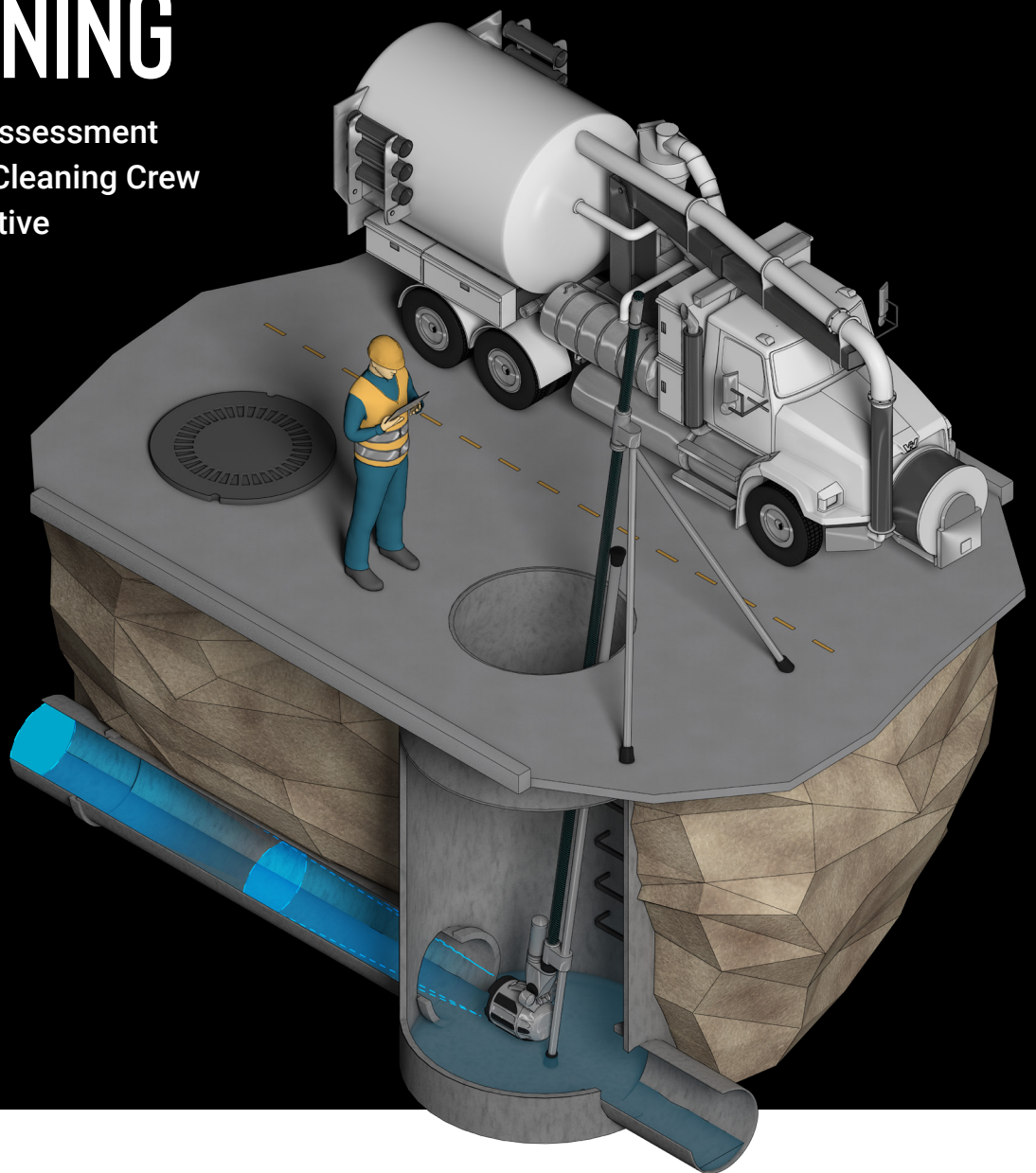


# ZOOM INTO SEWER CLEANING

How Zoom Assessment  
Makes Your Cleaning Crew  
More Productive



# INTRODUCTION



Most experts agree that jetting is the most efficient way to clean municipal sewers (EPA, 2003). Deployed by hose into a sewer, a jetter nozzle blasts water at up to 4000 psi to remove blockages, debris, sediment and FOG (fats, oils and grease). The powerful spray not only reduces foreign matter to a slurry that flows downstream, it also scours internal pipe surfaces to remove build-up that can reduce flow capacity and initiate clogging.

Despite jetting's power, cleaning crews often must jet blindly, without visual information about the condition of the pipes they are about to clean. In fact, up to 35% of sewer lines are jetted unnecessarily as part of scheduled cleaning and maintenance (Envirosight, 2015). Even when cleaning is warranted, choosing the most effective nozzle is rarely more than a guessing game, meaning resources are often used inefficiently. Pre- and post-cleaning visual inspection can be performed by a CCTV crawler crew, but the extra expense and manpower required seldom make this option viable on a large scale.

# THE COST OF JETTING BLIND

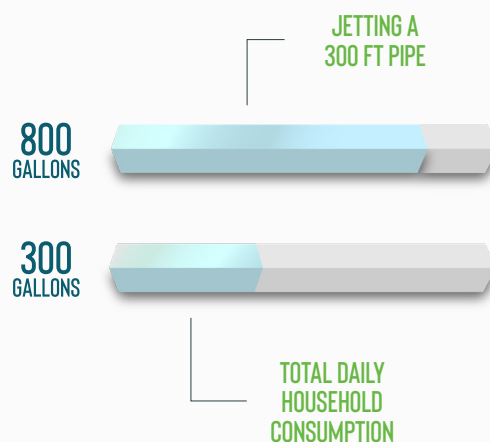
The cost of jetting blind can be measured in dollars, hours and gallons of water. Unnecessary or inadequate sewer cleaning can be a huge drain on all three.

A high-pressure jetter can consume up to 60 gallons per minute, depending on water pressure and pipe size and condition (Wysocky, June 2015). Travel, setup and jetting for a 300-foot segment of 8-inch pipe takes around 40 minutes. Without the ability to know what's going on underground, a cleaning crew can consume up to 800 gallons of water before realizing jetting may not have been necessary. By comparison, the average American family uses around 300 gallons of water over an entire day (EPA, 2021).

Even when a pipe does need cleaning, not knowing its condition means operators rely on little but gut instinct to pick a nozzle. Improper nozzle selection can lead to multiple cleaning passes. Resource consumption quickly multiplies with each pass—as does the need to refill the jetter truck with water. An informal survey of operators reveals this inefficiency accounts for 22-31% of total time spent jetting. As industry analyst Ken Wysocky puts it, “without correct nozzles, a water jetter is like a Ferrari without wheels—all revved up but incapable of delivering peak performance” (Wysocky, July 2015).

## CONSIDER THIS

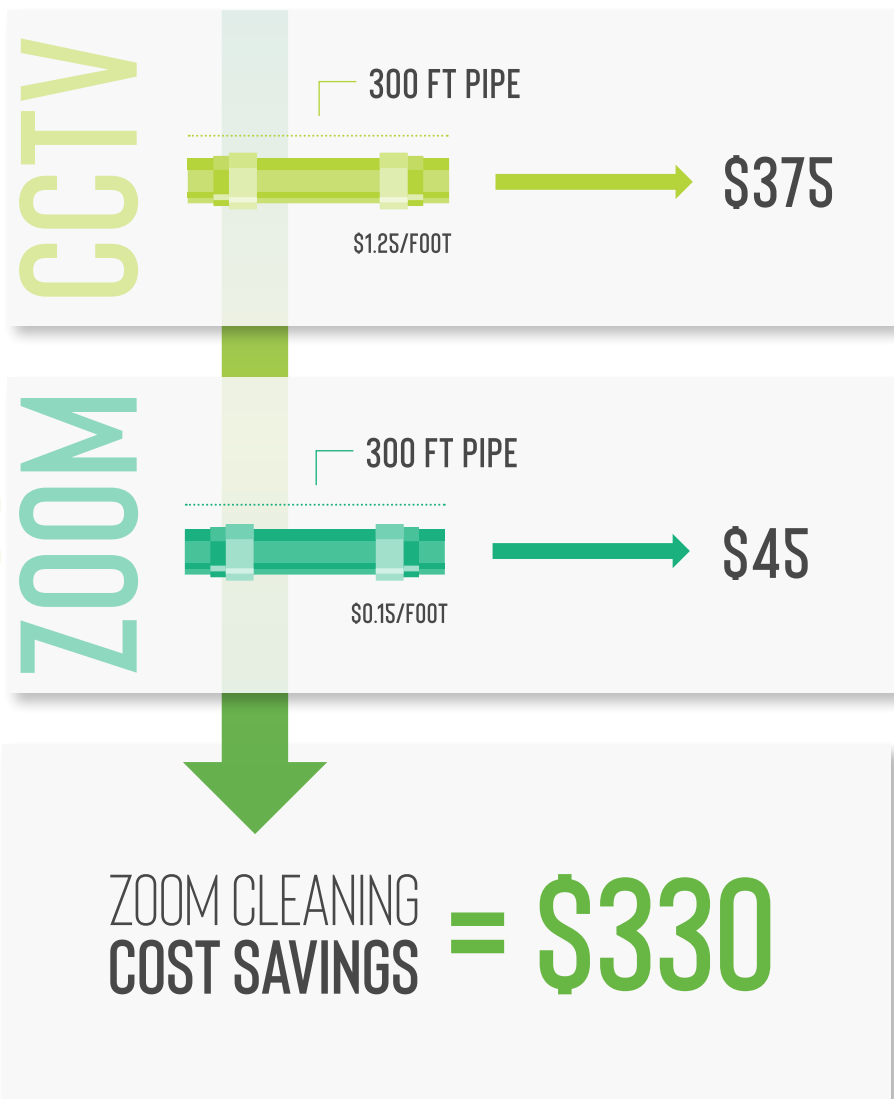
### WATER CONSUMPTION



## THE COST OF JETTING BLIND

Still, CCTV inspections are often too labor-intensive and expensive to offset the costs of wasted jetting. That leaves wastewater operators and cleaning crews with only one cost-effective option: zoom camera assessment. While a CCTV inspection can cost up to \$1.25 per foot, a zoom camera assessment costs just \$0.15 per foot (Envirosight, 2015).

### ZOOM VS. CCTV COST BREAKDOWN



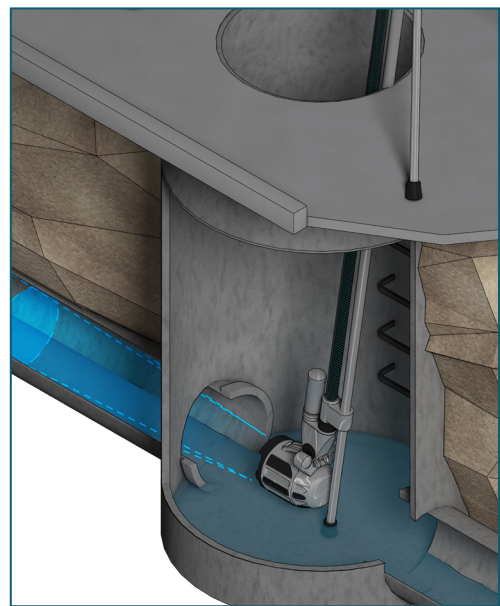
# WHAT'S A ZOOM ASSESSMENT?

A zoom camera uses focused illumination and high-powered zoom optics to gather detailed footage of a pipe's entire length. Camera and lighting are mounted on an adjustable pole, allowing users to assess confined spaces without entering them.

Zoom cameras are an attractive investment for municipalities and contractors because they are easy to use, portable, less costly than other pipe assessment tools, and useful in a wide range of applications.

- **A contractor** can use one to survey pipe condition before bidding services, and afterward to document completed work.
- **A municipality** can use one to identify and prioritize maintenance issues, avoid confined space entry and inspect hard-to-reach infrastructure.
- **Departments of transportation** can use one to assess culvert and storm pipe condition with minimal duration of traffic exposure.

Zoom cameras also survey manholes, catch basins and other assets, making comprehensive sewer system assessment quick and affordable. And, jetter operators can use zoom cameras to conveniently gather visual information pre- and post-cleaning. Zoom assessment integrates unobtrusively with existing sewer cleaning workflows, delivering valuable information with minimal disruption. It offers a quick, inexpensive way to determine which pipes need to be cleaned and how to clean them.



“ Zoom assessment integrates unobtrusively with existing sewer cleaning workflows, delivering valuable information with minimal disruption.”

# WHAT'S A ZOOM ASSESSMENT?

## PICTURE THIS

Sewer lines don't need to be cleaned before a zoom survey. Because they're highly portable and can be deployed by a single operator, zoom cameras are easy to stow on a jetter truck for rapid pre- and post-cleaning assessments, solving a range of potential issues for jetter teams.

- **TROUBLESHOOT AND TRACK FOG.** Fats, oils and grease are one of the biggest sources of clogged pipes, which can in turn result in sewer backups and spills; cause SSOs and other environmental problems; and even flood homes and businesses. Zoom cameras provide a quick and cost-effective way for jetter operators to understand what they are up against before they start cleaning.
- **SELECT THE BEST NOZZLE AND CLEANING STRATEGY.** Using the wrong nozzle wastes time, money and water—and these costs can add up quickly. Operators need to know whether a pipe is clogged with gravel, grease, mud, roots or sludge to make well-informed decisions. Visual information collected by a zoom camera helps an operator pick the most suitable nozzle, water pressure and cleaning speed.
- **DOCUMENT WORK.** When jetting blindly, the only visual indication of cleaning success comes from watching effluent in a downstream manhole until it runs clear. Jetter operators need to be able to assess their work directly to determine whether they've cleaned the pipes properly, or whether another pass is needed. Also, zoom cameras offer contractors a way to document completion of their work.
- **SAVE RESOURCES.** With water supplies dwindling in many regions, municipalities must seek creative ways to reduce water consumption without sacrificing sewer maintenance. The visual information collected by zoom cameras can help operators use water more wisely.



# A MORE EFFICIENT CLEANING WORKFLOW

To make the most effective use of zoom camera technology, innovative utilities are applying a three-phase approach to sewer jetting.

## PHASE I

### PRE-CLEANING ASSESSMENT

Municipalities and contractors perform a pre-cleaning assessment to determine whether a pipe requires cleaning. An operator simply lowers the camera into the manhole and then zooms the full length of the pipe to check for the presence of cross bores, collapses or other potential complications. If any of these is detected, they halt cleaning and notify higher-ups.

They also look for gravel, roots, sludge, debris, sediment, FOG, blockages or other adverse conditions. If any are present, cleaning is required. Otherwise, the crew marks the pipe segment as clean and moves to the next one on the cleaning schedule. In either case, captured footage is archived to document pre-cleaning pipe condition.

## PHASE II

### CLEANING STRATEGY

Most utilities with regular maintenance routines find that approximately 65% of pipes require cleaning. In this phase, operators use the visual information they've gathered in phase one to determine the most suitable nozzle, water pressure and cleaning speed for the pipe segment. Operators can also reassess the pipe after each pass with the jetter hose, adjusting nozzle selection, water pressure and cleaning speed as necessary until cleaning is complete.

## PHASE III

### POST-CLEANING DOCUMENTATION

When the pipe is clean, the crew documents their work. This record helps jetter operators QA/QC their own progress and grants supervisors peace of mind that the pipe has been cleaned. Municipalities may also want footage to document post-cleaning pipe condition, or track whether the pipe requires further investigation using a CCTV camera. (Zoom cameras don't replace CCTV inspection, but they do identify whether a pipe needs further investigation.)

# TECHNOLOGICAL CONSIDERATIONS

The quality of information captured during a zoom assessment has a lot to do with the capabilities of the camera. Sub-par technology can lead to sub-par data or inefficient performance out in the field. Before purchasing a zoom camera, consider some key technological and operational factors:



## ILLUMINATION

When performing a zoom assessment, you can only see as far as you can illuminate. Projecting light several hundred feet down a narrow pipe requires focus, alignment and intensity. For seeing long distances, light should be collimated, which means all rays from the lamp are projected parallel to each other toward a target. This is accomplished with a parabolic reflector. Proper alignment is only achieved when illumination is circumferential (distributed evenly around the camera) to deliver uniform sidewall illumination.



**Sub-par technology can lead to sub-par data or inefficient performance out in the field.**



## DETAIL

Because zoom assessment relies on viewing from a distance, as well as close-up in manholes, detail is crucial. Optical zoom and camera resolution determine the detail with which a given defect can be viewed. Only optical magnification contributes detail; disregard specifications touting “digital zoom” or “total zoom.”



## ALIGNMENT

Proper camera alignment ensures sidewall illumination and detail are uniform at all clock positions in the pipe. Camera centering and camera tilt work in conjunction to optimize alignment. These adjustments are impossible to set up accurately beforehand—the ability to make adjustments in-manhole is essential.



## STABILIZATION

How the camera pole is held affects video quality and ease of operation. A self-standing or tripod-mounted pole produces stable video at high magnifications and lets the operator dedicate full attention to viewing and control.



# TECHNOLOGICAL CONSIDERATIONS



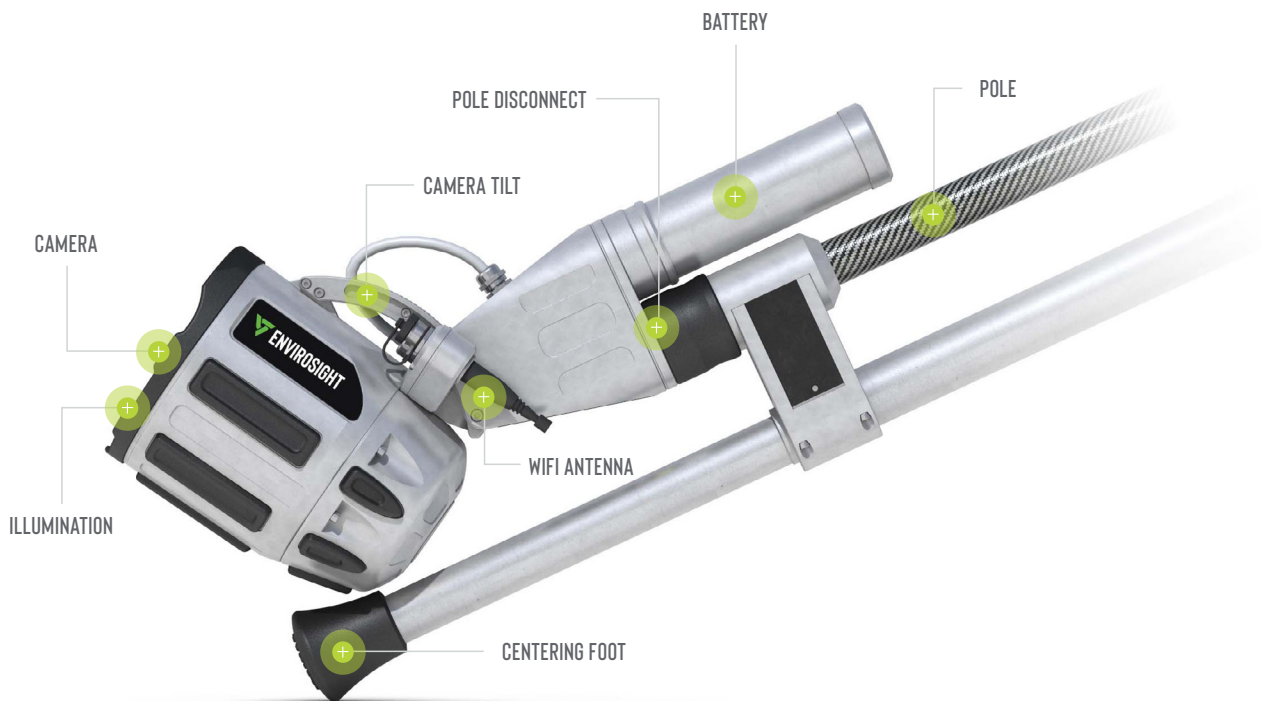
## SETUP AND PORTABILITY

The efficiency of zoom assessment can easily be diminished by a system that is time-consuming to set up and dismantle, or unwieldy to transport. Portability, wireless connections, ease of setup and battery life should all be considered.



## INTERFACE

The ease with which an operator can control and view a zoom assessment has a major impact on efficiency and data quality. Superior zoom cameras have an integrated wireless interface that allows users to control, view, record and share footage from a single device.



# IN CONCLUSION



In the world of sewer jetting, knowing what you are up against has many benefits. A zoom camera offers a quick, portable way to assess cleaning challenges—sediment, debris, FOG, collapses, protruding taps and root balls. It allows crews to accomplish routine cleaning more effectively and efficiently. Beyond that, an operator can confirm success post-cleaning, and even alert higher-ups to anything requiring further attention. Using zoom assessment can save municipalities and municipal contractors from wasting time, money and resources.

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