Inverted Siphons: Reduce Maintenance Effort by Using Gravel Traps

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PUG 2018 Sharing Technologies Seminar
Thursday, February 22, 2018
Welcome!  Welcome!  Welcome!
Let’s talk about GRIT!
Who Has A Grit Trap in Their Collection System?

Figure 4-33.—An inverted siphon.
Agenda

▪ What is a grit trap?
▪ Case Study: Oro Loma Sanitary District
▪ Case Study: City of Santa Clara
▪ Lessons Learned
▪ Lunch
Grit Trap

Basically an oversized manhole with the bottom dropped to catch gravel and sand.

- 8 feet diameter
- 5 feet deep
Bayfair Siphon

- Single Barrel Siphon
- 36-inch Diameter Sewer
- Difficult Access
Outlet Structure has Difficult Access

Siphon

Outlet Structure
Inlet Structure is in Parking Lot

Inlet Structure

Siphon

Inlet Structure
Solution = Grit Trap

8 feet diameter
5 feet deep
Grit trap was constructed upstream of siphon.
Cleaning Tools
View of Parking Lot
Cleaning Operation – The Cleaning Team
Cleaning Operation
Cleaning Operation
Cleaning Operation – Full of Grit
Cleaning Operation – Loosening The Grit
Cleaning Operation

Assembly
Cleaning Operation

Ready to Go
Cleaning Operation
Adjustable Suction Relief
Adjustable Suction Relief – The Other Side!
Cleaning Operation
Cleaning Operation

Time to play the videos...
Cleaning Operation

Drain the water and keep on cleaning.
Cleaning Operation – Packing Up
Cleaning Operation – Dumping A Load
Cleaning Operation – Dumping A Load
Cleaning Operation – Dumping A Load
Cleaning Operation – Dumping A Load
Cleaning Operation – Two Trips to Empty the Grit Trap

3.5 yard Vactor
Two Trips
Cleaned Once Per 6 Months
2.5 hours of effort
City of Santa Clara

- 27 inch diameter sewer
- 9.5 feet to invert of sewer
- Trap is 5 feet deep, 8 feet in diameter
- 4 to 4.5 yards cleaned per cycle
- Inspected every 6 months
- Emptied yearly
Lessons Learned

- Neither agency reported odors.
- Grit trap captures smaller particles than expected.
- Cleaning a grit trap is easier than cleaning a big siphon.
- Installing a grit trap upstream of existing siphons should be strongly considered.
QUESTIONS?

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Time for lunch!
Grit Trap

5 feet deep and 8 feet in diameter