JWC Environmental®
Trust Monster Quality™

The Right Tools to Wipe out the Wipes Crisis

JWC Environmental

Agenda:

1. What's Up With Wipes?
2. Pathways to a Solution
3. New Approach

What's Up With Wipes?

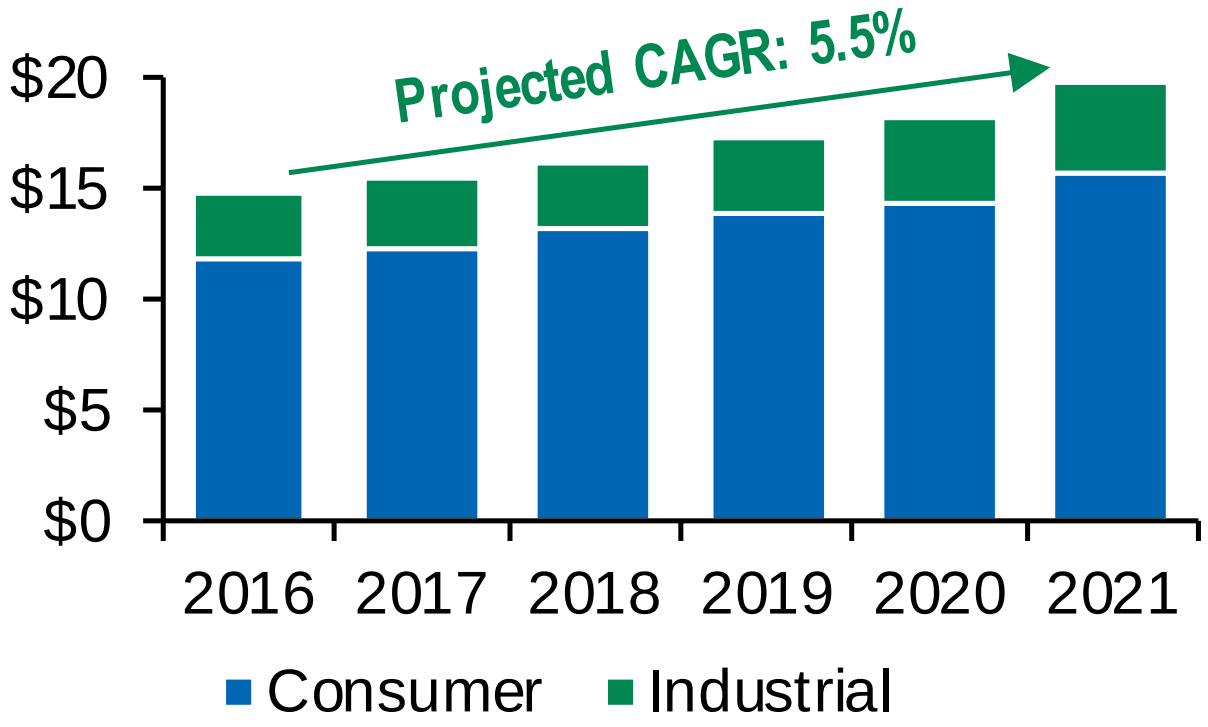
Introduces in early 2000's for cleaning and bathroom use

Wipes Fill a Need

- Hygienic
- Convenient
- High Performance

All at an attractive Price Point

Consumer & Industrial Wipes Sales 2016-2021 ($ millions)

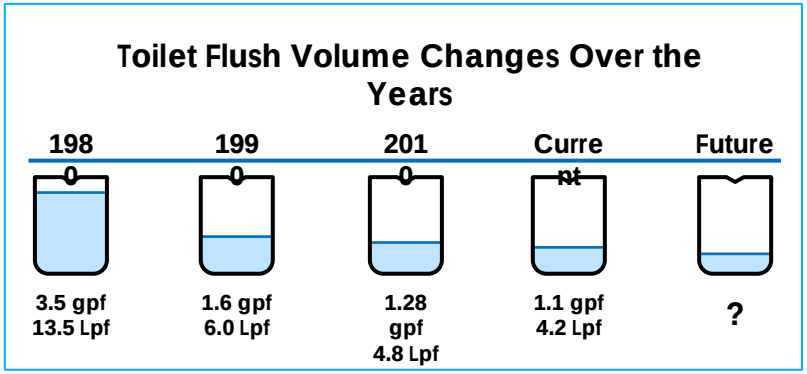


5.5% Annual Growth Rate

- $14 Billion per year business in 2016

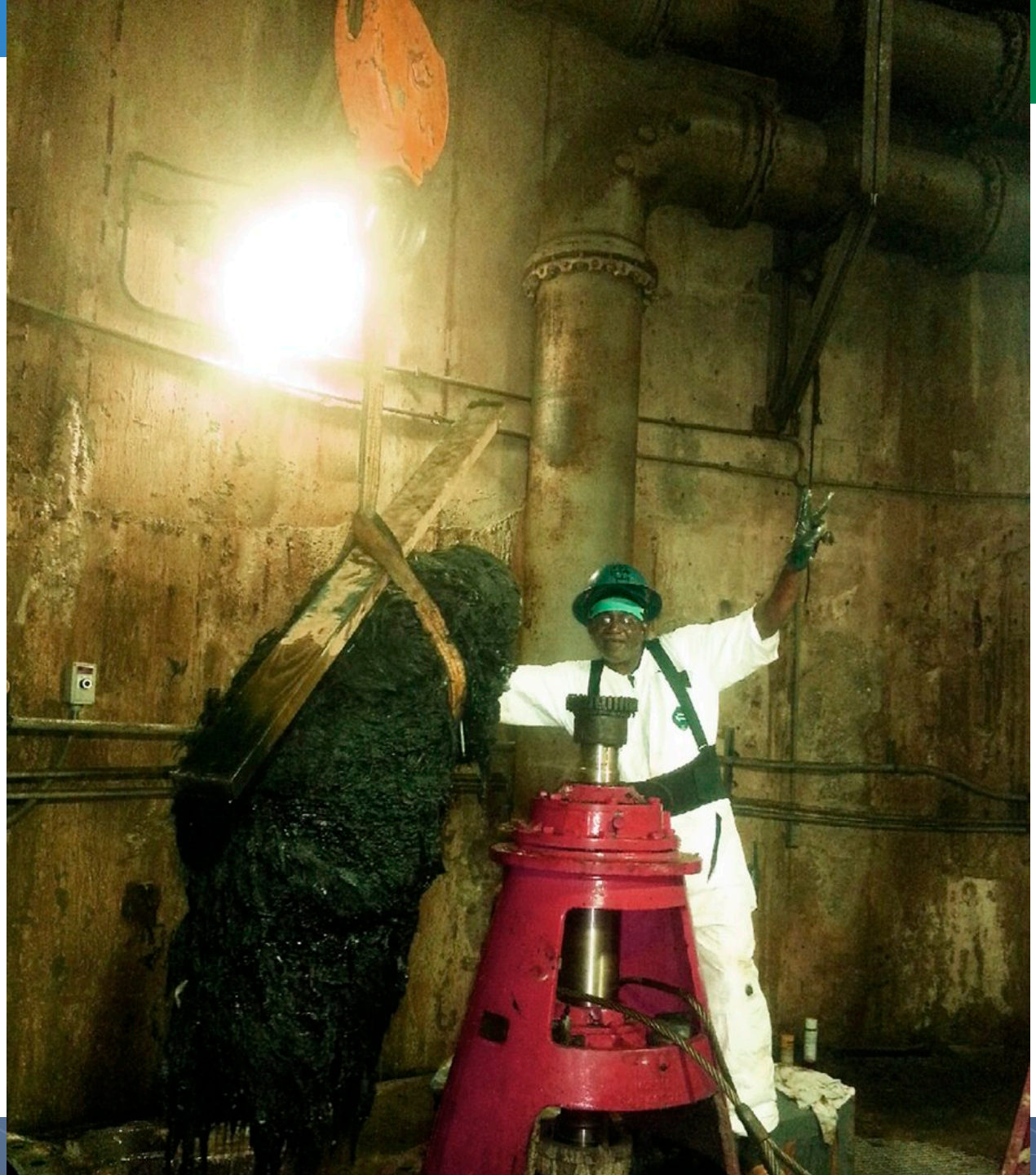
Adoption of Low-Flow Toilets

- New toilets are limited to a maximum of 1.6 gallons per flush, instead of the legacy 3.5 to 5 gallons
- Since the efficiency standards became law, research shows the United States saves 7 billion gallons of water a day
- Low-Flow toilets have led to higher proportions of solids in the wastewater stream, leading to a potentially harmful effect on downstream pumps and equipment
- Solid waste concentration will increase as residential toilets continue to become more efficient



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



Disposable vs. Flushable vs. Dispersible

- Early Wipes Technology – Spunlaced Nonwovens
  - Rayon, Polyester, Nylon with Cellulose
  - Described by some as “Indestructible pieces of plastic”

Disposable

Designed for single use

Flushable

Will not clog you toilet & plumbing?

or

Will not harm septic or municipal system?

Dispersible

Will breakdown in sewer…..

Like toilet paper?

Some time in the future?

What's Causing the Clog?

40% paper towels
20% baby wipes
15% cleaning wipes
14% feminine products
8% "**flushables"** wipes

50% of Baby Wipes
Purchased by Households With No Children

How Will We Prevent This?

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

Solids Handling Pumps

How they work

- Screw-type impeller uses the leading edges to shear the solids
- Vortex-style impeller pushes the solids toward the discharge with little contact to impeller (Hydromatic, Fairbanks, Wilo)

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

Chopper Pumps

How they work

- Operate at High speed/Low cutting torque
- Blades and wear plates chop like a macerator

Considerations

- Pumps and Chops in a single unit
  - Not optimized for both
- Not able to handle tougher solids
  - Speed to pump reduces torque to cut
- Higher energy costs
  - Needs larger motor
- Typically used in lower flows
- Potential for reweaving of cut wipes

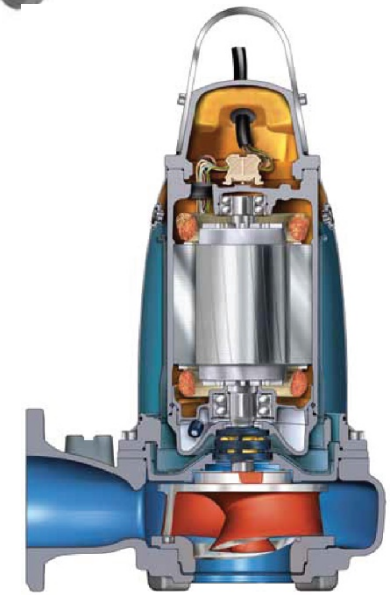
Pumps Are Trying to Change

Multiple Impeller options

- Vortex, Chopper, Screw-Type

But…

- Does it fit hydraulically?
- What else has to be upgraded?
- Is it efficient?
- What is “normal sewage”?



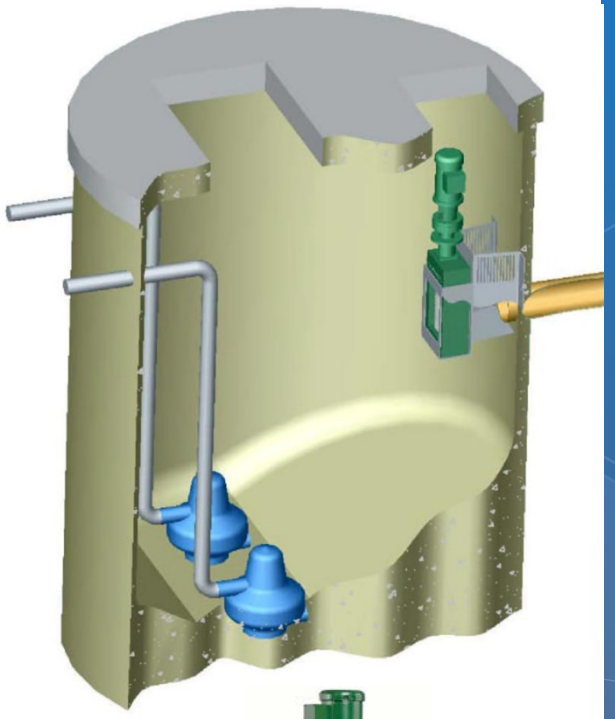
Grinder with Pump

How they work

- Two rotating cutter shafts operate at low speed with high torque to macerate solids
- Solids small enough to be pumped on to headworks

Considerations

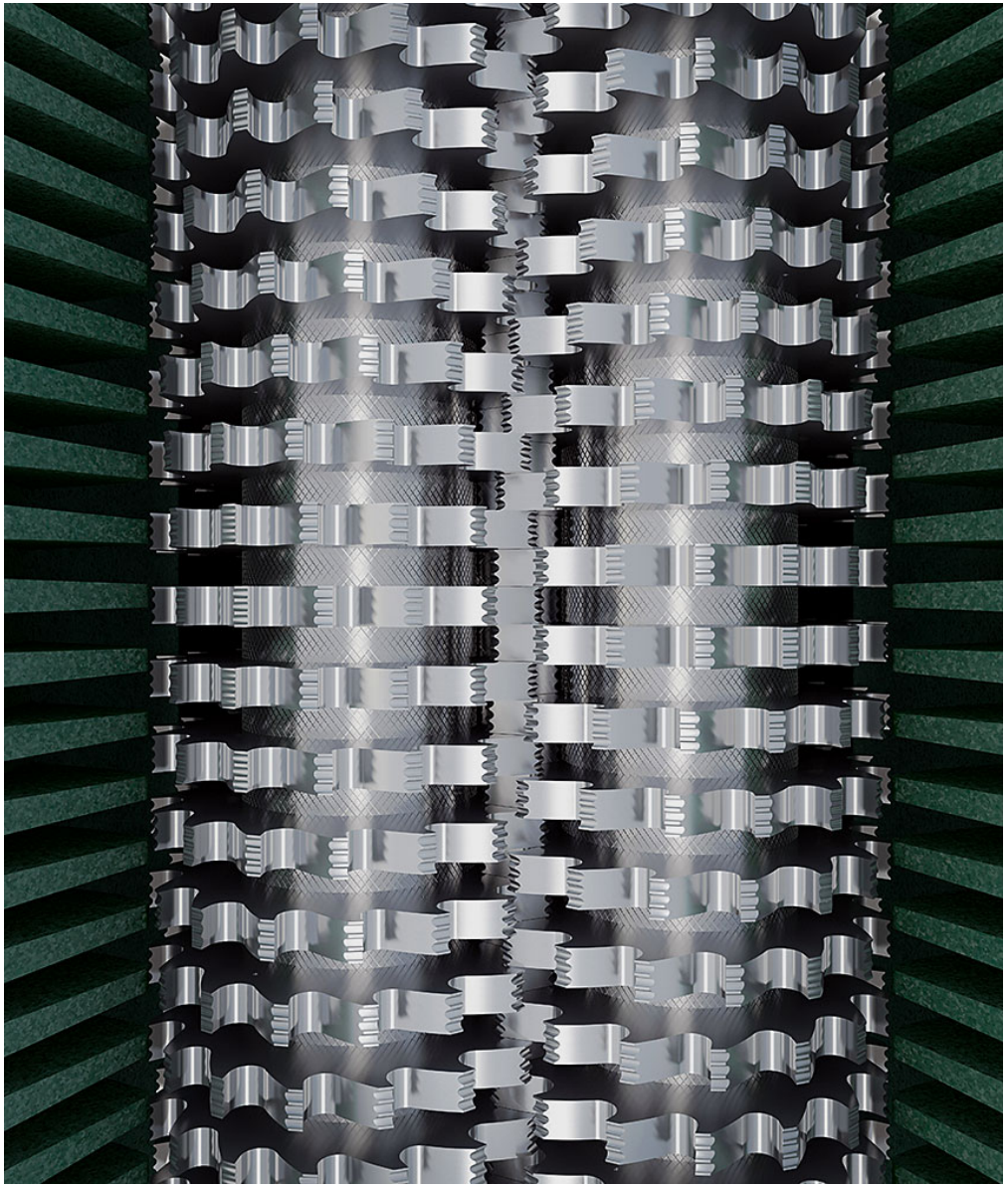
- Can be utilized with existing pump systems
- Must have space for installation in wet well or install manhole system upstream
- Some two shafted grinder systems produce long strips which can reweave into ragballs



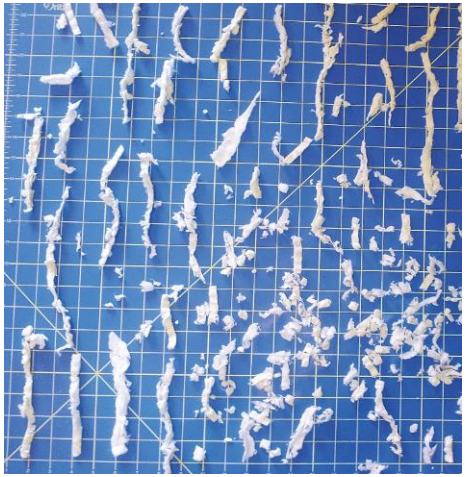
Reweaving

- 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



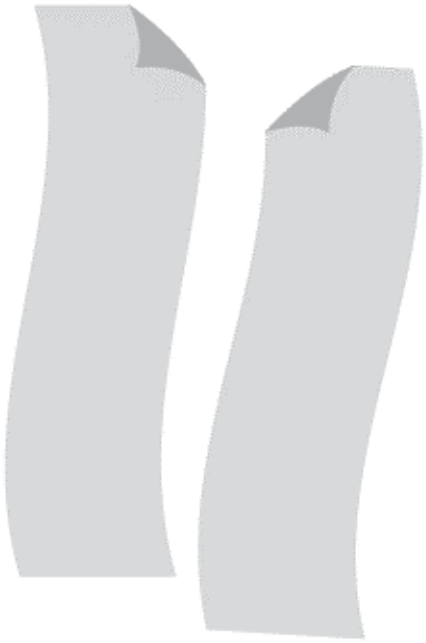
17 Tooth Serrated Cutters



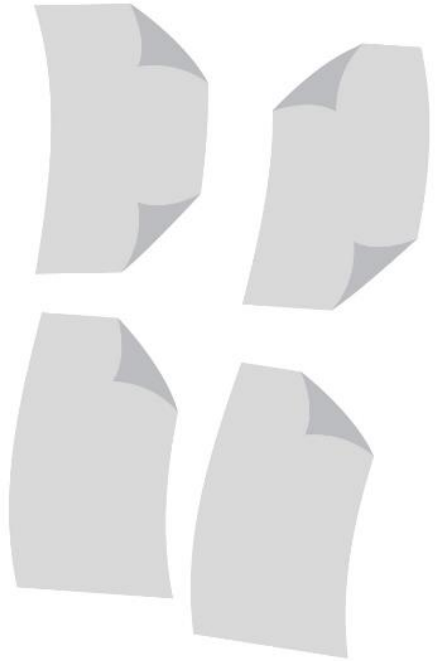
Typical Grinders

17 tooth

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



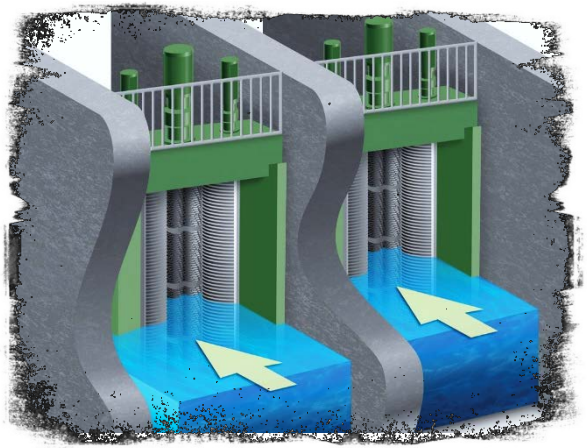
Long strips cut in 1 direction

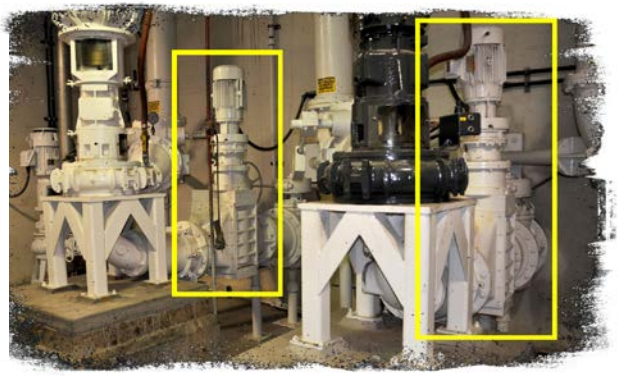


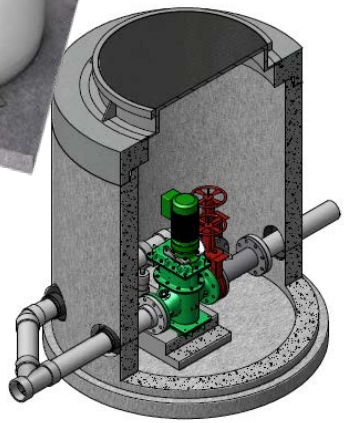
Cut in 2 directions w cuts 2 ways

2 direction cutting = No Reweaving

Grinders Can Fit Almost Anywhere







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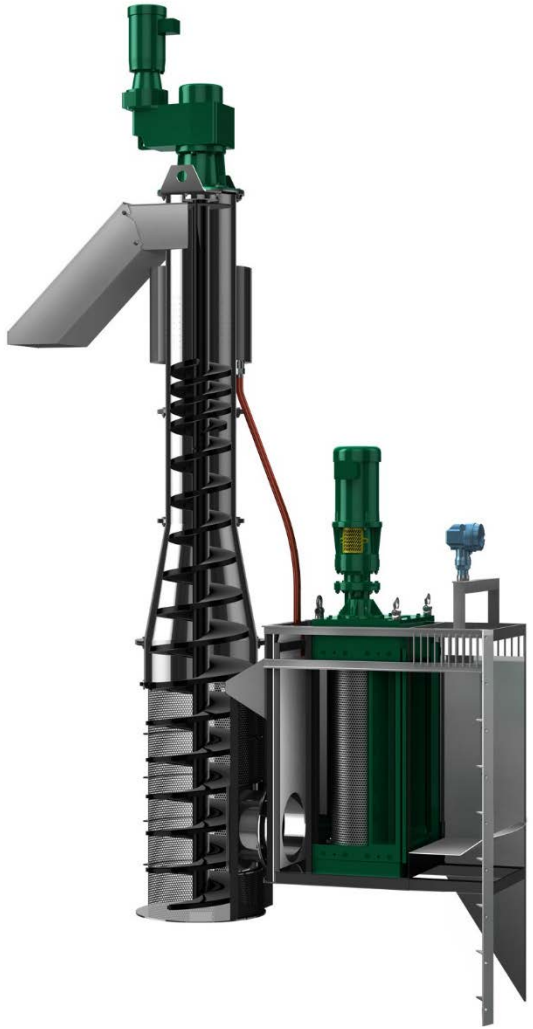
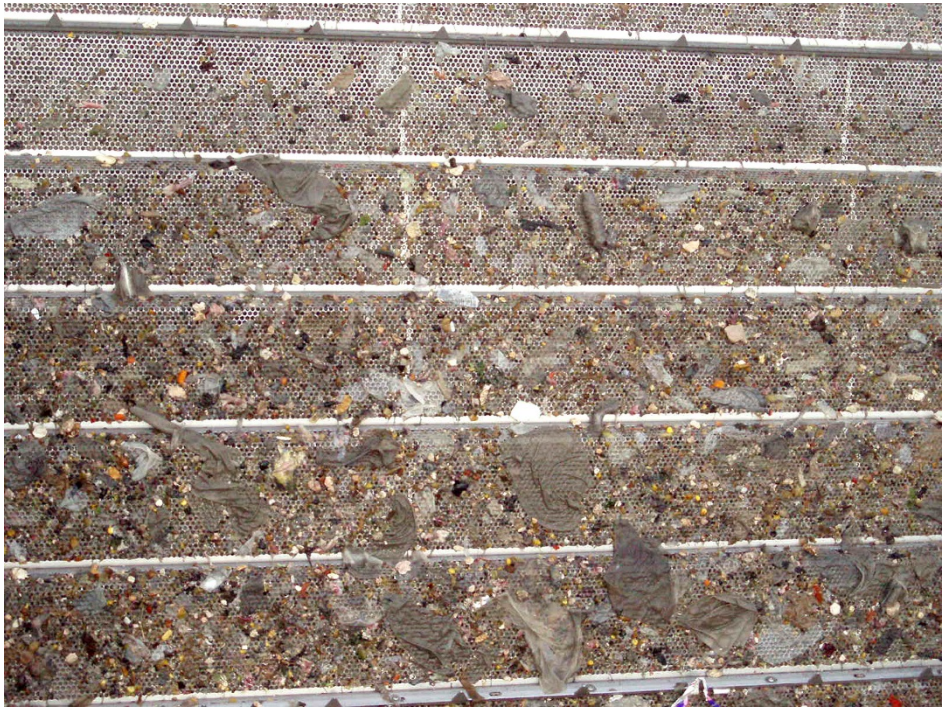


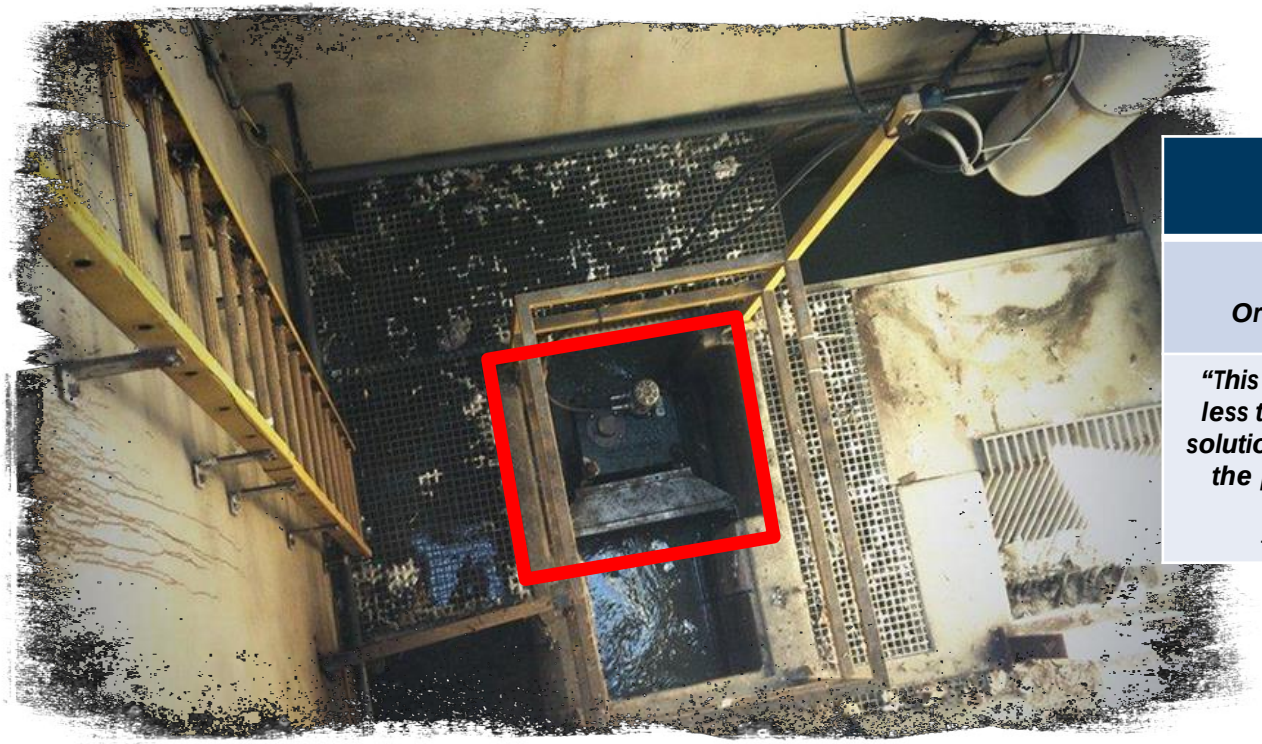
Capture/Cut/Remove at Lift Station

Remove



Better Sewer Technologies - Finescreens

In-Channel Grinder Success



Case Study

Santa Margarita WD
Orange County, California

"This upgrade cost significantly less than new pumps. Plus, this solution will completely eliminate the pump clogging problems we were having."
- Plant Superintendent

Sliced Annual Pumping Energy Costs by $78k

Don’t be a Fatberg – Let’s Solve this

Questions & Answers