Tracking Down Rapid Infiltration in a Tangle of Pump Stations

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Can you identify this?
What is a Micromonitor?

Specialized low-flow measurement
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Each tributary area is very small.
Low Flow Problems

Low flow has several problems for monitoring.
Low Flow Problems - Velocity

Probe needs to be covered for velocity measurements.
Low Flow Problems - Velocity

ICSO 2150 does not even make a velocity measurement below 1 inch of flow.
Low Flow Problems - Velocity

ICSO 2150 does not even make a velocity measurement below 1 inch of flow.
Low Flow Problems - Debris

Probe obstructs flow and catches debris in low flow.
Low Flow Solution – A Weir

A weir that does not obstruct flow or catch debris...
Low Flow Solution – A Weir

The weir must have smooth flow path...
Low Flow Solution – A Weir

It increases the depth of low flow.
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Finding I/I in a tangle of pump stations
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Massive clearwater baseflow after rainfall.
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Pump Station Schematic
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Phase 1 Micromonitor Sub-basins
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MM02

MM03

MM04
Lucas County Phase 1

MM05

MM06

MM07
Lucas County Phase 1

MM04

MM10
Massive clearwater baseflow after rainfall

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MM01 was also ranked High, but was far less significant than MM10.

Massive clearwater baseflow after rainfall
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Phase 2
Sub-basins with highest I/I. Selected for wet weather CCTV
Sub-basin with high I/I is shaded in grey. No known direct connections. I/I is delayed after storm. How do we find the sources?
Tap with I/I

How is wet-weather CCTV different than normal PACP coding?
Normal Tap

How is wet-weather CCTV different than normal PACP coding?
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**I/I Found Lessons**

- Not-directly-connected-sources can be found with micromonitoring and wet-weather CCTV
- No need to PACP code
- No one likes to CCTV in the rain
Questions?