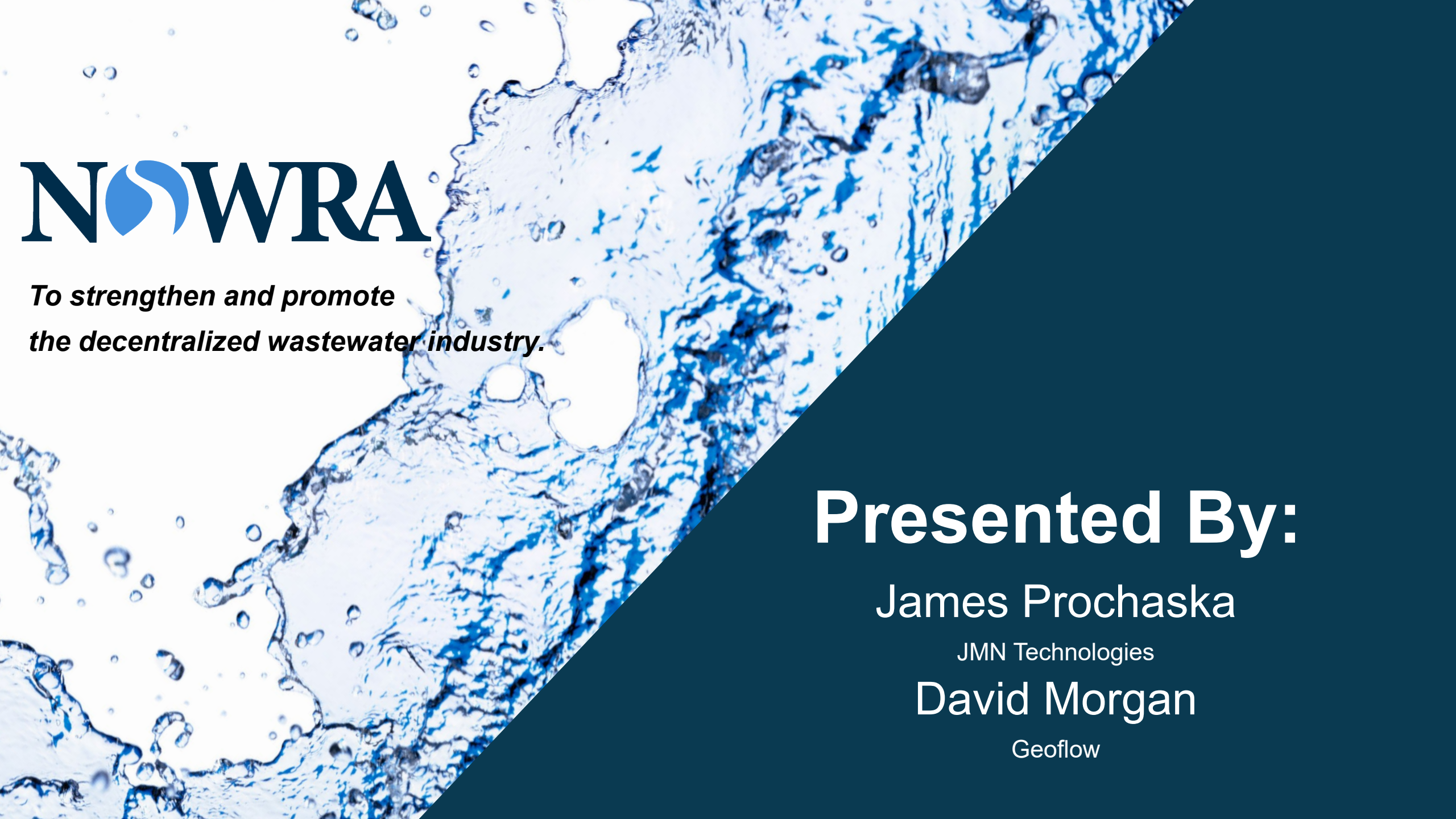
NOWRA

To strengthen and promote the decentralized wastewater industry.

Drip System Components



NOWRA

To strengthen and promote the decentralized wastewater industry.

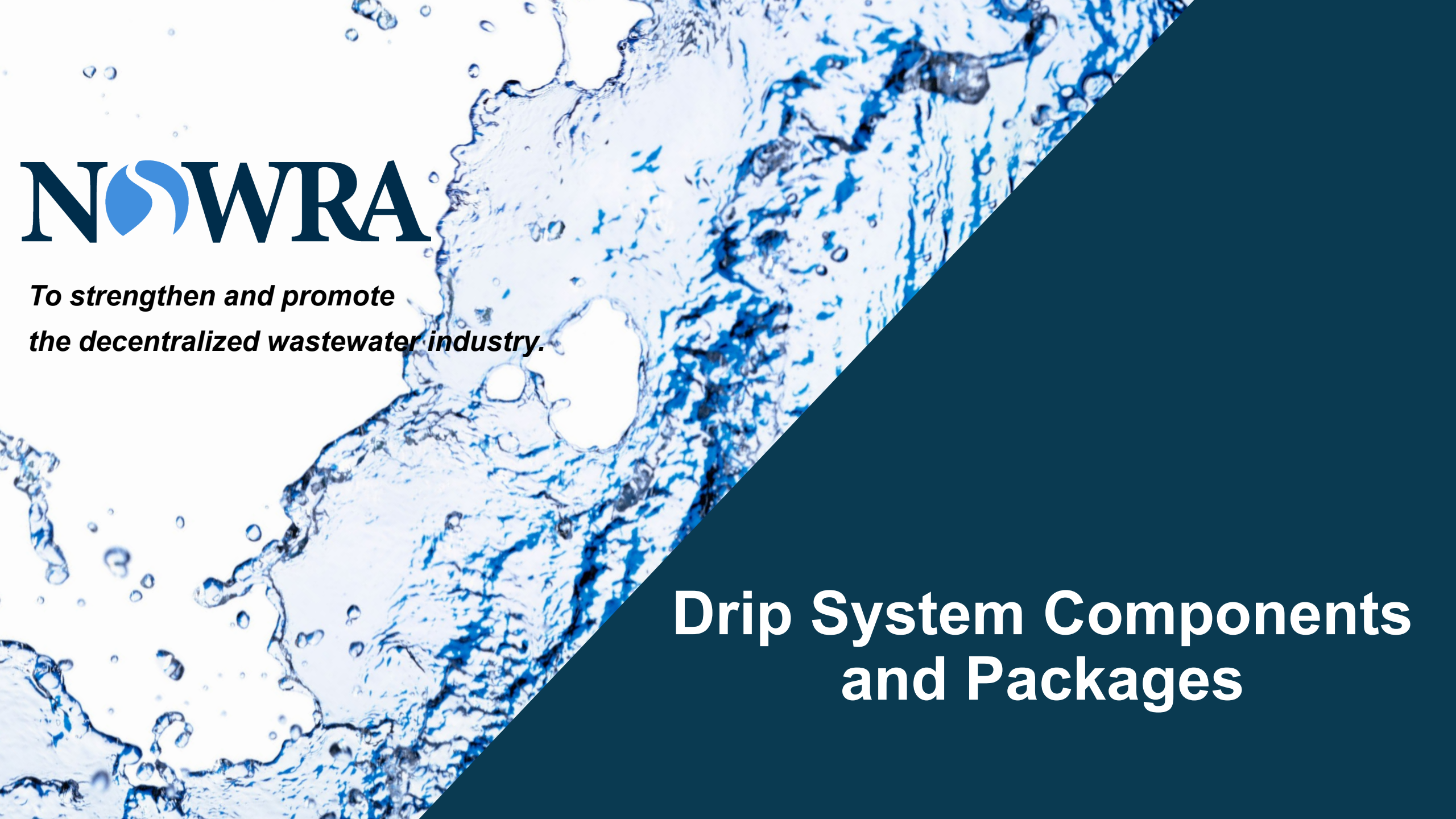
Presented By:

James Prochaska

JMN Technologies

David Morgan

Geoflow



NOWRA

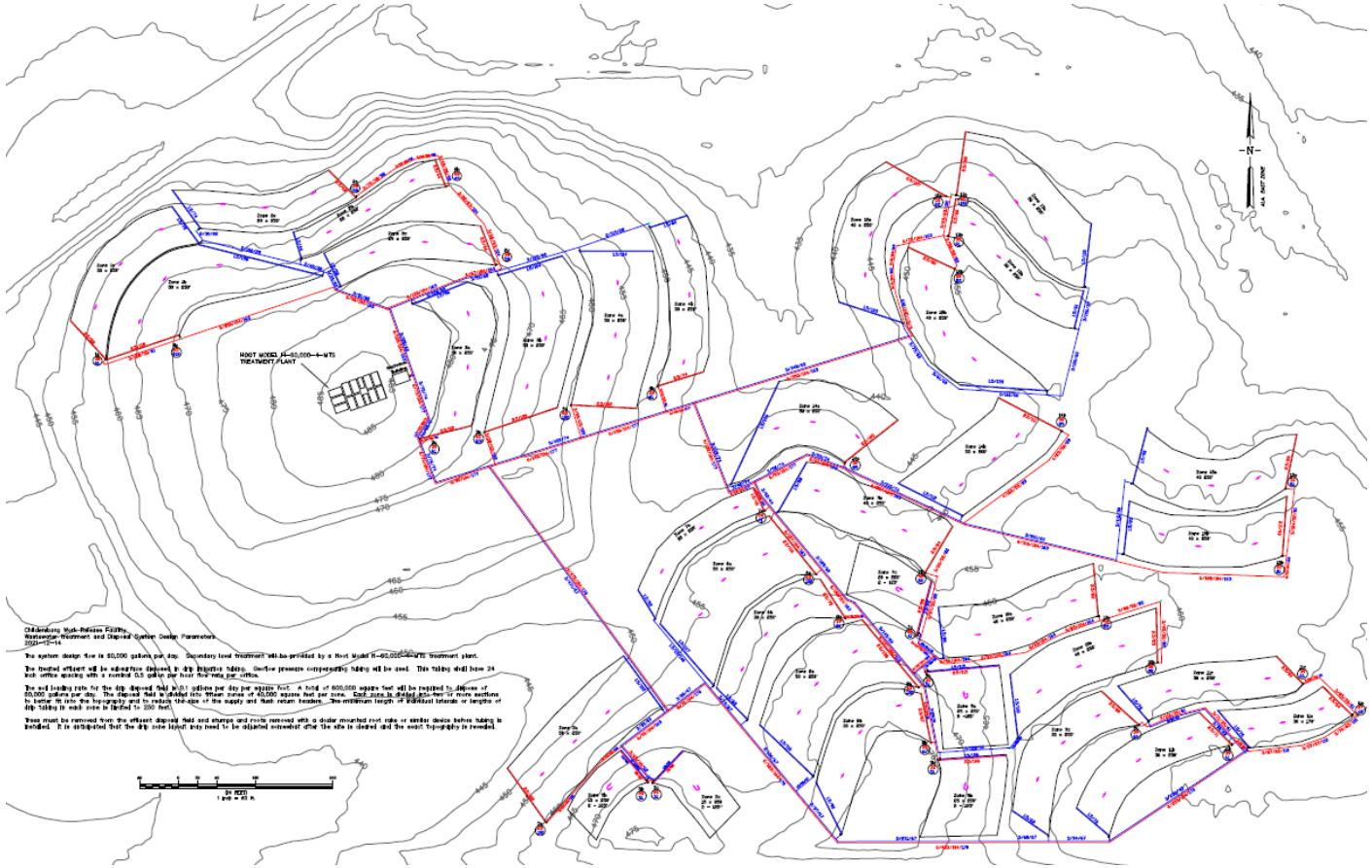
To strengthen and promote the decentralized wastewater industry.

Drip System Components and Packages

Commercial System Design

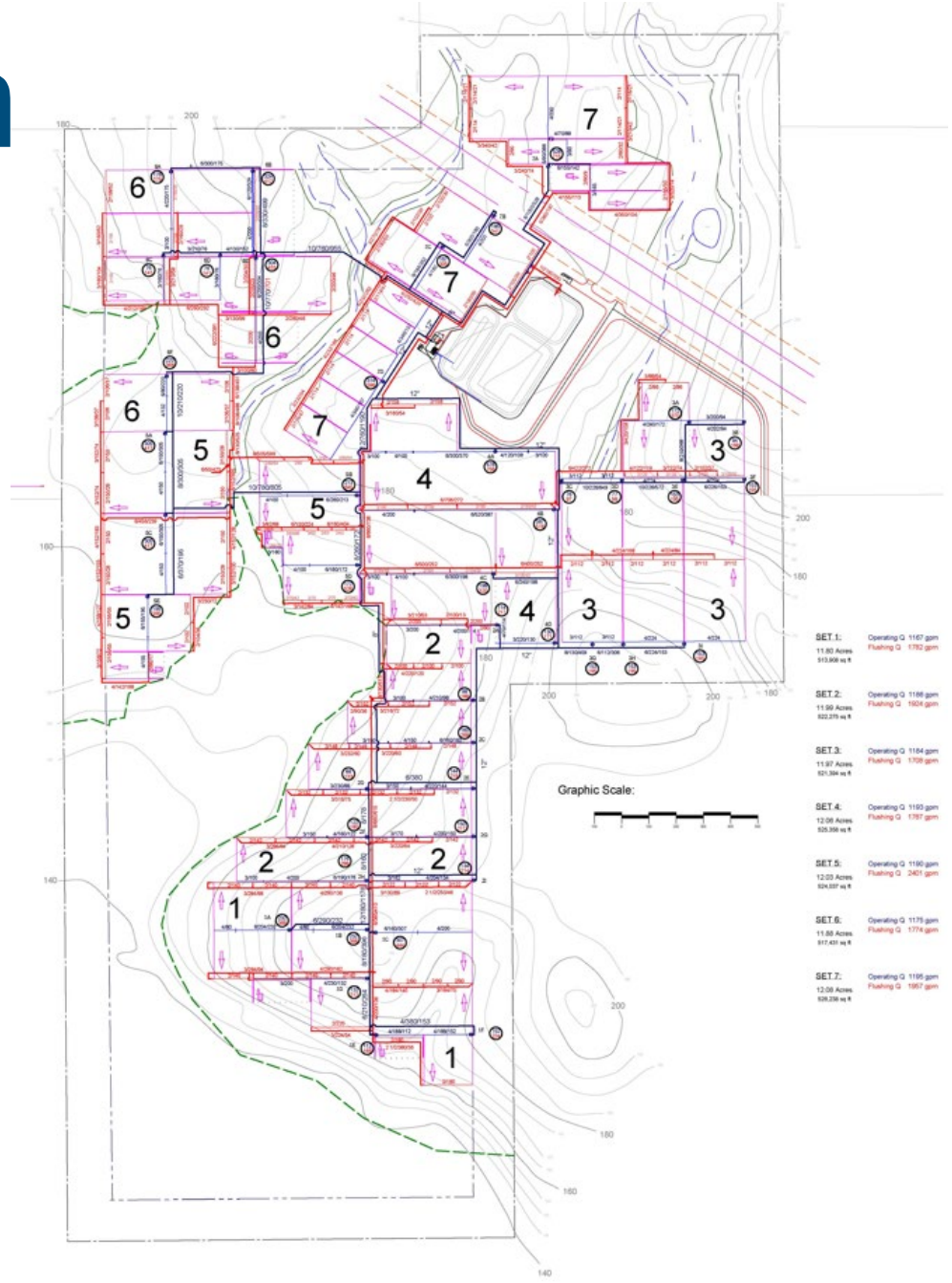
Proposed Design

- 60,000 gpd
- 0.1gpd/ft^2
- 14 acres
- 15 zones
  - 36 subzones
- 100 gpm dosing
- 160 gpm flushing



Proposed Design

- 700,000 gpd
- 0.19 gpd/ft^2
- 84 acres
- 7 zones
  - 49 subzones
- 1,200 gpm dosing
- 2,400 gpm flushing



Why Are We Doing This?

WaterflowPRO®
Drip Tubing

Technical Specifications

Why Choose WaterflowPRO?

- 16mm diameter tubing with PC or Classic emitter
- Patented nano-Rootguard® band PROtects against root intrusion
- Patented Geoshield® antimicrobial lining prevents biofilm build-up inside tubing
- Constant performance in all climates
- Optimal for use on severe slopes and long runs
- Provides maximum water distribution uniformity in tough topographical areas
- High quality resins assure durable performance and long life
- Warranty against defects in materials or workmanship
- Emitter spacing available in 12" or 24"

Ordering Information

Effective
Effluent
Dispersal
And……

BIOLINE® DRIPLINE

THE WORLD'S MOST ADVANCED CONTINUOUS SELF-CLEANING, PRESSURE COMPENSATING DRIPLINE SPECIFICALLY DESIGNED FOR WASTEWATER

Correct Application of
Drip Technology

Copper oxide is impregnated into the emitter serving as a natural antimicrobial agent to help prevent microbial activity.

Valves

Valves

- Glass-Filled Nylon
  - 2 – 4”
  - NPT, BSP, PVC Union, Groove, & Flange
  - 45 – 700 gpm
  - Operating Pressure 5 – 145 psi

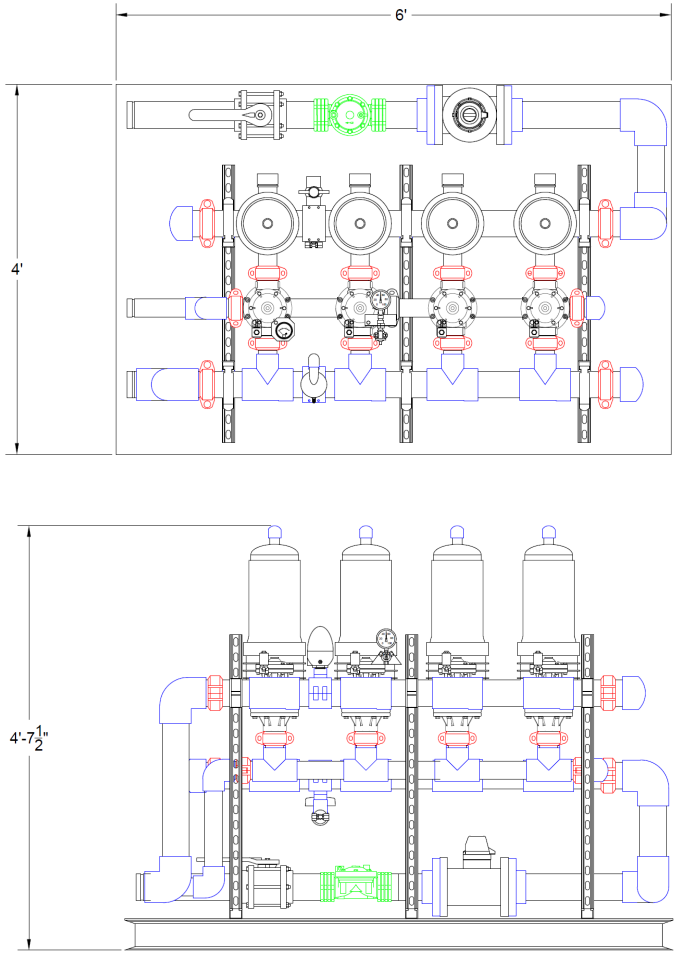
- Cast Iron, Ductile Iron, Brass, GF Plastic
  - 2 – 16”
  - NPT (2-3”), Grooved (2-6”), Flanged (2-16”)
  - 25 – 12,000 gpm
  - Operating Pressure 7 – 232 psi

Valves – Manual Control

Valves – Solenoid Plus Base

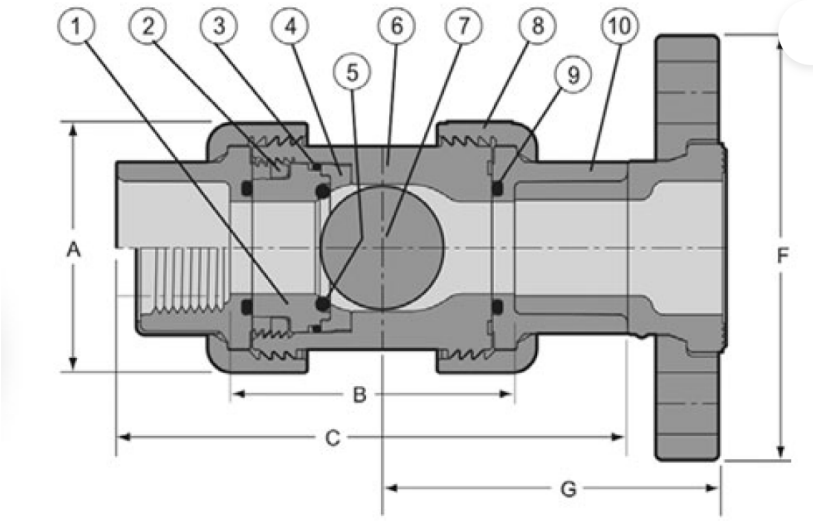
Valves – Solenoid Base & Pilot Control

Filter Backflush



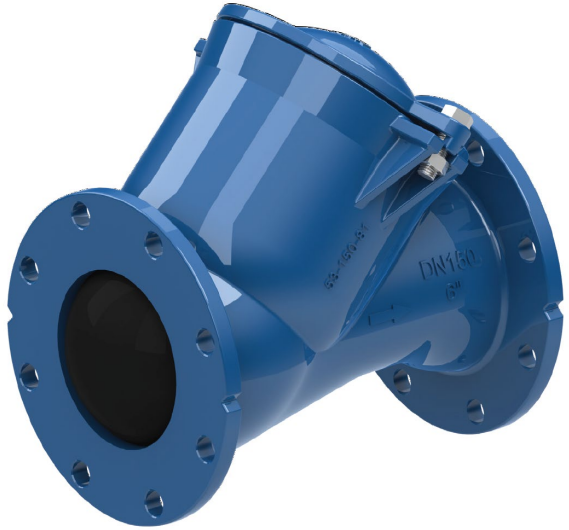
Check Valve

- True Union Ball Check
  - Fluids free from debris and entrained solids
  - ½” – 8” IPS sizes
  - ½” – 4” 235 psi, 6” & 8” 150 psi
  - Thread, Slip/Socket and Flanged
  - SCH 80 full port design



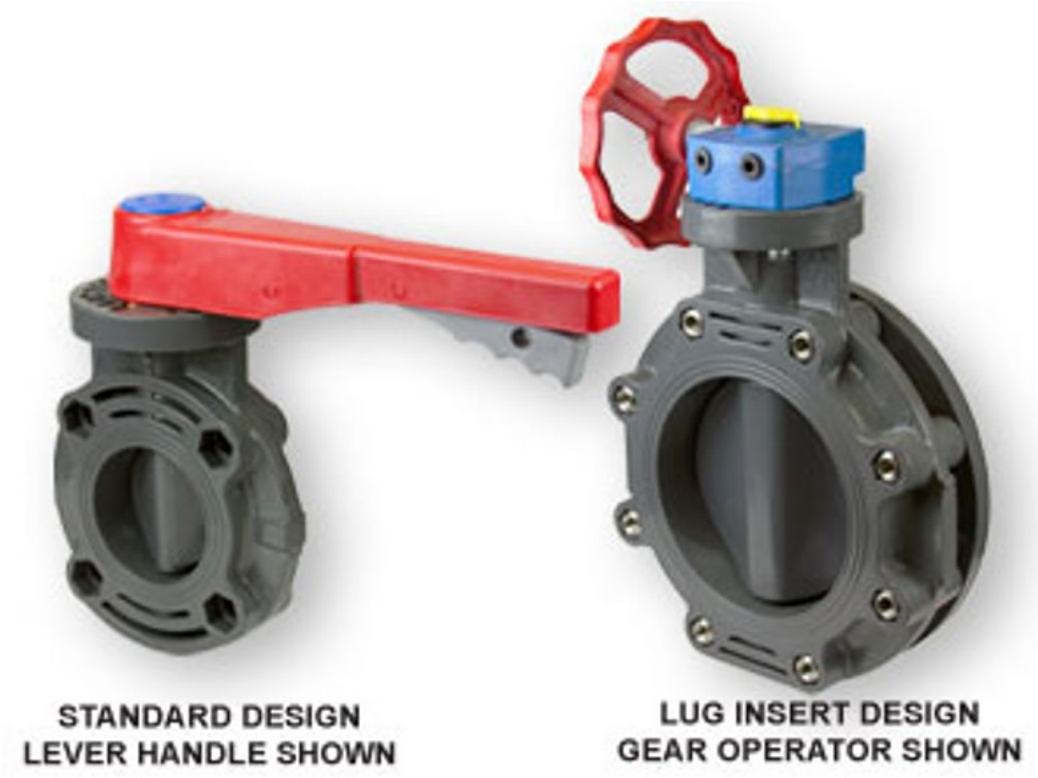
Check Valve

- Clear waterway, low head loss
- Mount vertically or horizontally
- Random sealing of the ball
- Ductile iron
- 1-1/2” & 2” NPT
- 2” – 24” flanged
- 150 psi leak test



Butterfly Valves

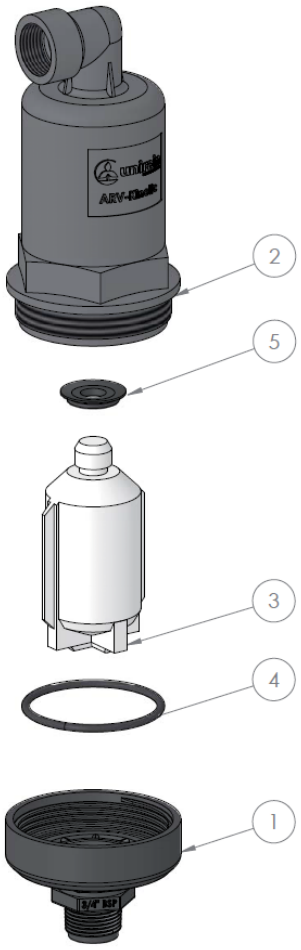
- Isolation
- PVC, 1-1/2 – 12”
- Leaver handle, 1-1/2 – 8”
- Gear drive 1-1/2 – 12”
- 150 psi PVC, max
- EPDM, Buna-N, & FKM seals



Vacuum Relief & Air Release

- Vacuum Relief
  - Reintroduce air as system drains
- Air Release
  - Continuously release air as it accumulates after system pressurization

Vacuum Relief & Air Release



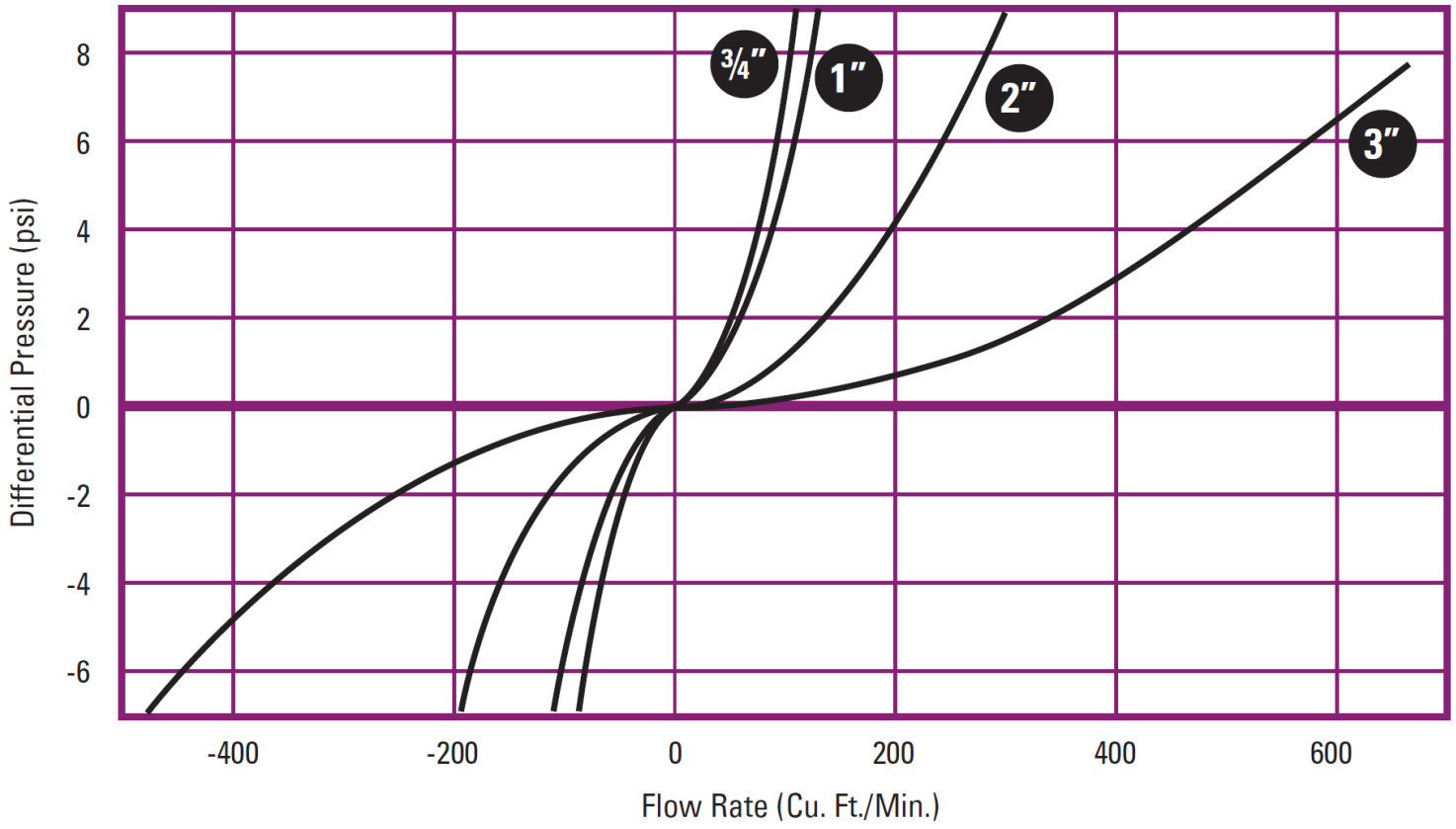
Plastic base BSP / NPT

1. NPT Valve Base
2. Valve Body
3. K Float
4. O-Ring
5. Main Seal

Plastic base BSP/NPT

1. Automatic Body
2. NPT Valve Base
3. ARV KA Float
4. ARV KA Yoke
5. Main Seal
6. ARV KA Secondary Seal
7. O-Ring

Air Valve Sizing

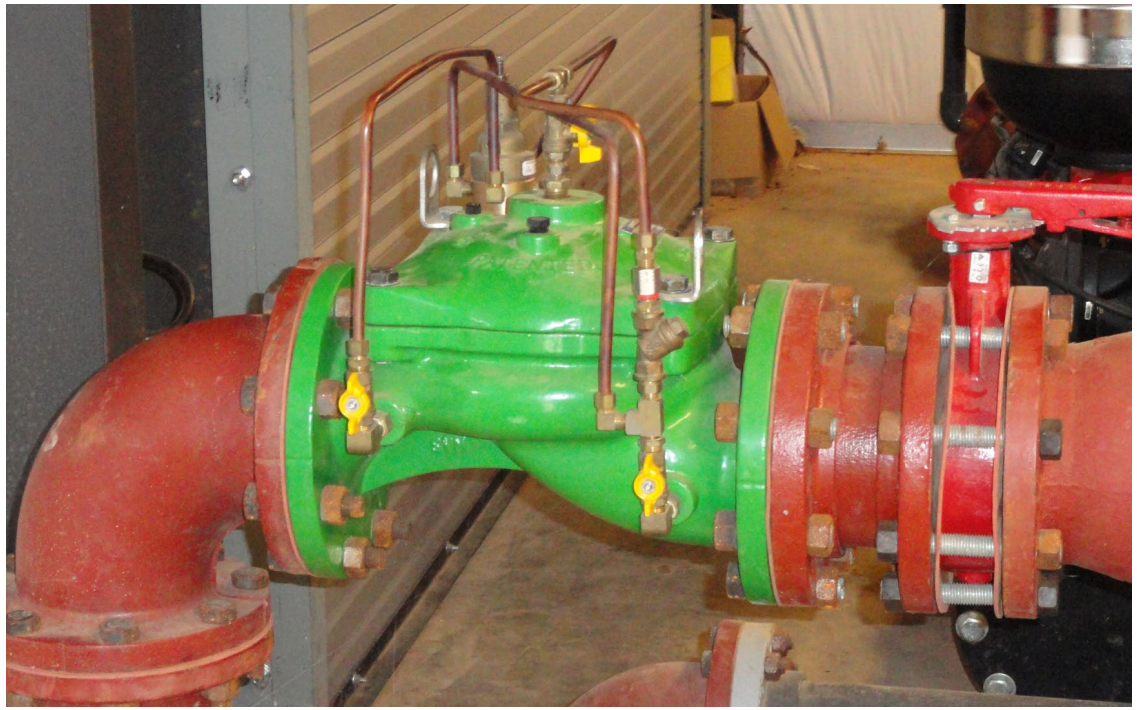


Vertical Wall Mount Valve Cluster

Valves

12” NC-PR-Main Valve

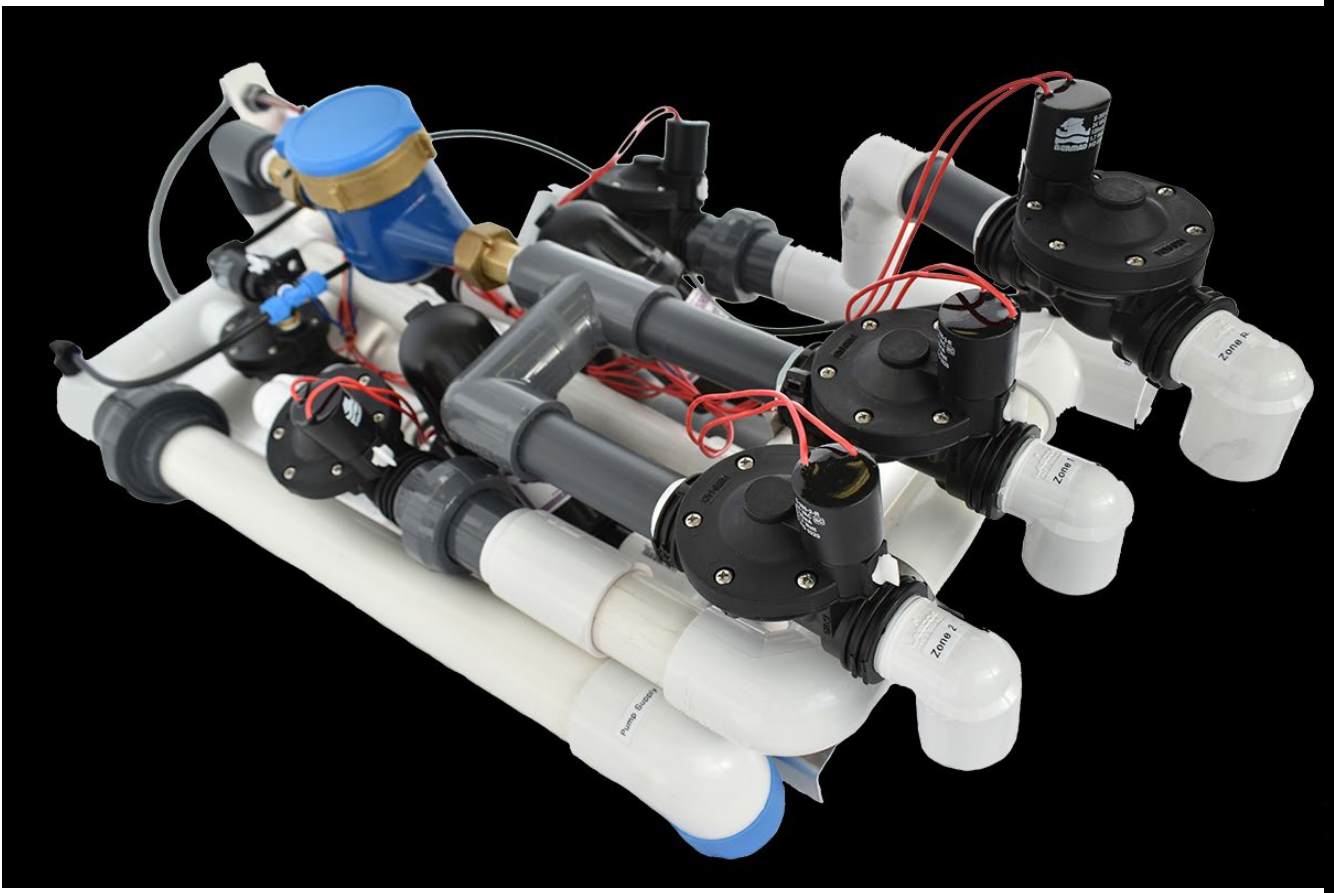
8” Pressure Relief Valve

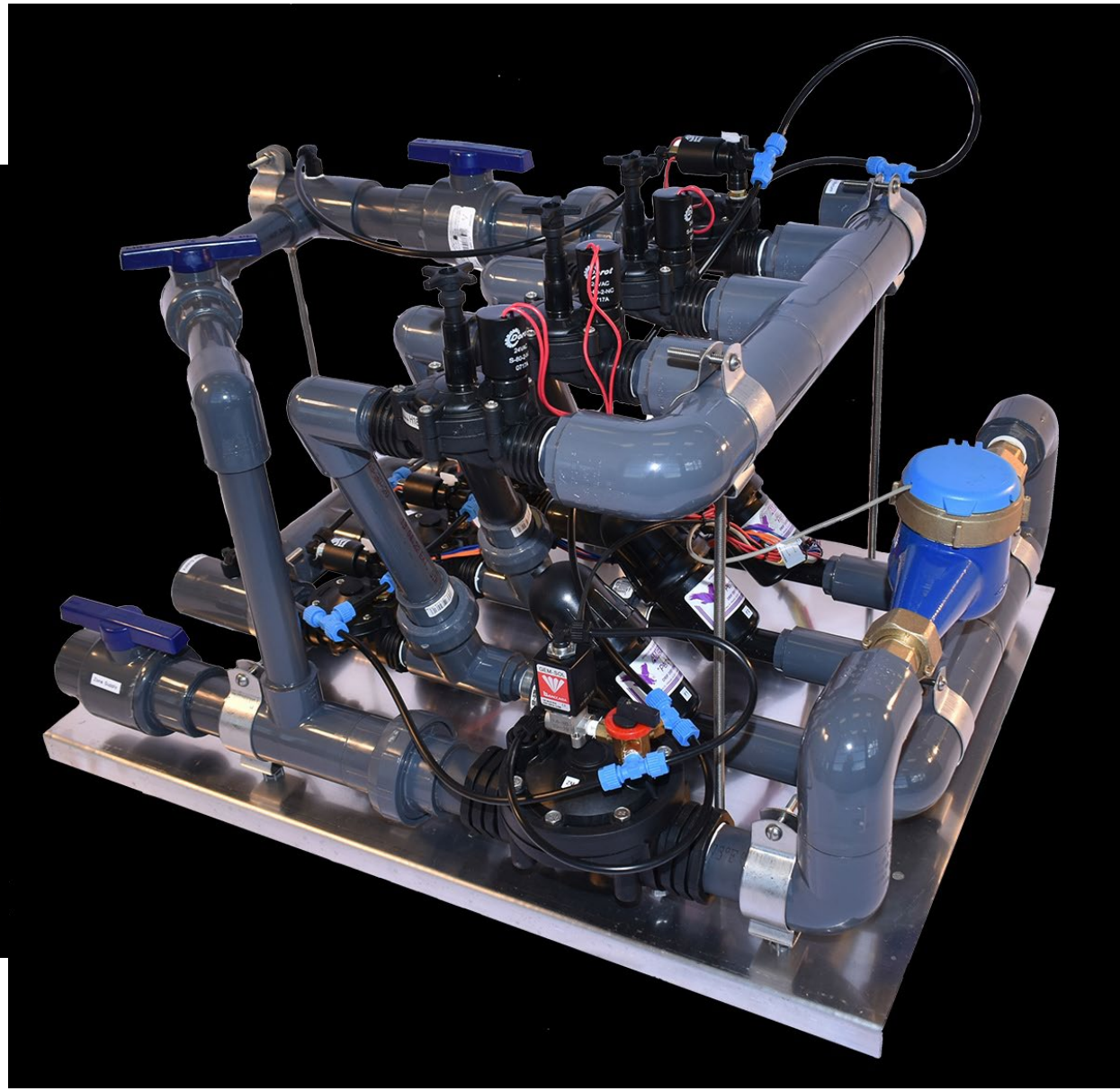


Filters

Filters

Lite-Commercial Applications





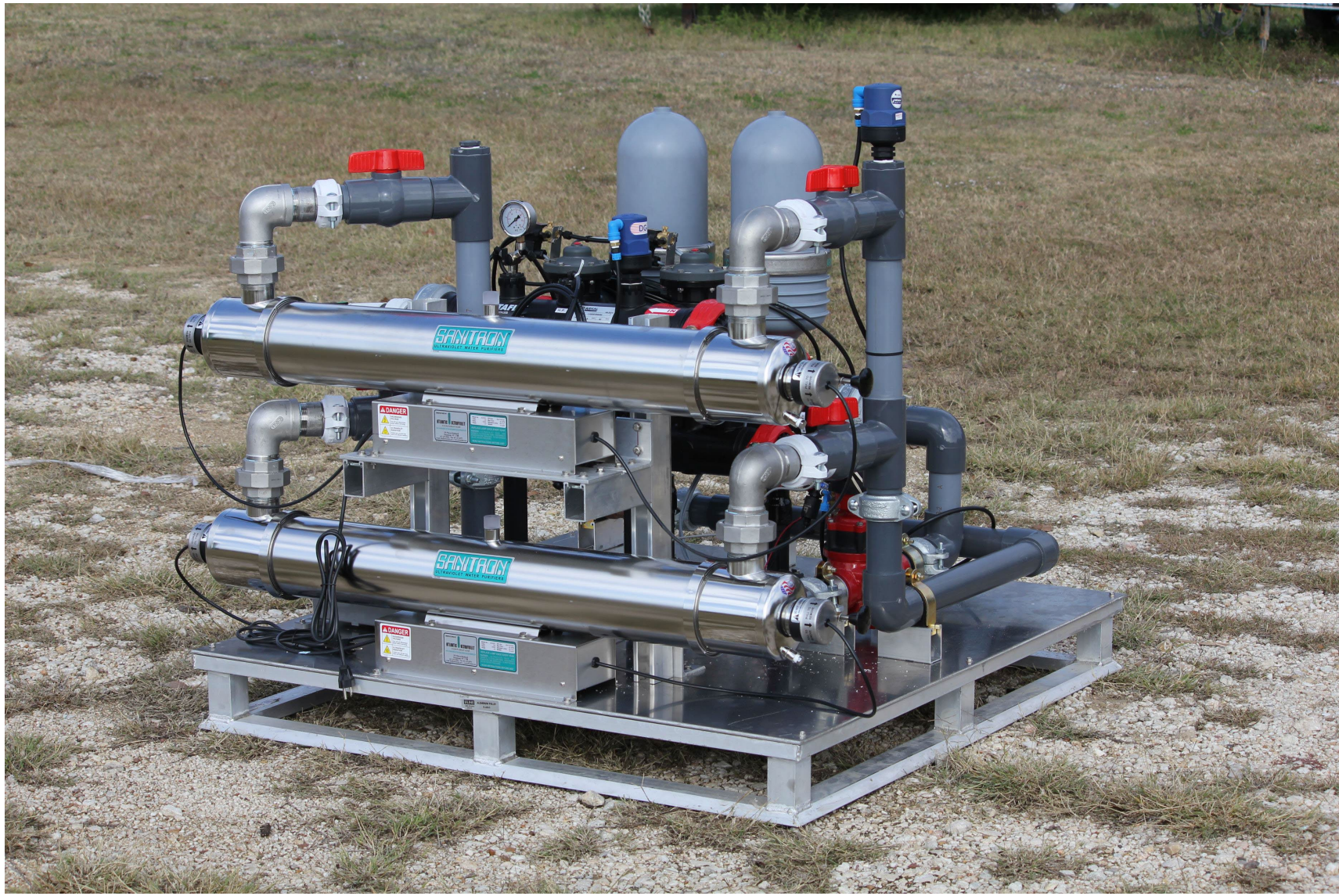
15-25 GPM

Filters

Small Commercial Applications

Institutional Applications
With Flows Up to 50 GPM
5,000 to 36,000 GPD

Can Be Equipped for Special Applications Such As Disinfection



Filters

Custom Designs to Fit Particular Installation Needs.

Daily Flow Ranges From 10,000 to 50,000 GPD

Filters

Daily Flows from
75,000 – 150,000 GPM

High Flow Screen
Filters with Scanner
Cleaning

Larger Flow Applications

www.jnmtechnologies.com

Filters

Large Subdivision and Municipality Projects

200,000 GPD to 1,000,000+ GPD

Filters

Pumps

Pumps

Vertical Turbine Pumps

Well and Cistern Pumps

Bottom Suction

Mid-Suction

Typically Used in Smaller Systems

Pumps

Self-Priming Centrifugal Pumps

Typically Used in Above Tank Applications

Flow Rates Will Be Limited

Pumps

High Flow Centrifugal Pumps

No Limit on Flow Rate

Typically Used with Flooded Suction

Pumps

High Flow Turbine Pumps

Flow Rate Is Unlimited Due to
Parallel Ganging of Pumps

Controllers

Controls

Controls

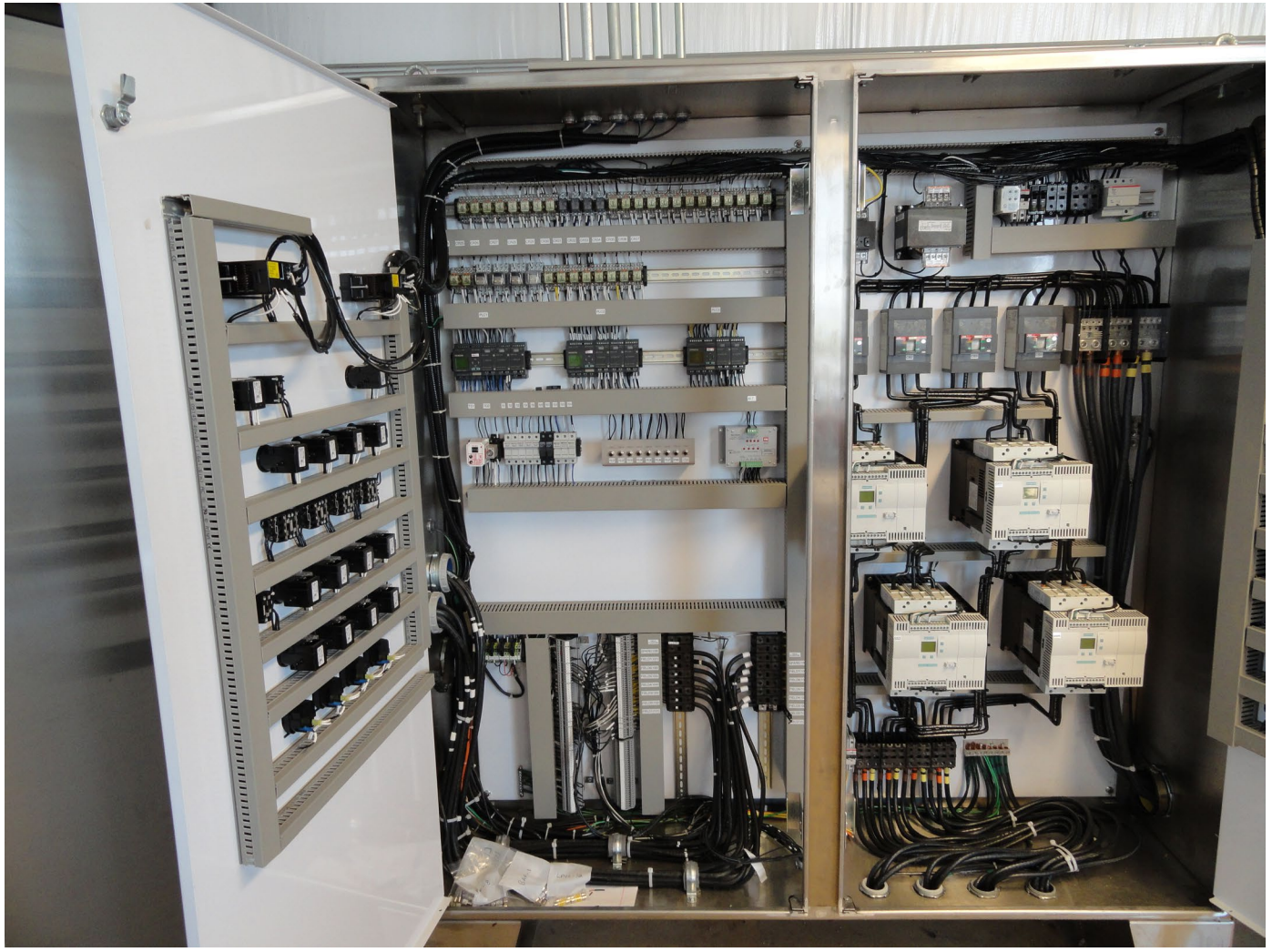

DRIP CONTROLLER
DANGER
POWER STATUS
PUMPS ON
ALARM
CLEAR ALARMS


DRIP IRRIGATION CONTROL PANEL
WARNING
WARNING


DANGER
WARNING

Controls

Controls



Controls

System Integration and O&M

System Integration

Why????

O&M

DRIP DISPERSAL OPERATIONS AND MAINTENANCE

Drip Dispersal Operations

Construction

- Follow piping installation instructions provided by the designer or piping manufacturer.
  - Flush mainline prior to connecting to drip tubing zones and manifolds. Minimize the debris that might enter into the zone and manifold systems.

Startup

- Once drip tubing is installed and connected to the distribution and return manifold it should be flushed prior to putting online.
  - Open manifold plug ends or open manifold flush valves to flush debris from the tubing and manifolds.
  - Flush the distribution manifold first leaving the flush valves or plugs on the return manifold closed or in place. If the distribution manifold is fed from the center, then flush through one end at a time leaving the opposite closed in order to force all the water and debris to the open end.
  - Reverse the process for the other end.
  - Close the distribution manifold flush valves/plugs. Repeat the process for the return manifold.
  - Be sure to allow time for the water to travel the tubing and flush out of the return manifold ends.
- Pressure test each zone and subzone.
  - Close all flush end valves/plugs prior to pressure testing.
  - Close the *return valve* isolation valve.
  - Manually open zone valves. If zone control valve box is equipped with an isolation valve, then close it prior to pressurizing the zone.
  - Open the hydraulic zone control valve and then slowly open the isolation valve. Observe the zone piping and drip tubing. Watch for wet spots indicating a joint or coupling failure. Repair any leaks prior to full pressurization of the zone.
  - Open zone isolation valve fully and allow system to fully pressurize. If no leaks are observed, then proceed to the next zone.
  - Observe and record the irrigation flow rate for the zone. Check the irrigation rate against the design. Actual value should not vary significantly unless more or less tubing was installed.
  - Open the *return valve* isolation valve.
  - Complete testing of all zones.
- Test the flushing flow of each zone.
  - Be sure the dosing tank or pond has adequate water to carry out field flush testing.
  - Start with the more distant zones in order to fill the field flush return piping.

    - Operate each zone individually from the controller or manually from the field.
    - Open the Field Flush Valve manually.
    - Set each zone to irrigate. Activate additional pumps or increase VFD speed to compensate for the extra water needed.
    - Operate the pumps in order to achieve the design Field Flush Pressure.
    - Allow the zone and field flush piping to fill and achieve flow equilibrium. This will take longer for first zone to be tested since the piping will be empty.
    - Observe and record the field flush rate of flow once flow equilibrium is achieved. Check valve against the design.
    - Field flush return rate will be Total Flow minus the recorded Irrigation Rate. Be sure that the field flush return rate is equal to the amount to achieve a flow of 1.6 gpm per distal end (equivalent to 2.0 ft/sec flushing velocity) of the drip tubing within that zone. Distal end flushing velocity should not be less than 1.5 ft/sec.
    - Continue until all zones are tested and results are recorded.
    - If flow rate values for irrigation and flushing vary greatly with the design, then check carefully against the actual tubing installed. Flow rates that vary greatly can be the result of blockage or piping or tubing breaks.
- Test the automatic controls.
    - Set all irrigation values according to the design documents.
    - Operate each zone valve from the controller in manual and automatic mode.
    - If a zone fails to open or close, then check the operation of the controller and zone valve to be sure that it is functioning properly. Construction debris can cause valve complete or partial failure. Correct problems accordingly.
    - Put system into fully automatic mode. Be sure there is adequate water in the tank or pond prior to testing in automatic.
    - Run system for a full 24 hours. Check operations periodically to be sure the controller is sequencing properly and operating for the appropriate amount of time.
    - At the end of the testing period check recorded values for each zone and match against the set values for each zone.
    - Test alarm functions of the controller using the manufacturer's recommendations.
    - Place the controller in fully automatic mode once all testing is complete and satisfactory. (Do not place system into automatic operation if the wastewater treatment facility is not fully online.)
- Normal Operations.
    - Follow the designer's instructions for the daily operation of the irrigation system.
    - Adjust irrigation parameters to meet changes in system inflow.

Irrigation System Maintenance

Pumping and Control

Daily-Pumping and Control

- Observe normal operation of the drip dispersal filter, pump and control system
  - Check the automatic operation of the dispersal system looking at controller outputs.
  - Look at flow meter reading on the screen (if equipped) and on the flow meter register (if equipped). Note any observations that appear to outside of normal flows.
  - Check pressures on the filters and filter skid.
  - Look for leaks including any standing water that is new and unexplained. Correct small leaks when they are found. Larger leaks or leaks in a major component that cannot be easily isolated will require that the repair activity be scheduled, and the system be shut down for the adequate amount of time to make the correction.
  - Check for leaks at the pump seals (above ground pumps only).
  - Be sure building vents, cooling and heating systems are operable.

Monthly-Pumping and Control

- Check zone operations from the control station.
  - Check flows to all zones. Review data for irrigation volumes going into each zone.
  - If flows into a zone are above or below what would be expected, then the zone valve should be operated manually from the controller and observed. If the flows are outside normal then field checks need to be made in order to determine the possibility of a pipe break, a parted drip lateral or emitter plugging.
  - Remove, clean and replace filter control water filter.

6 Month-Pumping and Control

- Perform advanced checks on filters, valves and sensors.
  - Observe filter differential pressure. Manually flush filters and determine if the filters returned to a clean status based on differential pressure. If they did not, then open each filter and remove and clean filters. Replace and test again.
  - Open and clean control water filters. Check for tears in screen mesh. If torn then replace.

12 Month-Pumping and Control

  - Open and inspect each filter element. Clean or replace with clean filter elements. Inspect filter cover rubber seals/O-rings and lubricate using MolyKote 111.

- Operate all solenoid valves manually. Check for stuck or hard to turn manual operators. Dismantle, clean and lubricate any manual operator showing signs of failure.
- Observe pressure gauges and replace if units are not operating correctly.
- Check system pressures with handheld pressure gauge when system is equipped with Schrader valves.
- Check irrigation controller and computer (if equipped). Look for signs of corrosion and component degradation. Run anti-virus software on computer if hooked to the internet.
- Manually operate solenoids. Open and clean if there is resistance in solenoid operator or hesitation in valve operations. Check upper and lower rubber seals on plunger. Replace plunger if rubber is missing, torn or cracked.

Five Year-Pumping and Control

- Replace all gel-cell batteries in backup or power usage such as the ACE controller and RTUs. (if installed)
- Replace UPS for controller and computer. (if equipped)
- Remove and replace filter cap O-ring seal.

7 Year-Pumping and Control

- Remove and replace all solenoid operators on filter and pump skid.

10 Year-Pumping and Control

- Remove and replace filter flush valve diaphragm, control stem, seals and bottom bung and mount.
- Remove and replace diaphragm and spring on field flush return valve.
- Remove and replace filter spine.
- Remove and replace filter ring discs.
- Remove and replace control water filter.

Field

Daily-Field

- Observe field components including valves, drip tubing and main piping
  - Observe field areas and make note of excessively green areas and areas showing stress due to a lack of water.
  - Make note of any water on the surface. Small areas may be a failed dripper or damage caused by rodents or equipment.
  - Look for signs of animal disturbance in the zones. If possible, trap or exterminate any animal causing damage.

Monthly-Field

- Check control systems and devices.
  - Check that valve boxes are not being lost in the cover crop. Clear away excessive vegetation from around the zone control, return and air/vacuum relief valve boxes.
  - Check RTU locations and look for excessive vegetation growth that might cover the units and remove vegetation. (if equipped)

- Clean solar collectors if RTU is installed and uses solar power.

6-Month-Field

- Check for electrical and weather tight integrity on RTUs.
- Open field valve boxes and clear out any excessive soil or vegetation that might have accumulated in it.
- Manually operate all field valves. Repair or replace manual operators.
- Manually operate all field isolation valves.
- Inspect for damage to wiring and hydraulic control tubing.

12 Month-Field

- Open air/vacuum relief valve box and inspect valve. If unit is leaking remove, repair or replace it.
- Operate irrigation system and check differential pressure across the tubing using Schrader valves found on the air/vacuum relief valves. Compare results to benchmark readings taken at startup.
- Manually operate solenoids. Open and clean if there is resistance in solenoid operator or hesitation in valve operations. Check upper and lower rubber seals on plunger. Replace plunger if rubber is missing, torn or cracked.

Seven Year-Field

- Replace all zone valve solenoids. Can be done over a period of one or two years.

10 Year-Field

- Remove and replace all field valve diaphragms and springs.
- Remove and replace Guardian air/vacuum relief valves.

NOTE: For advanced filter maintenance and repair, refer to the manufacturers O&M manual for special maintenance items not addressed in the above list of duties.

DRIP DISPERSAL OPERATIONS AND MAINTENANCE

Drip Dispersal Operations

Construction

- Follow piping installation instructions provided by the designer or piping manufacturer.

Startup

- Once drip tubing is installed and connected to the distribution and return manifold it should be flushed prior to putting online.
- Pressure test each zone and subzone.
- Test the flushing flow of each zone.
- Test the automatic controls.
- Normal Operations.

Irrigation System Maintenance

Pumping and Control

Daily-Pumping and Control

- Observe normal operation of the drip dispersal filter, pump and control system.

Monthly-Pumping and Control

- Check zone operations from the control station.

6 Month-Pumping and Control

- Perform advanced checks on filters, valves, and sensors.

12 Month-Pumping and Control

5 Year-Pumping and Control

7 Year-Pumping and Control

10 Year-Pumping and Control

Field

Daily-Field

- Observe field components including valves, drip tubing and main piping.

Monthly-Field

- Check control systems and devices.

6-Month-Field

12 Month-Field

7 Year-Field

10 Year-Field

NOWRA

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Questions

For More Information

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