office. The method of election shall be by plurality of the

votes cast, as provided in the Articles of Incorporation. The term of office of each Director shall be two years. There is no limit on the tenure or number of successive or cumulative terms of any Director.

4.4. Vacancies. Any vacancy in the Board of Directors prior to the expiration of the vacant Director's term shall be filled by appointment of the remaining Directors by majority vote of the remaining Directors.

4.5. Compensation. Directors may be compensated for their services and reimbursed for any expenses incurred in carrying out their duties performed on behalf of or at the direction of the District as provided and limited by the Articles of Incorporation and ORS 198.190 (1999).

4.6. Oath of Office. Each Director shall, before entering upon their official duties, take and subscribe to an oath before a Notary Public that they will honestly, faithfully and impartially perform the duties devolving upon them in their office as Director, and that they will not neglect any of the duties imposed upon them by law.

4.7. Removal of Directors. The entire Board of Directors or any one or more individual Directors may be removed from office, with or without cause, by a majority vote of the Members called to a special meeting for that purpose.

4.8. Liability and Indemnification. Except as otherwise provided by law, neither the Board of Directors nor any Director shall be liable to the District or to any Member for any damage, loss or prejudice suffered or claimed on account of any action or failure ot act of the District, its Board of Directors or any member of its Board of Directors, provided only that the Board member has, in accordance with the actual knowledge possessed by him/her, acted in good faith. The District may indemnify, defend and procure insurance protecting any of its Directors, officers, employees and other agents to the extent and in the manner provided by ORS 60.387 through 60.414, and any successor or related provisions of Oregon law.

ARTICLE V

MEETINGS OF THE BOARD OF DIRECTORS

5.1. Organization Meeting. Within 10 days after each annual meeting of Members, the Directors elected at such meeting and those holding over shall hold an organization meeting for the purpose of electing officers as hereinafter provided and for transaction of such other business as may come before the meeting.

5.2. Special Meetings. Special meetings of the Board of Directors may be called at any time by the President, any Vice President or any two Directors.

5.3. Notices. Notice of the time and place of special Board meetings shall be given orally or delivered in writing personally to each Director before the meeting. Notice by mail shall be sufficient if actually received before the meeting or if mailed not less than 5 days before the meeting. Notice mailed shall be directed to the address shown on the District records or to the Director's actual address as may be ascertained by the person giving the notice. Notice of the time and place or holding of a

meeting to resume an adjourned meeting need not be given if such time and place be fixed at the meeting previously adjourned. Attendance of a Director at a meeting shall constitute a waiver of notice of such meeting except where a Director attends a meeting for the express purpose of objecting to the transaction of any business because the meeting is not lawfully called or convened.

5.4. Quorum and Vote. A majority of the Directors shall constitute a quorum. A minority of at least two Directors, in the absence of a quorum, may adjourn from time to time, but may not transact any business. A minority of the Directors may pass resolutions which shall not go into effect until approved by a majority of the Directors.

5.5. Action Without a Meeting. Directors may take any action in the absence of a meeting which they could take at a meeting by obtaining the oral or written approval of all of the Directors. Any action so taken shall have the same effect as though taken at a meeting of the Directors.

ARTICLE VI

POWERS AND DUTIES OF THE BOARD OF DIRECTORS

6.1. General Powers. The Board of Directors shall have all of the powers granted to it by the laws of Oregon, and specifically Chapter 554 of the Oregon Revised Statutes, as may be limited or refined by the Articles of Incorporation, or these bylaws.

6.1.1. These powers of the Board include the power to provide by resolution for the billing and collection of the rate, tolls, fees, fines and charges of the corporation. Such provision may apply to rates, tolls, fees, fines and charges for the operation and maintenance of the corporation, for the use of water, or for the use of any of the works of the District, or for principal and interest (at the statutory rate of 1.5% per month or fraction of a month) of maturing indebtedness, and shall fix the time when any rates, tolls, fees, fines, and charges shall become due and payable, and a time after which they shall become delinquent, which time shall be no later than within one year from the due date.

6.1.2. If any rates, tolls, fees, fines or charges remain unpaid after the delinquency date, the Secretary may file a Notice of Claim of Lien with the recording officers of Clackamas County, in accordance with the provisions of ORS 554.135 and its successor and related statutes.

6.2. Rules and Regulations. The Board of Directors may promulgate, amend, and delete rules and regulations governing the operations of District and the exercise of the powers of the District and its Directors in accordance with the Articles of Incorporation, these bylaws, and the laws of the State of Oregon. Such rules, regulations and amendments thereof must be ratified by two-thirds of the votes of the Members before they become effective.

6.3. Nothing in this provision or any action taken pursuant to it shall in any way limit the power or discretion vested in the Board of Directors or each of them to take any action on behalf of the District in accordance with these bylaws, the Articles of Incorporation, and the laws of the State of Oregon.

ARTICLE VII

OFFICERS

7.1. General. The officers of the District shall be a President and a Vice President, who shall be members of the Board of Directors, and a Secretary who may be, but need not be, a member of the Board of Directors. The Secretary shall also hold the office of Treasurer of the District. The Board of Directors may appoint an Assistant Secretary or an Assistant Treasurer by resolution entered in its minutes. The officers shall be elected by and hold office at the pleasure of the Board of Directors. Any two offices may be held by the same person, except the office of President and Secretary-Treasurer. A vacancy in any office because of death, resignation, removal, disqualification or any other cause shall be filled in the manner prescribed in the bylaws for appointment.

7.2. Compensation and Term of Office. The compensation and term of office of all the officers shall be fixed by the Board of Directors, except that the term of the President shall be one year and shall continue thereafter until a qualified successor is elected and takes office. Any officer may be removed, either with or without cause, by action of the Board of Directors. Any officer may resign at any time by giving written notice to the Board of Directors, the President or the Secretary. Any such resignation shall take effect upon receipt of such notice or at any later time specified therein. Unless otherwise specified therein, the acceptance of such resignation shall not be necessary to make it effective, provided that the Board of Directors may reject any post-dated resignation by notice in writing to the resigning officer. This section shall not affect the rights of the District or any officer under any express contract of employment.

7.3. President. The President shall be the chief executive officer of the District and shall, subject to the control of the Board of Directors, have general supervision, direction and control of the business and affairs of the District. He/she shall preside at all meetings of the Members and of the Board of Directors. He/she shall be ex-officio a member of all the standing committees, including the executive committee, if any; shall have the powers and duties of management usually vested in the office of President of a corporation; and shall have other powers and duties as may be prescribed by the Board of Directors or these bylaws.

7.4. Vice President. In the absence of or disability of the President, the Vice President shall preside and perform the duties of the President. He/she shall also perform such other duties as may be delegated to him/her by the Board of Directors.

7.5. Secretary. The Secretary shall keep or cause to be kept at such place as the Board of Directors may order a fair and correct record of all proceedings of the Board of Directors and the official business of the District. This record shall include minutes of all meetings of Directors and Members showing the time and place of the meeting, whether it was regular or special, and if special, how authorized, the notice given, the names of those present at Directors meetings, and the number of Homeowners and the Lots represented at membership meetings and proceedings thereof. The Secretary shall give or cause to be given such notice of the meetings of the membership and of the Board of Directors as required by these bylaws. The Secretary shall keep the seal of the District and affix it to any documents requiring a seal, and shall have such other powers and perform such other duties as may be prescribed by the Board of Directors or these bylaws.

7.6. Treasurer. The Treasurer shall keep and maintain, or cause to be kept and maintained, adequate and correct accounts of the properties and business transactions of the District, including accounts of its assets, liabilities, receipts and disbursements. The books of accounts shall at all reasonable times be open to inspection by any Director. The Treasurer shall keep the proceeds of the assessments in appropriate accounts depending upon the purpose of the assessments, and disbursements for the expenses of the District shall be paid out of the appropriate account. He/she shall render to the President and Directors, whenever they request it, an account of all of their transactions as Treasurer and of the financial condition of the District, and shall have such other powers and perform such other duties as may be prescribed by the Board of Directors or these bylaws.

7.7. Delegation and Change of Duties. In the event of absence or disability of any officer, the Board of Directors may delegate during such absence or disability the powers or duties of such officer to any other officer or any Director.

ARTICLE VIII

CORPORATE RECORDS, FUNDS AND AUDITS

8.1. Records of Proceedings of Board of Directors. The Board of Directors shall cause to be kept a well-bound book entitled "Records of Proceedings of Board of Directors," in which shall be recorded minutes of all meetings, proceedings, certificates, bonds, and any and all District acts, which records shall be at all times open to inspection of anyone interested, whether Members or creditors.

8.2. Lien Docket. A lien docket shall be maintained as to every Lot, in which all assessments or liens shall be charged and all payments shall be credited, and in which interest on any assessments in arrears shall be charged at time of payment of any installment, to the end that such record shall show the true condition of all liens an the amount thereof.

8.3. Warrant and Bond Register. A warrant and bond register shall be maintained in which shall be separately kept a record of all warrants issued, the number, date and amount thereof with the name of payee, and the date paid, showing principal and interest separately. Likewise, there shall be kept and maintained a register of all bonds with a description thereof, the date

thereof and when issued, and generally such a record as shall show all outstanding bonds separately of the several issues and the kinds and payments.

8.4. Checks, Drafts, Etc. All checks, drafts or other orders for payment of money, notes or other evidences of indebtedness, issued in the name of or payable to the District, shall be signed or endorsed by the Treasurer and such other person, if any, and in such manner as shall be determined by resolution of the Board of Directors.

8.5. Execution of Documents. The Board of Directors may, except as otherwise provided by law or these bylaws, authorize any officer or agent to enter into any contract or execute any instrument in the name of and on behalf of the District. Such authority may be general or confined to specific instances. Unless so authorized by the Board of Directors, no officer, agent or employee shall have any power or authority to bind the District by any contract or engagement, or to pledge its credit, or to render it liable for any purpose or for any amount.

8.6. Deposit of Funds. Except as otherwise provided by subsection (2) of ORS 554.160, all money of the District shall be deposited with a federally insured depository in the name of the District, and all funds provided to be segregated and held separate shall be so kept, and an accounting of each of such funds on the books of the District shall be correctly kept.

8.7. Audits. From time to time the Board of Directors, at the expense of the District, may obtain an audit of the books and records pertaining to the District and may furnish copies thereof to the Members. At any time any Member may, at their own expense, cause an audit or inspection to be made of the books and records of the District.

ARTICLE IX

RULES AND REGULATIONS

9.1. Rules and Regulations governing District operations and policies necessary for the smooth operation and maintenance of District affairs for the benefit of all Members of the District may be promulgated, amended, or repealed by the Board of Directors at such times as the Board shall find it necessary or expedient to do so, and shall be promulgated upon written petition of a Member or Members representing at least 20% ownership of the number of Lots then eligible to vote. The Rules and Regulations may set forth provisions regarding assessments, liens, charges, fines, procedures, and policies of the District not set forth in these bylaws, the Articles of Incorporation, or any recorded Landowner Notice, and shall be subject to any limitations therein.

9.2. Publication. The current Rules and Regulations, if any, shall be published and kept with the records of the District, open to inspection by any Member at all reasonable times. The Secretary of the Board shall transmit to each Member according to the contact information provided by that Member, a complete and accurate copy of the current Rules and Regulations of the

District upon request, and shall provide notice to the Members within three months of ratification of any change to the Rules and Regulations.

9.3. It shall be the responsibility of the Directors and Officers of the District to carry out policies and procedures embodied in the Rules and Regulations. The Rules and Regulations shall bind each Homeowner, Member and Lot as provided therein, and each and every Member of the District shall be held responsible for his or her own compliance therewith.

ARTICLE X

INSURANCE

10.1. Duty to Obtain Insurance. The District, acting for itself and for all owners, shall obtain and maintain at all times insurance of the type of policy and amount set forth below. Payments of premiums for such insurance shall be considered a purpose for which assessments may be levied by the District.

10.1.1. A policy or policies of fire insurance with extended coverage endorsement for the full insurable replacement value of all water system structures and improvements.

10.1.2. A policy or policies insuring the District, its officers and Board of Directors and employees against any liability to the public or the owners, their invitees or tenants, incident to ownership or use of the Properties. Limits of under such policy shall not be less than $100,000 per occurrence and $300,000 in the aggregate for personal injury and $100,000 for property damage in each occurrence. Such policy or policies shall be issued on a comprehensive liability basis to provide cross-liability endorsements.

ARTICLE XI

GENERAL PROVISIONS

11.1. Seal. The Board shall adopt an appropriate corporate seal to be used as necessary on official District documents or correspondence.

11.2. Amendment of Bylaws. The Board of Directors may amend or repeal these bylaws or adopt new bylaws, provided such amendment or repeal is ratified by two-thirds of the votes of the Members as required by ORS 554.080.

11.2.1. A record shall be kept with other records of the District reflecting any change, amendment, or repeal of these bylaws.

11.3. Waiver of Notice. Whenever any notice to any Member or Director is required by law, the Articles of Incorporation or these bylaws, a waiver of notice in writing signed at any time by the person entitled to notice shall be equivalent to the giving of the notice. Presence at any meeting for which notice may be required shall similarly constitute waiver of notice of any such meeting except where a person attends a meeting for the express purpose of objecting to the transaction of any business because the meeting is not lawfully called or convened.

11.4. Conflicts; Severability. These bylaws are intended to comply with Chapter 554 of Oregon Revised Statutes and to assist in carrying out the purposes of the District as stated in the Articles of Incorporation and any landowners' notice made and recorded pursuant to ORS 554.170-554.190. In the event of any invalid provision in any of such documents or any conflict between the documents, the invalid provision shall be deemed deleted and the remainder of the documents shall be construed as necessary to accomplish the purposes of the District to the greatest extent feasible.

11.5. These Bylaws supercede in whole any previous bylaws of the District.

The foregoing Bylaws of Riverbend-Riverbank Water Improvement District are the official Bylaws of the District, and have been duly ratified by the Members of the District and made effective as of the _____ day of _____200__.

Signature of President:_____ Date:_____

Signature of Secretary:_____ Date:_____

Section 9

Oregon Water Laws

Oregon Water Laws

booklet goes here