

Successful Flow Monitoring in Low Flow Situations

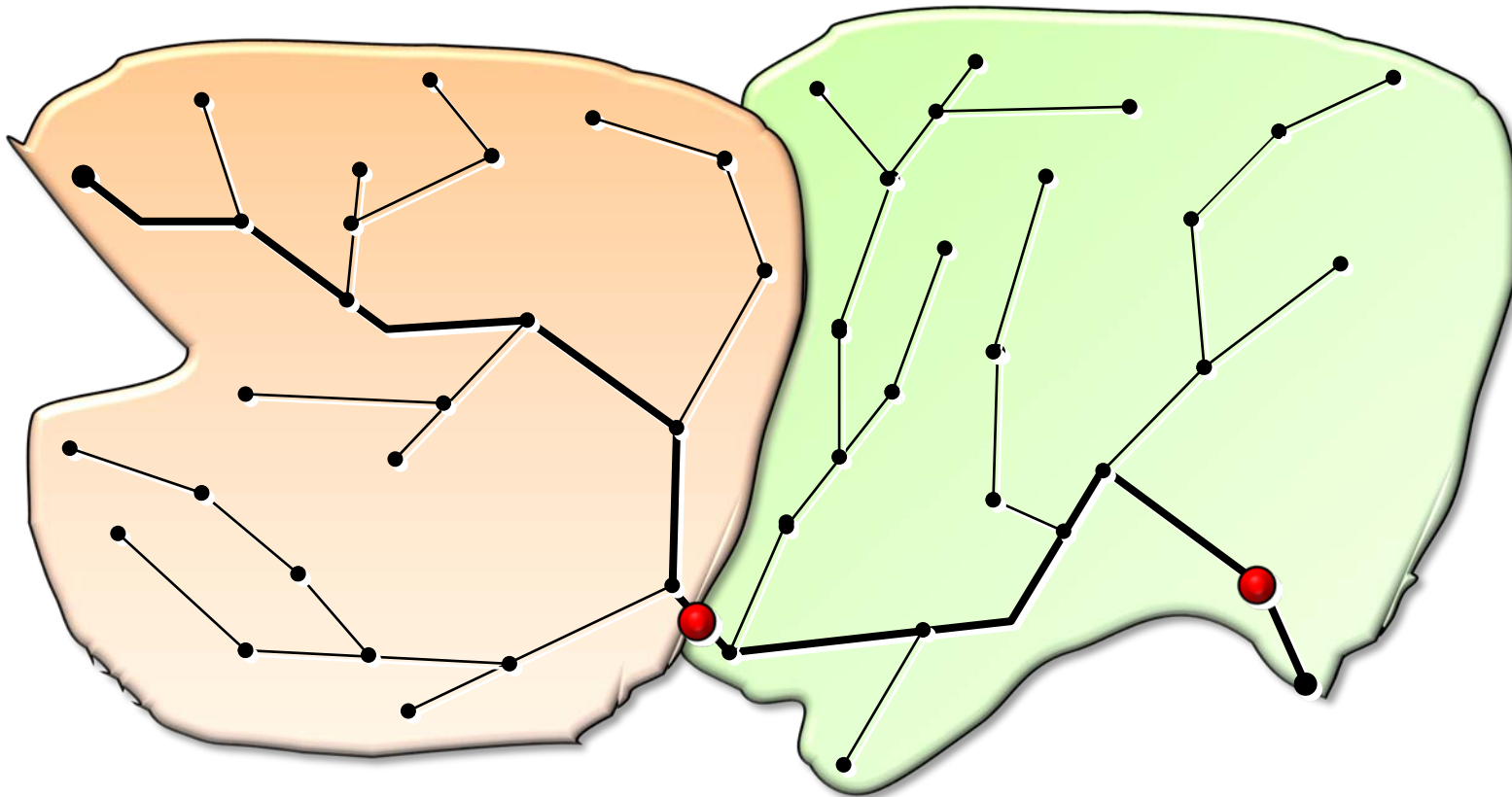
Agenda

- Introduction
- Reasons for Flow Monitoring
- Typical Approach
- Typical Installation
- Atypical Situations

Reasons for Flow Monitoring

- Model development/refinement
- Consent Decree requirement
- SSES
- Determine downstream capacity for new development

Typical Approach



- Identify tributary area
 - Typically want 20,000 to 60,000 LF upstream of meter
- Investigate manholes and find laminar flow at least 2 inches deep with a velocity between 2 and 7 fps
- Select flow monitoring equipment best suited for flow regime

Typical "In Pipe" Installations



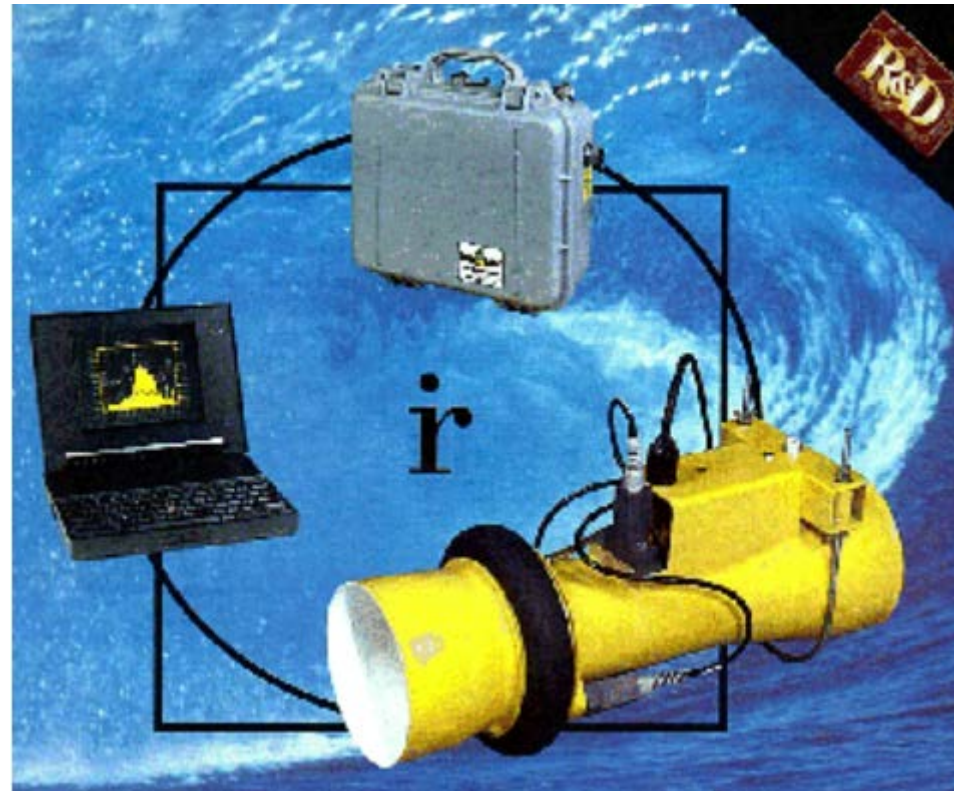
Typical “Out of Pipe” Installations



If you just need to confirm Groundwater Infiltration or Inflow



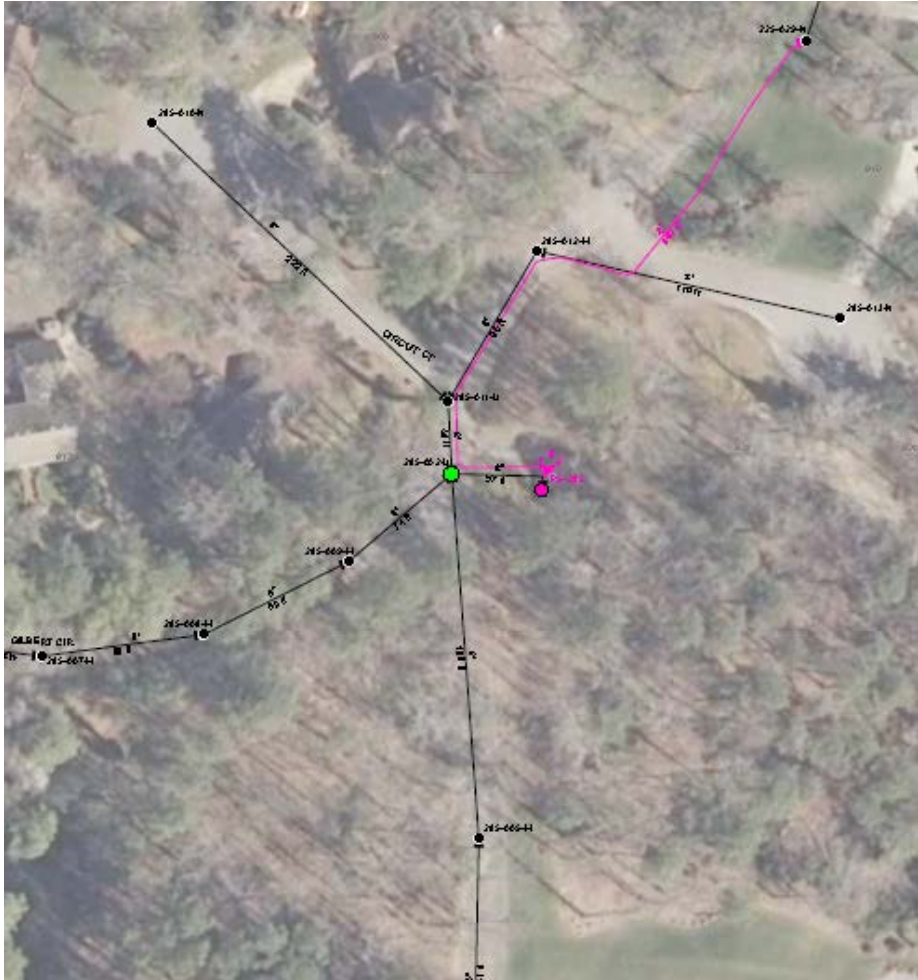
Specialized Equipment for Low Flow Conditions Known to Not have RDI/I Issues



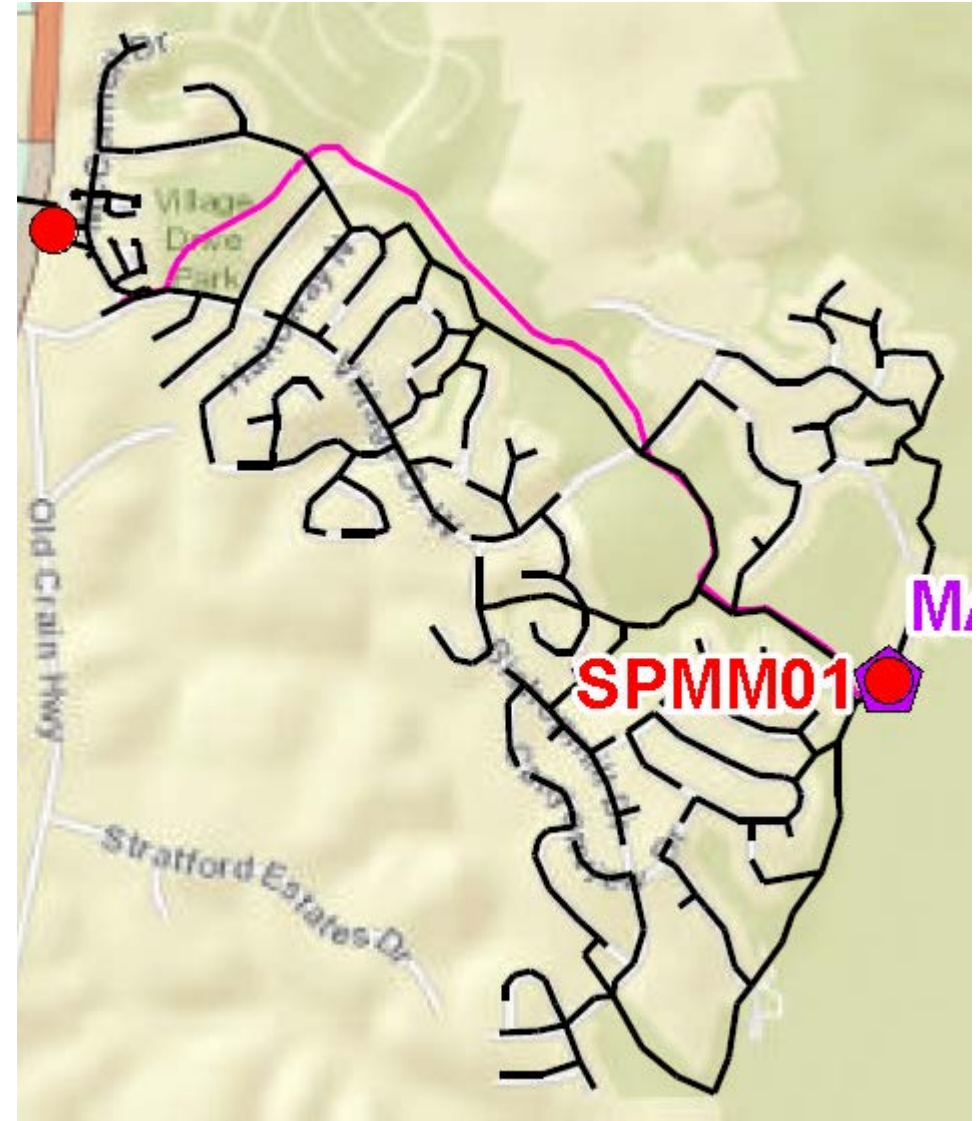
Collection system is small



Topography Requires Numerous Pump Stations



Boundary Conditions





Low Flow Installation



Think Outside the Box

- Install in outgoing pipe instead of incoming to increase flow.



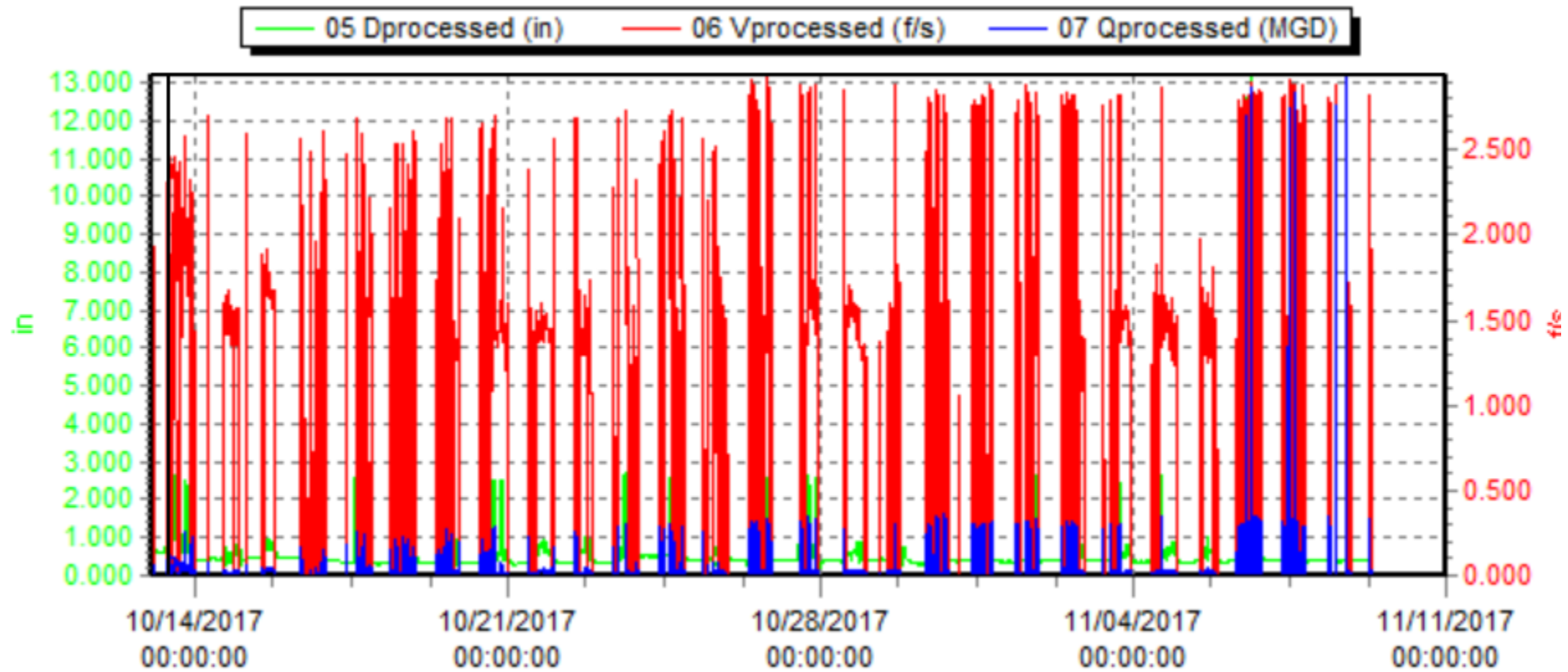




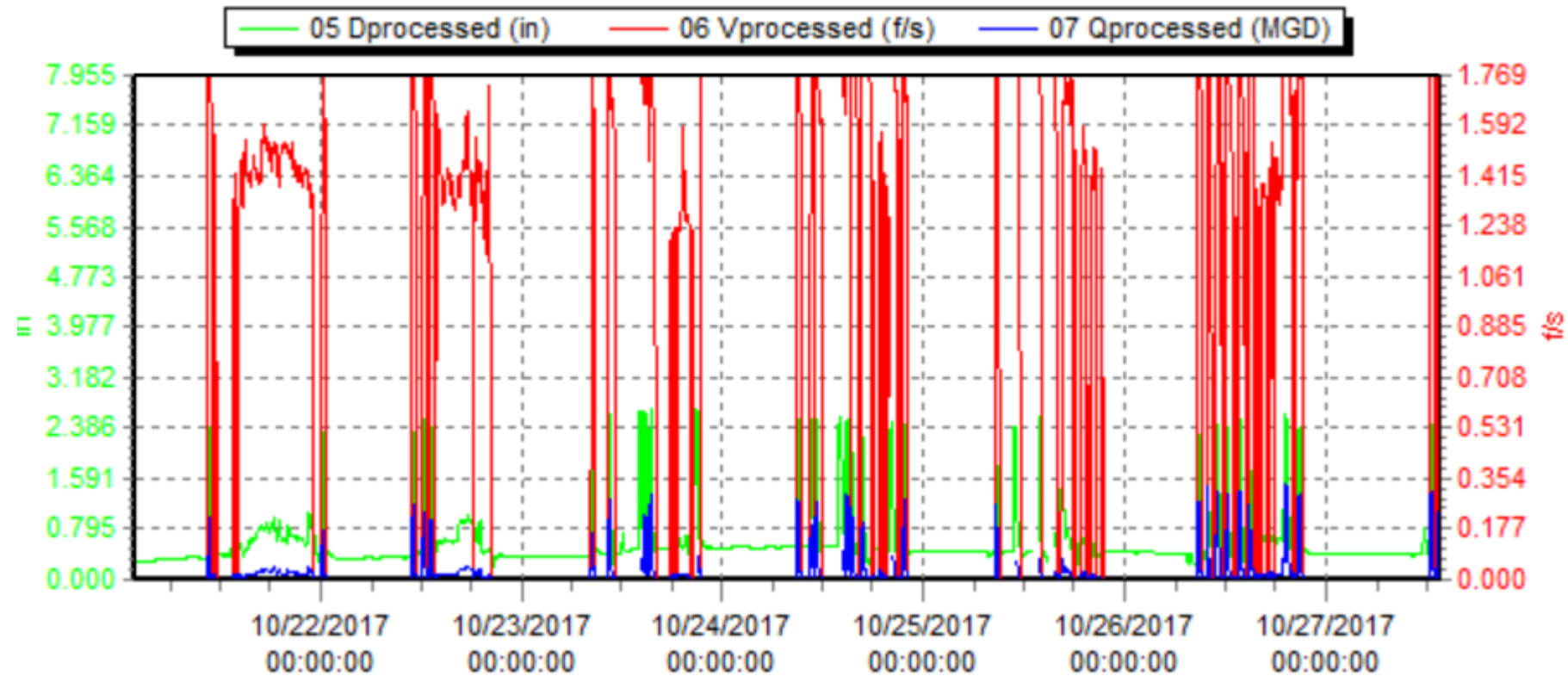




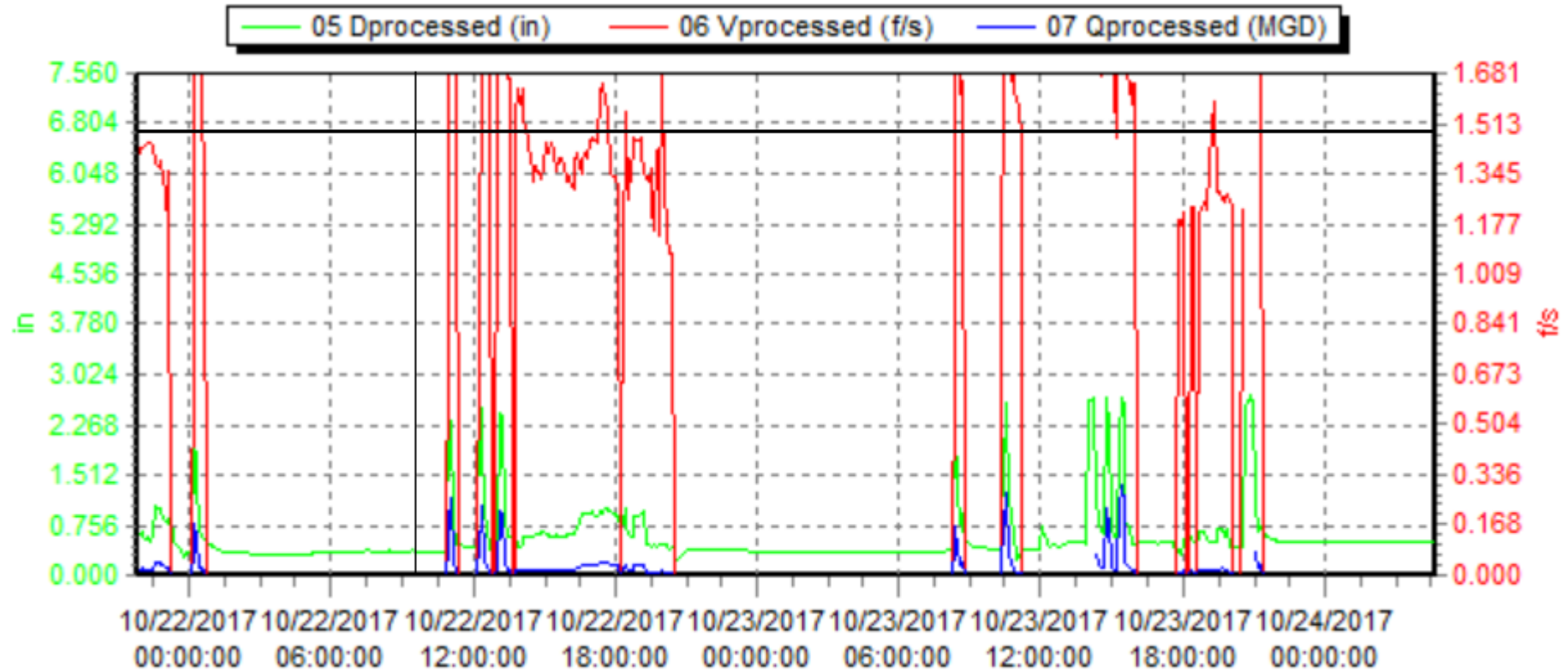
Is The Data Usable?



Pattern is Repeatable



Yes, It is Usable



Only tributary flow is from brewery

