

**RELIANT**

**Water Technologies**

**Eliminating FOG and Odor  
in the Collection System**

Gage, LLC

[www.gagellc.com](http://www.gagellc.com)

804-335-5956

**The Collection System  
is the Beginning of the  
Waste Treatment  
System for any Village,  
Town or City**

# But – there are problems for lift stations

- Odor is the first, and a critical, problem
  - Caused by –
    - It *is* wastewater
    - Septicity – stagnant water
    - Anaerobic – nitrifiers
      - Scum on walls
    - Corrosive H<sub>2</sub>S
      - Sulfur based constituents
      - *Thiobacillus sp.* In concrete wet wells

# The Problems for Lift Stations (cont'd)

- **Fats, oils and grease (FOG) coagulation**
  - **Build up of coagulated FOG causes –**
    - **Lift station increased expensive maintenance requirements**
    - **Fouled or damaged float switch cables**
    - **Plugged connector lines and/or force mains**
    - **Clogged/damaged force main air relief valve systems**
    - **Sending FOG to the WWTP**



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# Plugged connector lines and/or force mains





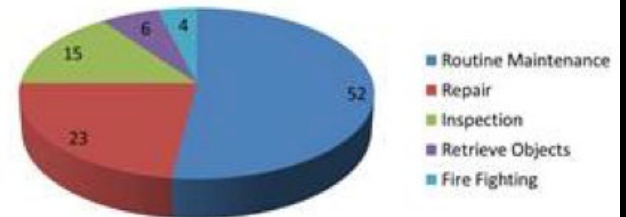
# Air Relief Valve Maintenance



# Confined space safety issues



Related Deaths/100 Reasons for Entry into Confined Spaces





**Over the past four decades there have been many attempts to address wet well problems –**

- Well water mixing**
- Fine bubble aeration**
- Bio-augmentation**
- Odor masking chemicals**
- Air scrubbing systems**

# To be a Minimal Maintenance, Pre-Treatment Part of the Wastewater System - Wet Wells Require –

- An indigenous aerobic microbial population
- High levels of oxygen
  - Oxidize chemical constituents
  - Keep H<sub>2</sub>S from forming
- Enough surface action to keep floatable solids on the top of the water
  - A FOG emulsifier or homogenizer
- Suction off the bottom for grit removal
- No air should get to pump volutes

**In 2014 a biologist began prototype trials on a new technology specific to the problems found in collection system wet wells**

**By the end of 2015 a final design had been proven in 8 different sized lift stations**

# **ALL of the aforementioned criteria had been met during the trials**

- **High levels of surface agitation**
- **High levels of dissolved oxygen – in excess of 3 PPM – all day, every day**
- **No air bubbles leaving the bottom of the device**
- **High vacuum on the bottom to lift sand and sludge for pump evacuation**
- **Minimal maintenance**

# In 2016 the Wet Well Wizard was Introduced



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# Specifics – the Wizard



- An Ejector – not an “aerator”
  - Patented internal ‘cleaving baffles”
  - Baffles cause large bubbles to spin viciously – cuts through FOG quickly
  - FOG is emulsified (any depth) overnight
- No bubbles below 24 inches – ever!
- A vacuum is developed on the bottom for –
  - Lifting grit and sludge for pump evacuation
- Ten pound stainless steel base keeps the unit vertical
- HDPE body and baffles with all 316L stainless steel hardware
- Over 1000 in service around the world
- Three patents with one patent pending

# Specifics - The Air Source



- From 1.5HP to 10HP regenerative blower
- Multiple Ejectors (Wizards) on each sized blower for large wet wells
- Low volume, high pressure blower
- 316L stainless steel manifold
- Inches of water gauge
- Pressure Relief Valve
- Polyester or stainless steel filter elements
- IP65 motor protection

# Specifics - The Supporting Hose



- 3-ply reinforced 1" ID EPDM Hose
- All connections are stainless steel 1" Cam Loc fittings
- All connections are locked with stainless steel Cotter Keys



Locking fiberglass weather cover

Open ended weather protection cover



# This Ejector is Designed to Aggressively Mix the Wet Well With High Volumes of Air

- The unique bubble cleaving baffles make the bubbles spin and cut as they rise
- This aggressive aeration action forces the oxidation of chemicals and wastes to eliminate odors and the buildup of H<sub>2</sub>S
- All of the action in the well is above the Wizard, no air gets down to the pump intake to cause cavitation.
- A vacuum is generated at the bottom to lift grit and sludge for the pumps to move downline.

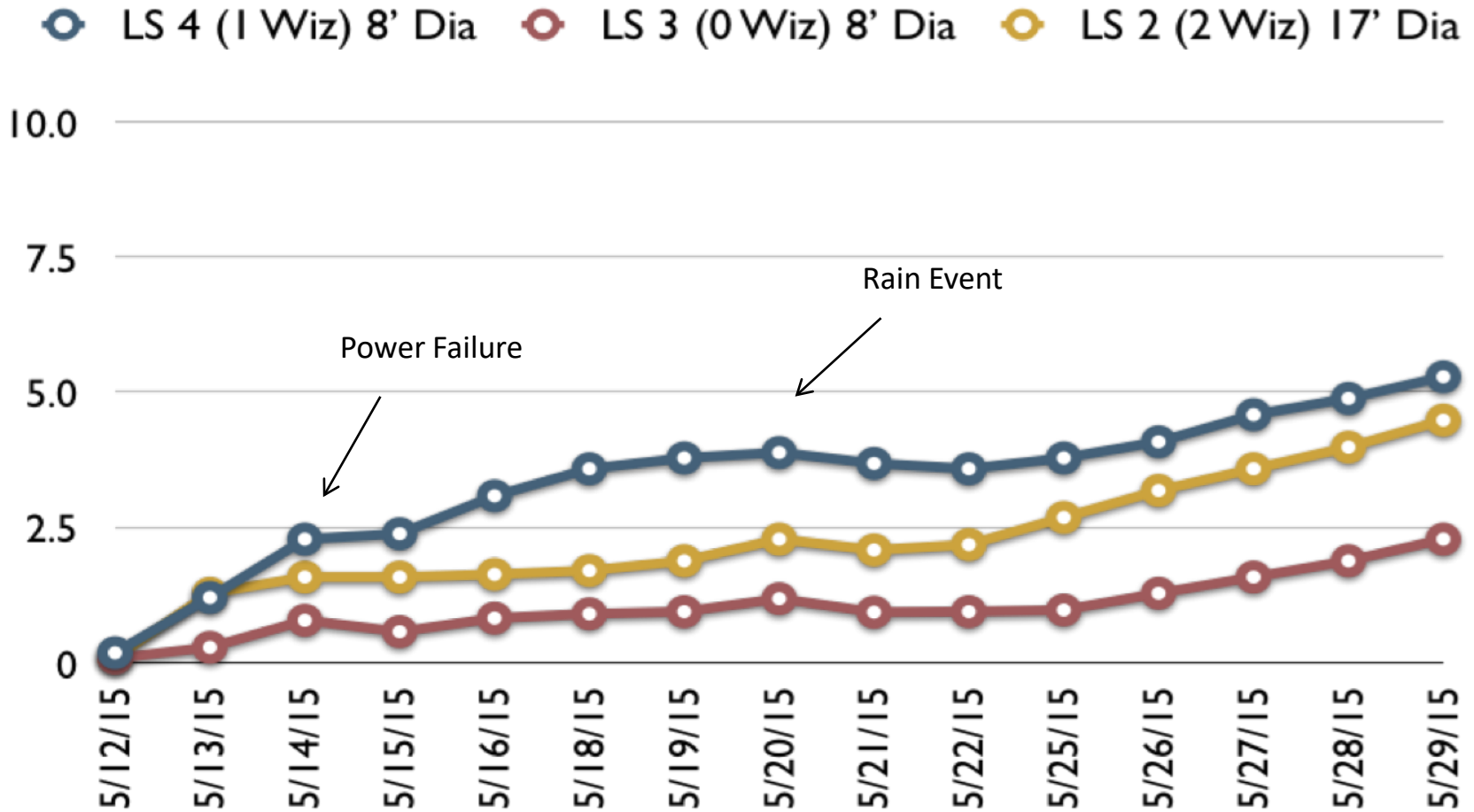


# During Prototype Testing ORP and DO Were Used to Identify Long Term Success

- ORP in the well water is an indicator of microbial activity.
- DO level in the well water informs us as to the health of the water – and is an indicator of the ability of H<sub>2</sub>S to exist.

# Town 7 (2700 Population) Wiz Trials - DO

- (1) 1.4 Mi between LS 4 to LS 3; .9 Mi between LS 3 to LS 2
- (2) LS 4 had a 9" grease cap on 5/12 - No grease cap on 5/13
- (3) LS 2 had a 15" grease cap on 5/12 - No grease cap on 5/13

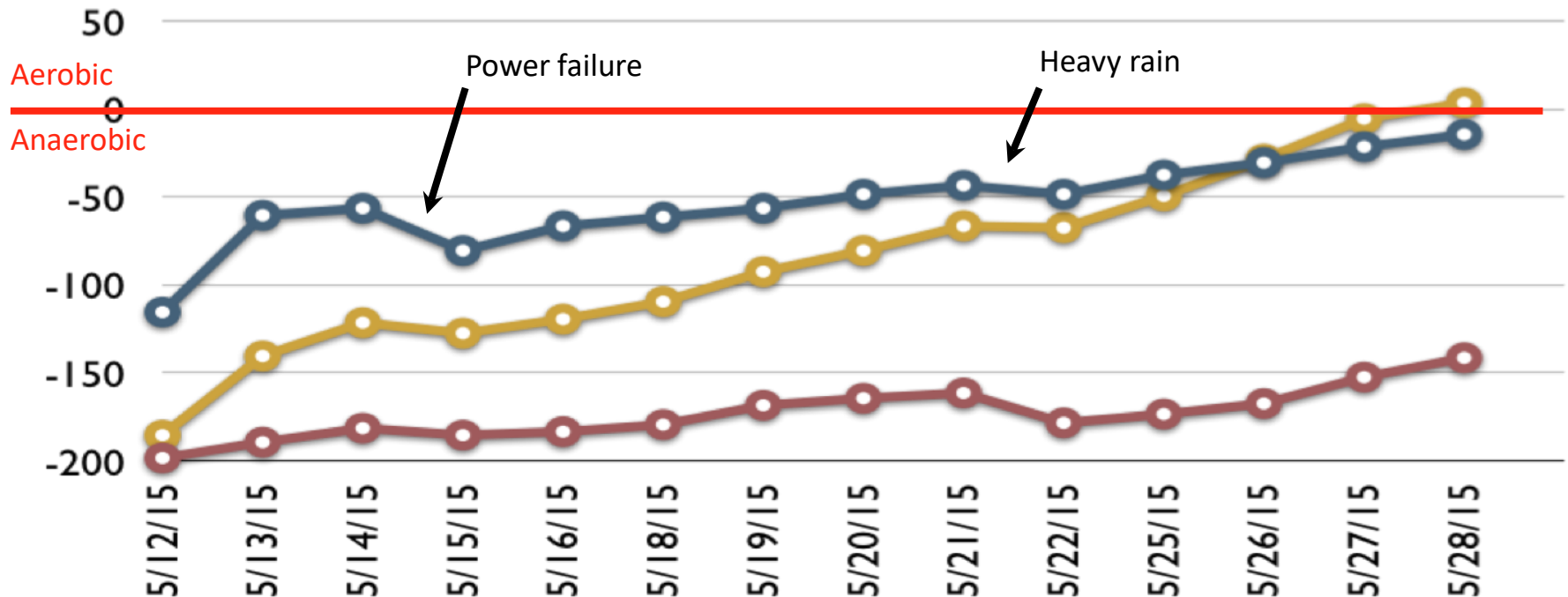


# Town 7 (2700 Population) Wizard Trials - ORP

## NOTES

- (1) 1.4 Mi between LS 4 to LS 3; .9 Mi between LS 3 to LS 2
- (2) LS 4 had a 9" grease cap on 5/12 - No grease cap on 5/13
- (3) LS 2 had a 15" grease cap on 5/12 - No grease cap on 5/13

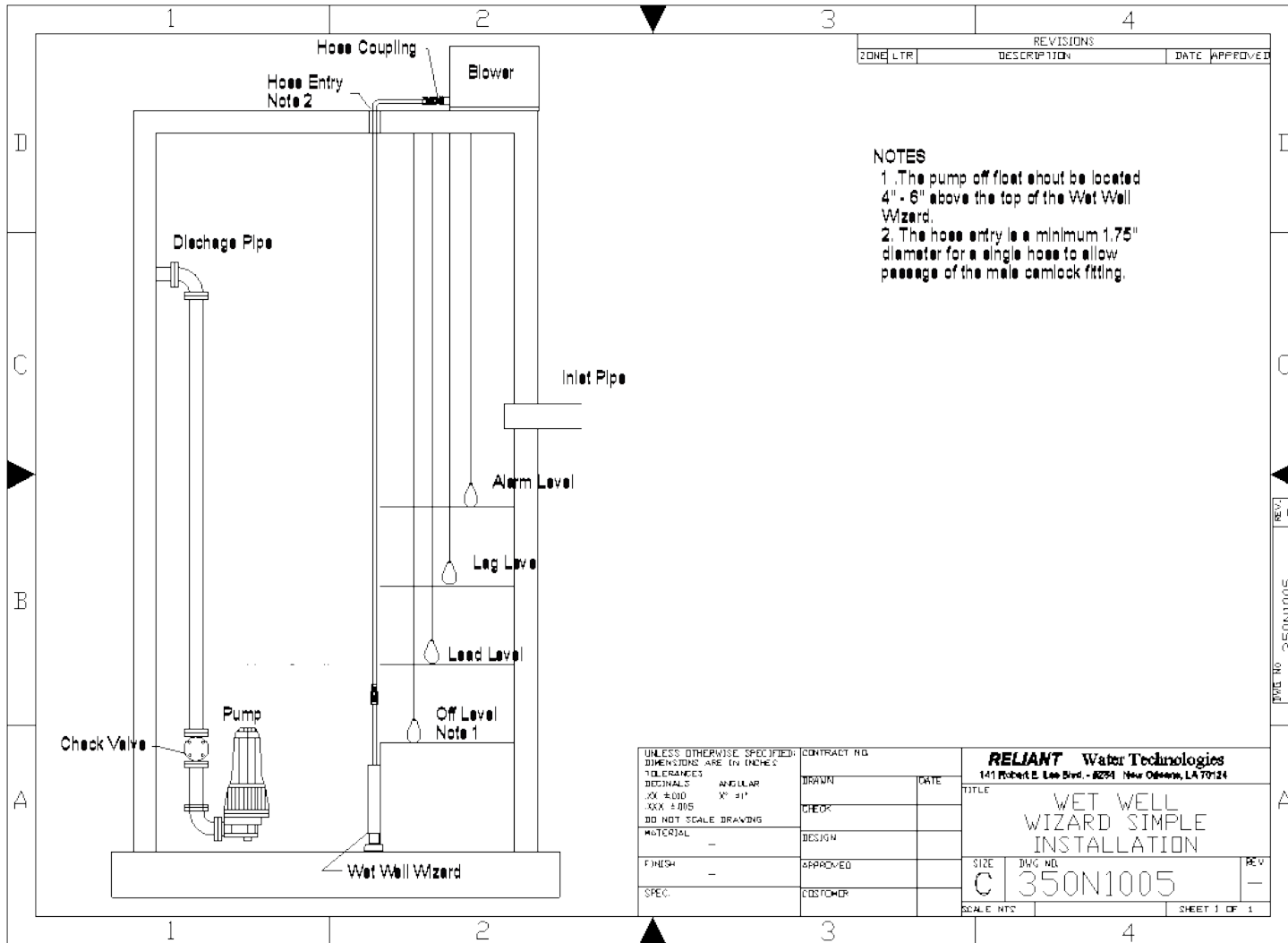
○ LS4 (1 Wiz)    ○ LS 3 (0 Wiz)    ○ LS 2 (2 Wiz)



100 Cap

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# COMMON INSTALLATIONS



REVISIONS			
ZONE/LTR	DESCRIPTION	DATE	APPROVED

**NOTES**  
 1. The pump off float should be located 4" - 6" above the top of the Wet Well Wizard.  
 2. The hose entry is a minimum 1.75" diameter for a single hose to allow passage of the male camlock fitting.

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES DECIMALS      ANGULAR .XX ±.000      ° ±1° XXX ±.005 DO NOT SCALE DRAWING MATERIAL      -	CONTRACT NO.		<b>RELIANT Water Technologies</b>	
	DRAWN		141 Robert E. Lee Blvd. - 8291 New Orleans, LA 70114	
	CHECK		TITLE	
	DESIGN		WET WELL WIZARD SIMPLE INSTALLATION	
	APPROVED		SIZE	DWG. NO.
COSTUMER		C	350N1005	
SPEC.		SCALE: NTS		SHEET 1 OF 1

REV: -  
 DWG. NO. 350N1005



# COMMON INSTALLATIONS (Cont'd)



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# COMMON INSTALLATIONS (Cont'd)





# COMMON INSTALLATIONS (Cont'd)





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# COMMON INSTALLATIONS (Cont'd)





# COMMON INSTALLATIONS (Cont'd)





# Interesting Oddities – Fog Balls



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## Necessary Information to Accompany Your Order, or for a Firm Quote

1. How deep is your lift station? \_\_\_\_\_ Lift Station Name \_\_\_\_\_
2. What is the diameter, or water surface dimensions, of the wet well for that lift station? \_\_\_\_\_  
A single Wizard will handle wet wells up to 8 feet in diameter. Two Wizards will handle wet wells up to 15 feet in diameter. In this case the same blower will work for both Wizards. All that we supply extra is the extra Wizard, another length of hose, and the necessary blower fittings to connect both Wizards to the same blower. Larger wells possible
3. What is the minimum water level in the wet well (pump shutoff depth)? \_\_\_\_\_
4. What is the maximum water level in the wet well (pump-on depth)? \_\_\_\_\_
5. Is there a building at the lift station that houses the power panel? \_\_\_\_\_ Is it possible to locate the blower inside a building? If not, it is suggested that the HDPE blower weather hood be considered. If the area is susceptible to H<sub>2</sub>S fumes, the stainless steel fiber hood, fiber element and painted fiber base should be considered.
6. Distance, in feet, from the power panel to the bottom of the wet well? \_\_\_\_\_ Thirty five feet of air hose is supplied with each Wizard. This hose must reach from the bottom of the wet well to the location where the blower will be located. There should be at least one to two feet of slack in the air hose.
7. Voltage and phase, and Hz of the power for your lift station? \_\_\_\_\_ Single and three phase blowers, any Hz are standard.
8. Does the lift station outside pad have a flood potential? \_\_\_\_\_ If there is a chance for flooding of the lift station surface pad, the blower should be placed on cinder blocks or other means of lifting it above high water level.
9. Primary problem – H<sub>2</sub>S odor \_\_\_\_\_ FOG Cap \_\_\_\_\_ Wall scum \_\_\_\_\_ Other \_\_\_\_\_

### WELCOME TO THE WORLD OF MINIMAL MAINTENANCE WET WELLS

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#### **RELIANT**

Water Technologies

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# Life Cycle Costs

- Man Hours/wet well maintenance
- Replacement of pipes due to H<sub>2</sub>S corrosion/decreased diameter of pipe due to FOG buildup
- Lift station rehabilitation due to H<sub>2</sub>S corrosion
- Premature replacement of pumps in lift stations



# THANK YOU

## Any Questions?

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