

# LIFT STATIONS IMPORTANCE OF PUMP PROTECTION

Grinding and screening  
Presented By:  
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# UPSTREAM CONDITIONS

Factors to consider:

- Where is your flow coming from
- How much flow are you getting and when
- Are you connected to a storm sewer  
(Combined system)



# UPSTREAM CONDITIONS

- ▣ WHERE IS YOUR FLOW COMING FROM



# UPSTREAM CONDITIONS

- ▣ By knowing where your flow is coming from, you can be more aware of what might be coming down the pipe.
- ▣ Factors to consider:
  - ▣ - Expect any large debris from construction.
  - ▣ - Expect any heavy ragging: nursing home, prisons.



# LARGE DEBRIS

## COMPOSTION OF PIPING

- Is it ductile Iron
- Is it clay tile

## COMPOSTTION OF MANHOLES

- Brick
- Concrete
- PVC

**\*\* Locking lids for manholes\*\***



# LARGE DEBRIS

Know your system and the contributors. The “who and what”

- Identify the problematic locations: manholes

Investigate upstream for potential hazards

- Eliminate some if possible.... Locking





# DIAPERS AND WIPES

- ▣ FLUSHABLE..... YES
- ▣ DEGRADABLE... Takes longer than the run to your plant to degrade!!





# THE RIGHT TOOLS TO WIPE OUT THE WIPES CRISIS







# How Big is the Problem?

- Increased maintenance - \$20-30k/year/station
- Increased electrical costs - \$30k/year/station for Vancouver, WA
- Seattle spends \$500,000/year removing wipes from pump stations



# What's Causing the Clog?

40% paper towels  
20% baby wipes  
15% cleaning wipes

14% feminine products  
8% "flushable" wipes

# Handling Pumps

## How they work

- ▣ Screw-type impeller uses the leading edges to shear the solids (Flygt)
- ▣ Vortex-style impeller pushes the solids toward the discharge with little contact to impeller (KSB, ABS & Fairbanks)



## Considerations

- ▣ Moves the problem to **downstream equipment**
  - Required to change out all pumps
- ▣ Rated to pass a spherical non-compressible 3" solid (a baseball)
- ▣ Inefficient hydraulically (vortex)
  - Requires more energy to move the same amount of water
- ▣ Potential for reweaving



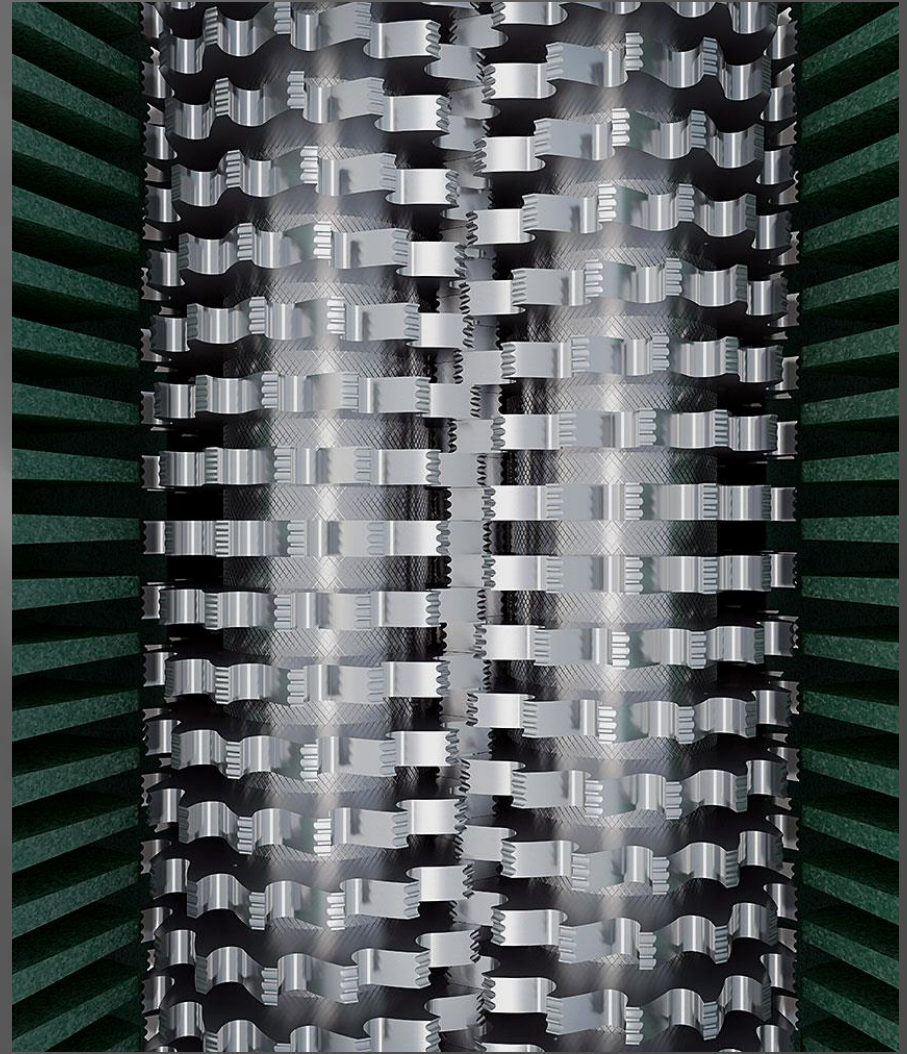


# Reweaving

- Whole and cut wipes can “Reweave” in the collections systems
  - Form “mats” in wet wells
  - Form “ropes” in piping
- Problem is worse when combined with FOG and hair
- “Ragballs”, “mats” and “ropes” can not be pumped once they form



# Re-Engineering Sewage Grinders





# 17 Tooth Serrated Cutters



Typical Grinders

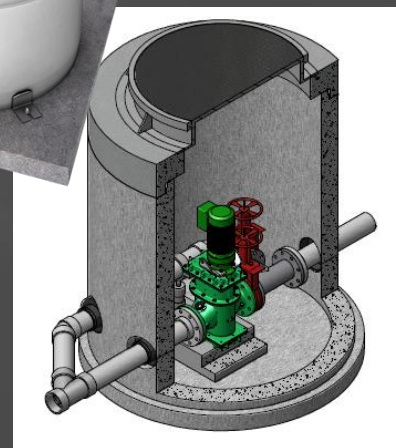
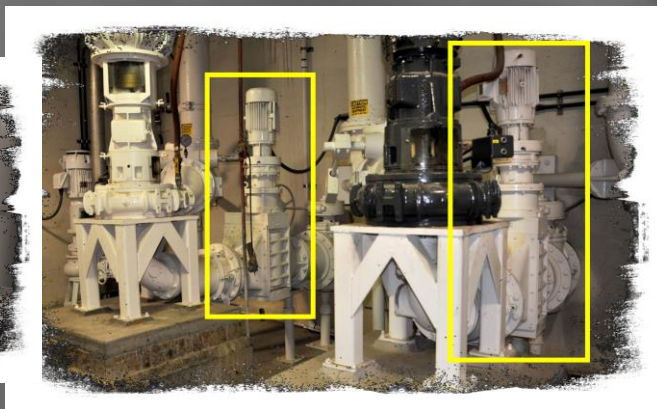
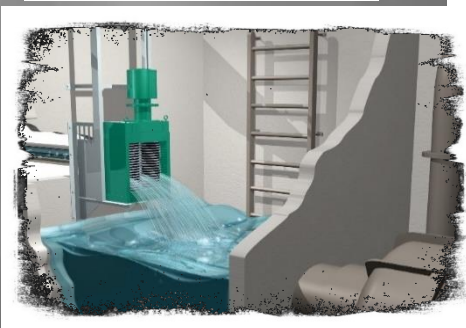
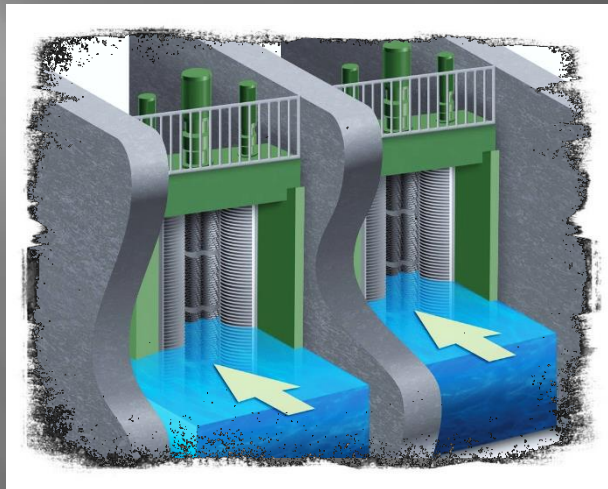


17 tooth

- Cuts 2 directions
- Works against knurled spacer
- Shafts Operating at different speeds
- 51% Reduction in Long Strips



# Grinders Can Fit Almost Anywhere



# Lift Station Equipment Solutions for Wipes

## Option 1

Pump Wipes to Headworks

Solids  
Handling  
Pump

Chopper  
Pump

Grinder  
with  
Pump

## Option 2

Remove  
Wipes

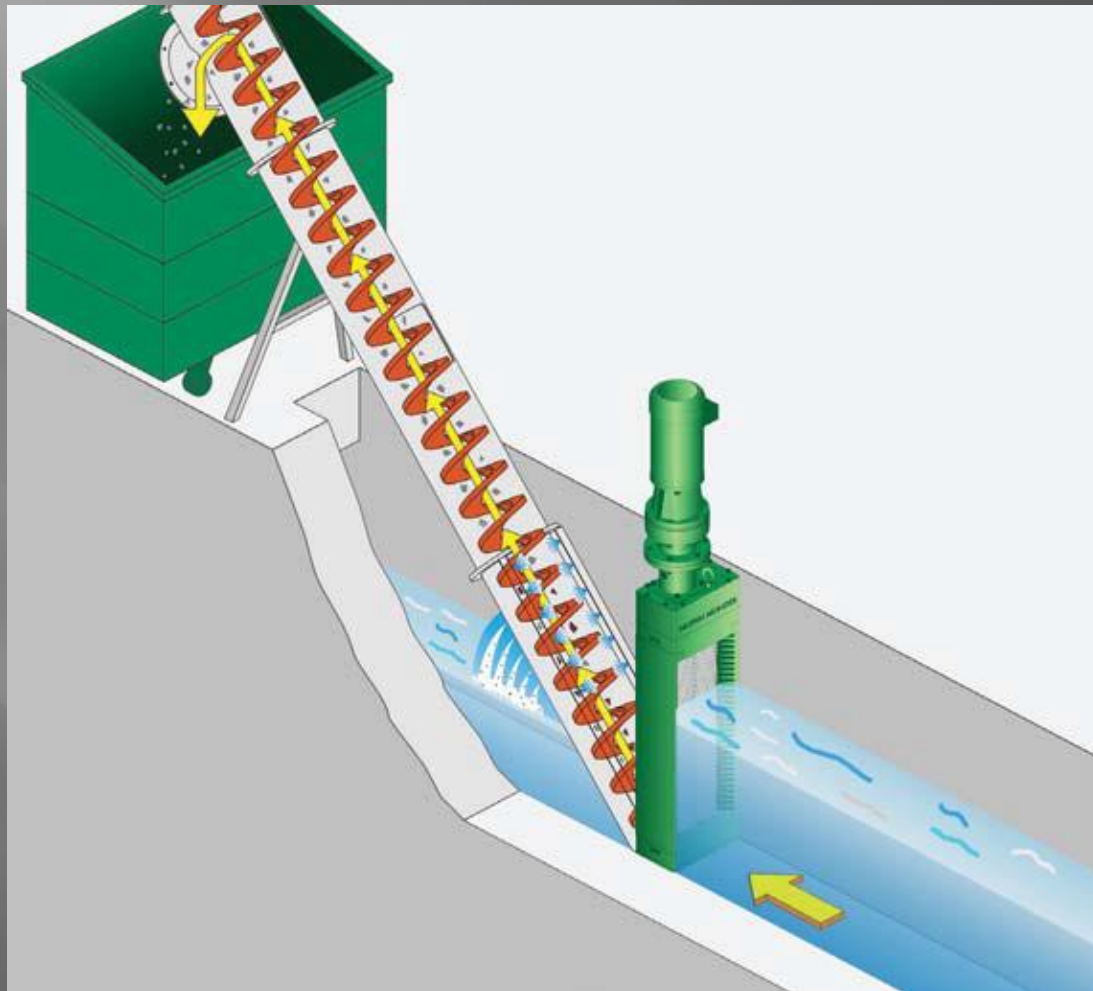
Screens &  
Augers

# SCREENING





# GRIND SCREEN AND CONVEY





# SCREENING

Ask yourself this question:

- Where is the most practical place to screen.

At the pump station? Or at the plant?

Factors to consider

- Having a dumpster at the location and access for trash truck.
- Man hours in bringing back the bagged debris to plant for disposal.



# TO SCREEN OR NOT TO SCREEN

More common for smaller systems to screen at a plant rather than a lift station.



# GRIND IT OUT



# GRIND IT OUT

Why Grinding?????

- No debris to haul off nor man hours associated with.
- Pumps protected from large debris
- Convenience



# WHAT TO KNOW AND HOW TO CHOOSE

What you need to know for design and sizing:

- Flow: Max and level of
- What are my channel dimensions
- Power available: 230, 480.....
- Levels upstream to protect: if any
- Characteristics of flow: industrial, corrosive chemicals in stream
- How fine do I want my debris
- Heavy grit (storm flow)





# OPTIONS FOR GRINDING IT OUT

Where do I put the grinder:

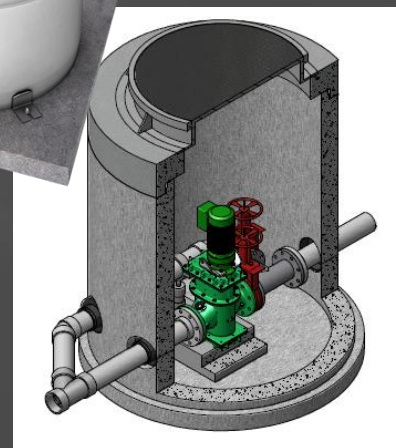
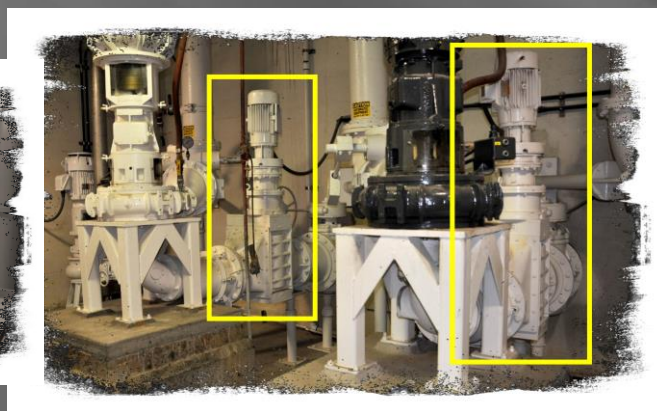
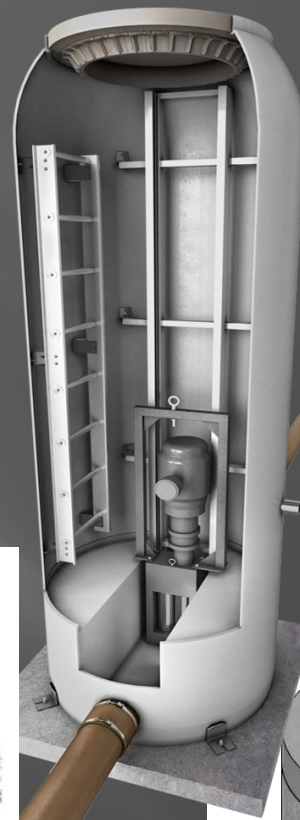
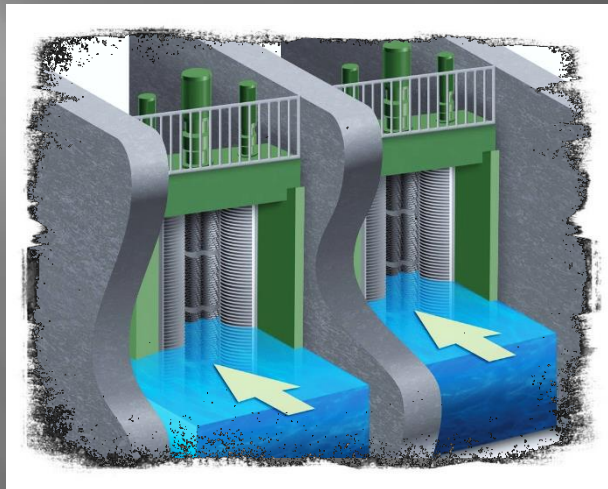
- Manhole
- Channel
- Well itself
- In Line



We have a solution for each one of these options.



# Grinders Can Fit Almost Anywhere



# CAN MY GRINDER BE UNDERWATER

- Answer is yes. JWC has come up with an immersible motor that can be submerged up to 30 feet for a seven day period.

Making it possible for a grinder to be in a wet well and still run. Note: check elevations.

- Corrosive conditions.... We've got that covered.



# H2S

We can offer cutters in stainless and also epoxy coat the grinder itself for added protection against corrosiveness.





# OVERVIEW

- How can I protect my pumps
- Do I screen or do I grind
- How fine do I need to grind
- Do I receive rags: a lot
- Is it a combined system: gritty material
- Where do I put my grinder: well, pipe, channel
- Possibility of being submerged
- Corrosive environment



# PUMPS ARE WORTH PROTECTING

Main reason we grind is to protect the pumps.

Costs associated with pumps down:

- Man hours and costs to pull pump
- Repair expenses
- Overflow reporting and possible fines

Grinders are a great line of defense against heavy debris that can cause headaches.



# SO GET PROTECTED



# THANK YOU FOR YOUR TIME

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