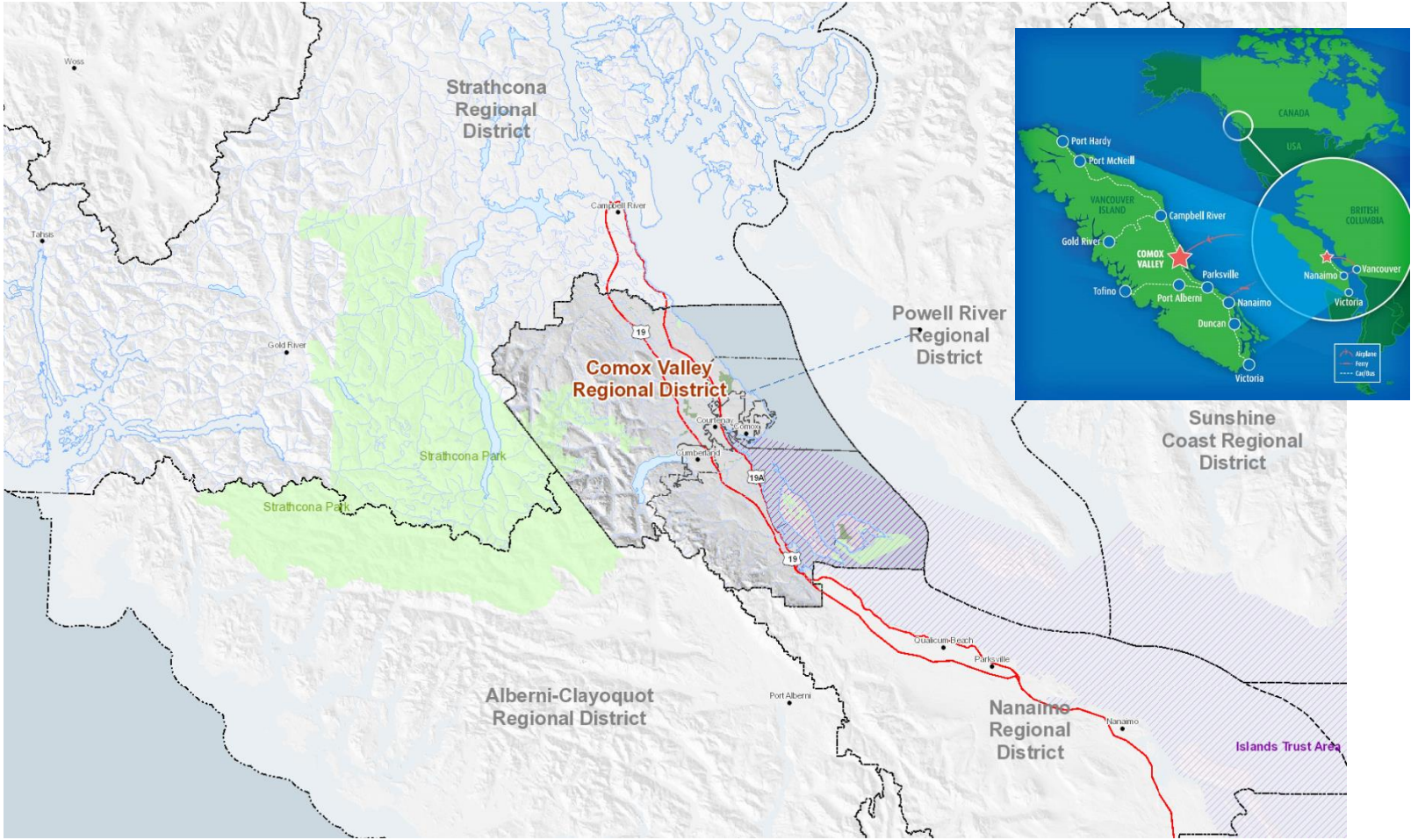
SCADA Data Across the Organization

Presented by
Brian Pearson
Senior Manager of Information Systems & GIS

Comox Valley
REGIONAL DISTRICT



Comox Valley Regional District

- Local regional government for 3 municipalities and 3 rural areas
- Manage major utilities – Water, Sewer, Solid Waste
- Population of 65,000
- 29 remote sites throughout the Comox Valley

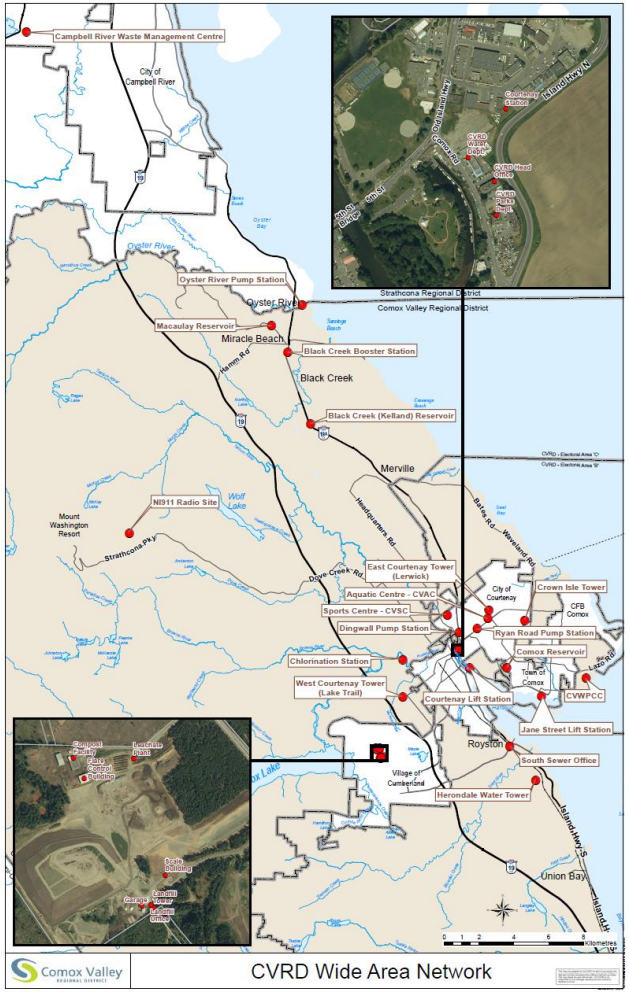
Overview

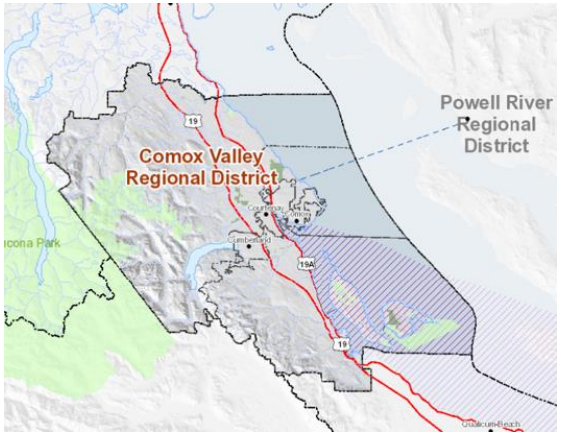
- Business Challenges
- Existing systems and how data collection worked in past
- Implementation of network and data connections
- Integration of the PI System®
- Integration of PI Vision™ and PI ProcessBook®
- Changes to systems and how staff work
- Outcomes and future directions with data integration

Business Challenges

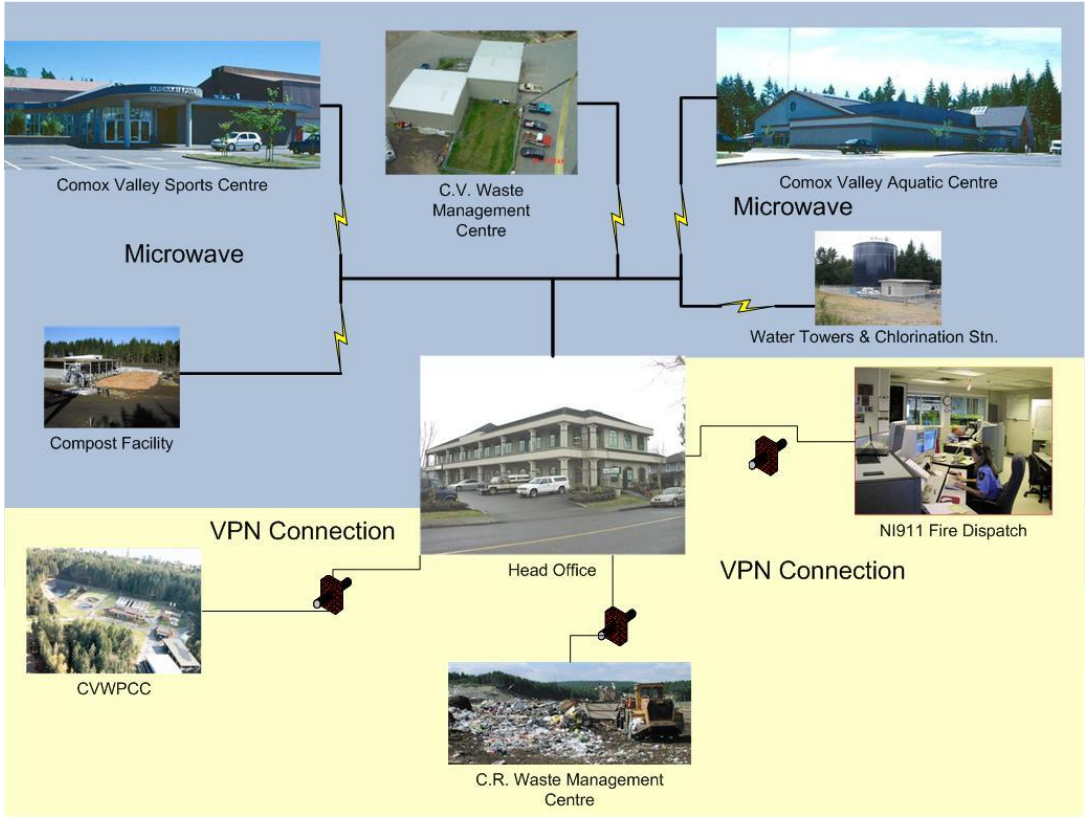
- Bring all data from remote water, sewer and solid waste stations to central office
- Large distances between sites makes local data analysis impossible
- Need to centrally store and analyze data from remote sites in real time
- Many staff members in several departments need to view and monitor collected data and systems
- Increase efficiencies in time, labour and costs to access data and to control remote systems

29 remote sites throughout the Comox Valley

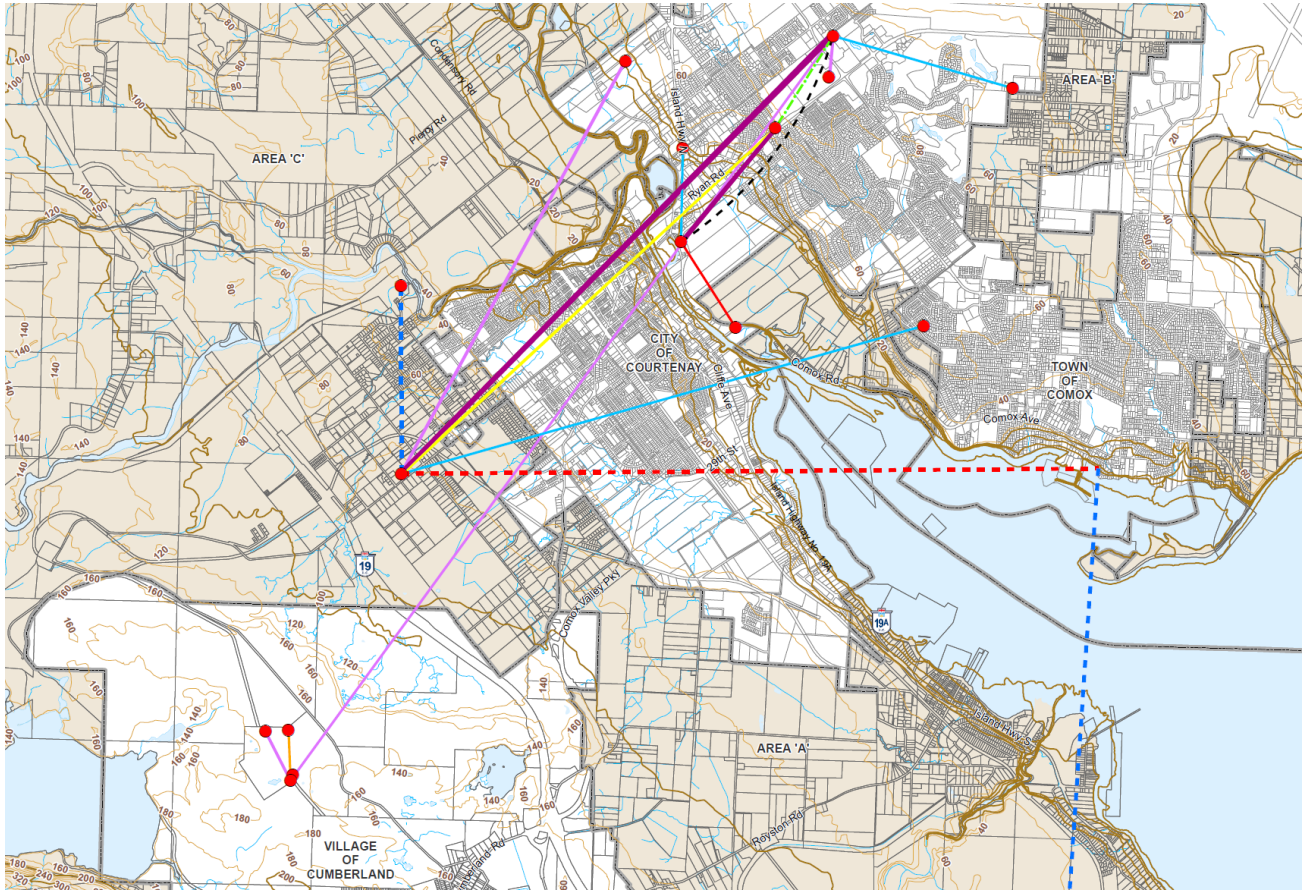


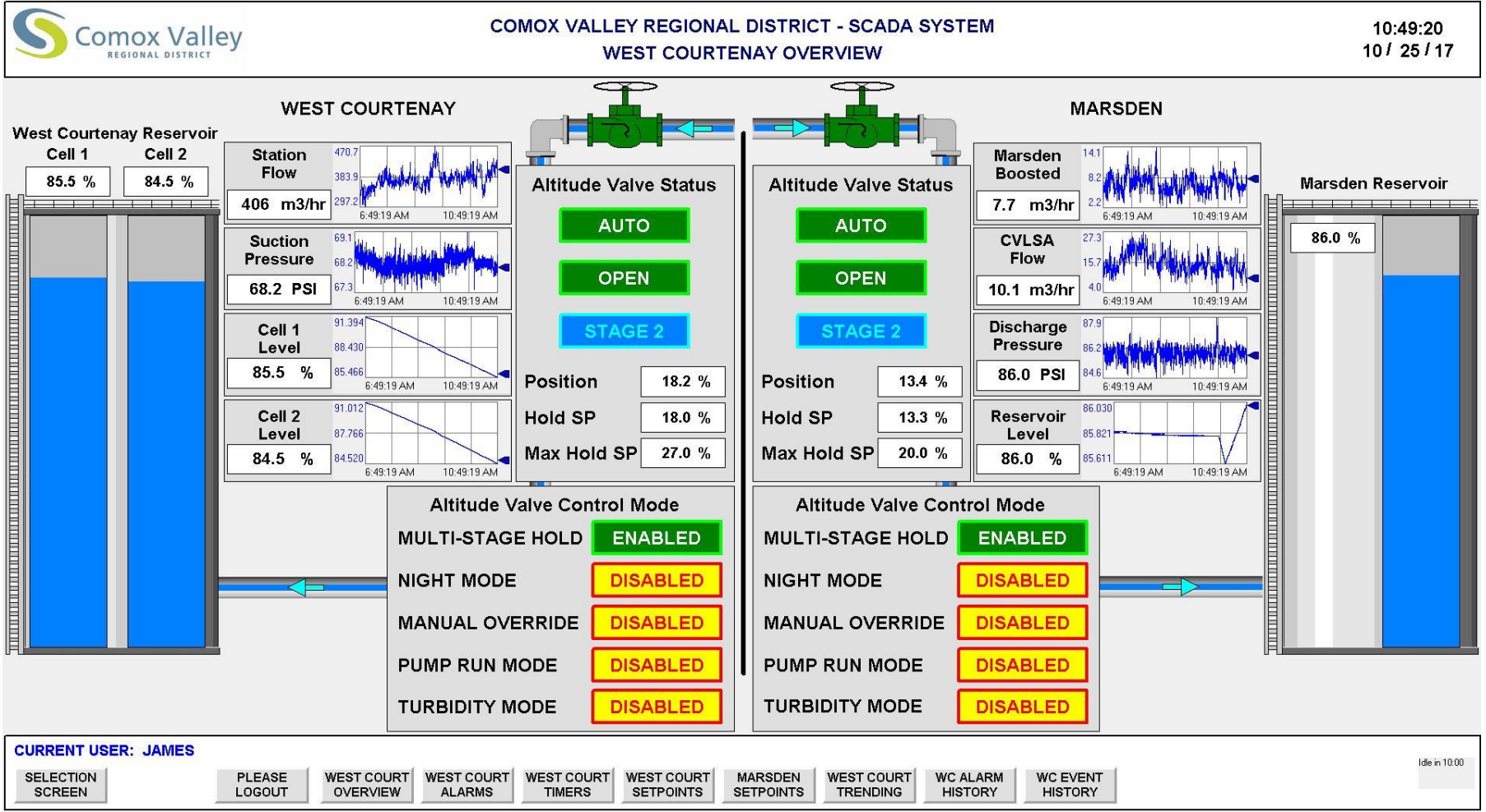


CVRD Wide Area Network



CVRD Wide Area Network





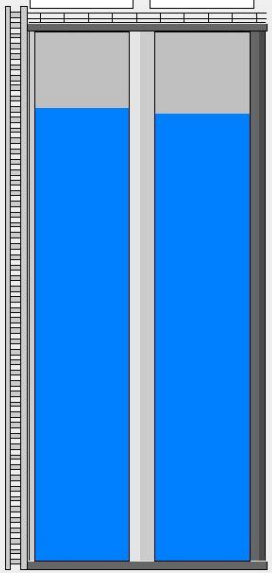
Comox Valley REGIONAL DISTRICT

COMOX VALLEY REGIONAL DISTRICT - SCADA SYSTEM
WEST COURTENAY SETPOINTS

10:52:26
10 / 25 / 17

West Courtenay Reservoir

Cell 1	Cell 2
85.4 %	84.4 %



Active Reservoir Cell for Setpoints: CELL 1

WC ALTITUDE VALVE SETPOINT DEFAULTS

Alarm Setpoints			Current
Cell 1 High Reservoir Level Alarm	98	%	85.37
Cell 1 Low Reservoir Level Alarm	70	%	
Low Suction Pressure Alarm	10	PSI	68.01
Low Flow Alarm	0	m3/hr	376.59
Control Setpoints			
Cell 1 Stop Fill	95.0	%	85.37
Cell 1 Stage 3 Setpoint	85.0	%	
Cell 1 Night Mode Disable	80.0	%	85.37
Low Suction Pressure Close Valve SP	40.0	PSI	68.01

ALTITUDE VALVE CONTROL

MULTI-STAGE HOLD: ENABLED

NIGHT MODE: DISABLED | ENABLE

Altitude Valve Multi-Stage Max Hold Setpoint: 27.0 %

Altitude Valve Hold Stages

	Valve Position	Reservoir Level
Current	18.07 %	85.37 %
Stage 1 (PLC)	9.00 %	94.50 %
Stage 2 (PLC)	18.00 %	91.17 %
Stage 3 (HMI)	27.00 %	85.00 %

MANUAL OVERRIDE: DISABLED | ENABLE

Altitude Valve Manual Override Hold Setpoint: 0.0 %

PUMP RUN MODE: DISABLED | ENABLE

1st PUMP		2nd PUMP	
STOP SETPOINT	95.0 %	STOP SETPOINT	90.0 %
START SETPOINT	85.0 %	START SETPOINT	80.0 %

TURBIDITY MODE: DISABLED | ENABLE

Altitude Valve Will Hold Closed When Turbidity Mode is Enabled

Altitude Valve will open below: 94.50 %

Altitude Valve will close above: 95.00 %

Altitude Valve Status

AUTO

OPEN

STAGE 2

Position	18.1 %
Hold SP	18.0 %
Max Hold SP	27.0 %

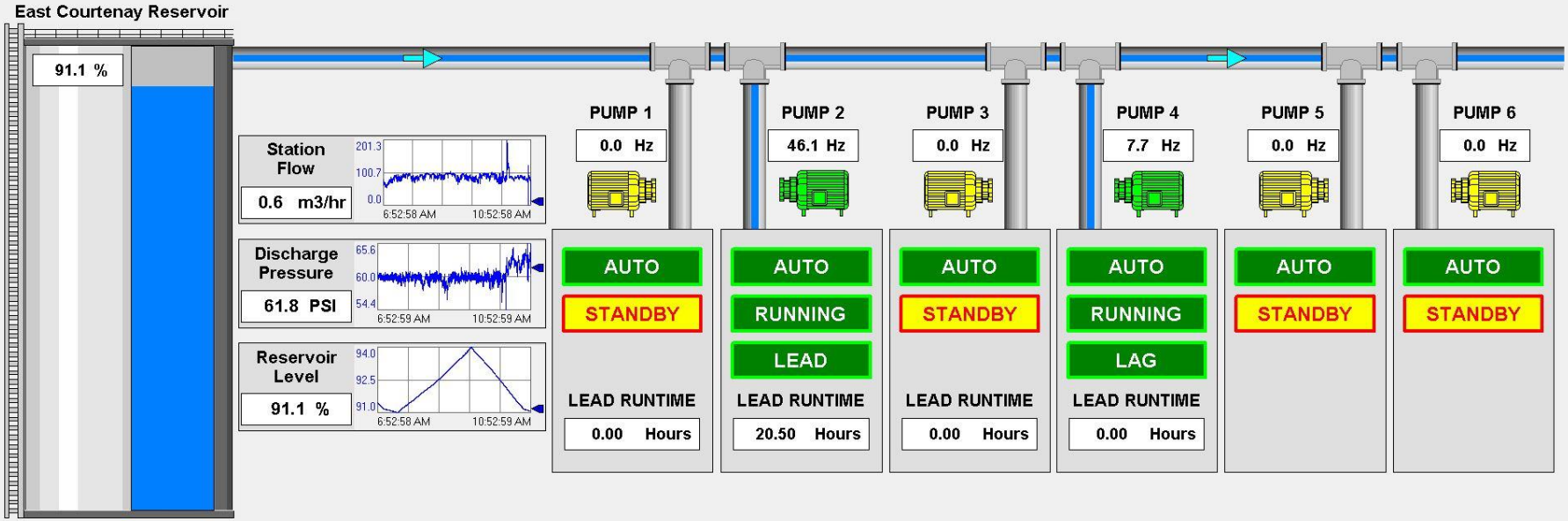
CURRENT USER: JAMES

SELECTION SCREEN | PLEASE LOGOUT | WEST COURT OVERVIEW | WEST COURT ALARMS | WEST COURT TIMERS | WEST COURT SETPOINTS | MARSDEN SETPOINTS | WEST COURT TRENDING | WC ALARM HISTORY | WC EVENT HISTORY

Idle in 10:00

COMOX VALLEY REGIONAL DISTRICT - SCADA SYSTEM
EAST COURTENAY OVERVIEW

10:52:59
10 / 25 / 17



CURRENT USER: JAMES

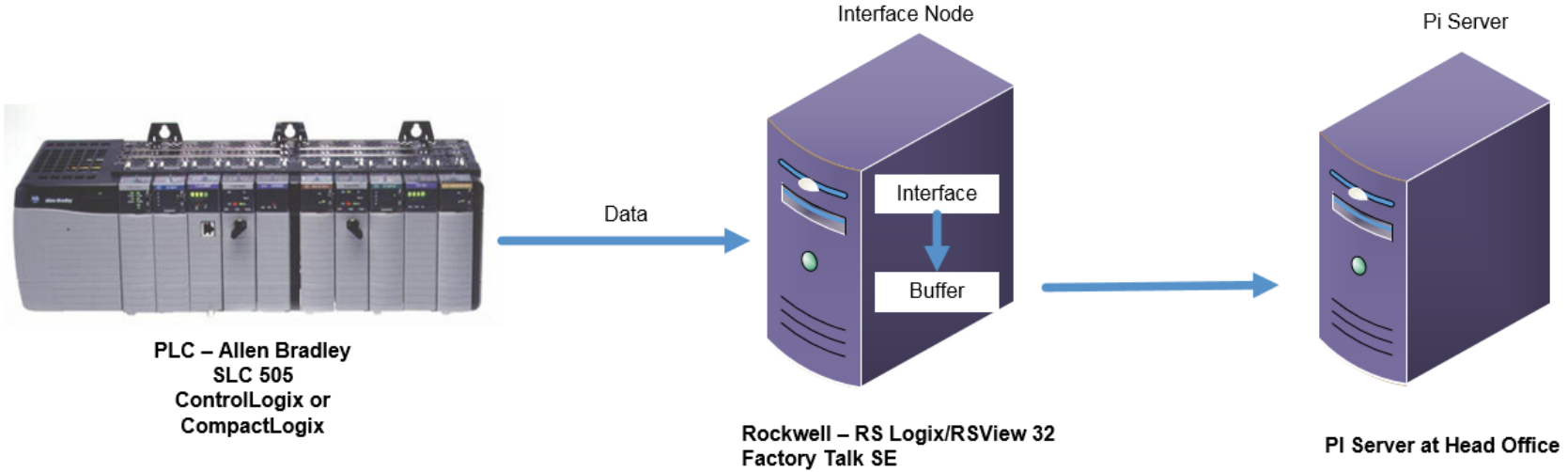
SELECTION SCREEN | PLEASE LOGOUT | EAST COURT OVERVIEW | EAST COURT ALARMS | EAST COURT TRENDING | EAST COURT SETPOINTS | EAST COURT TIMERS | EC ALARM HISTORY | EC EVENT HISTORY

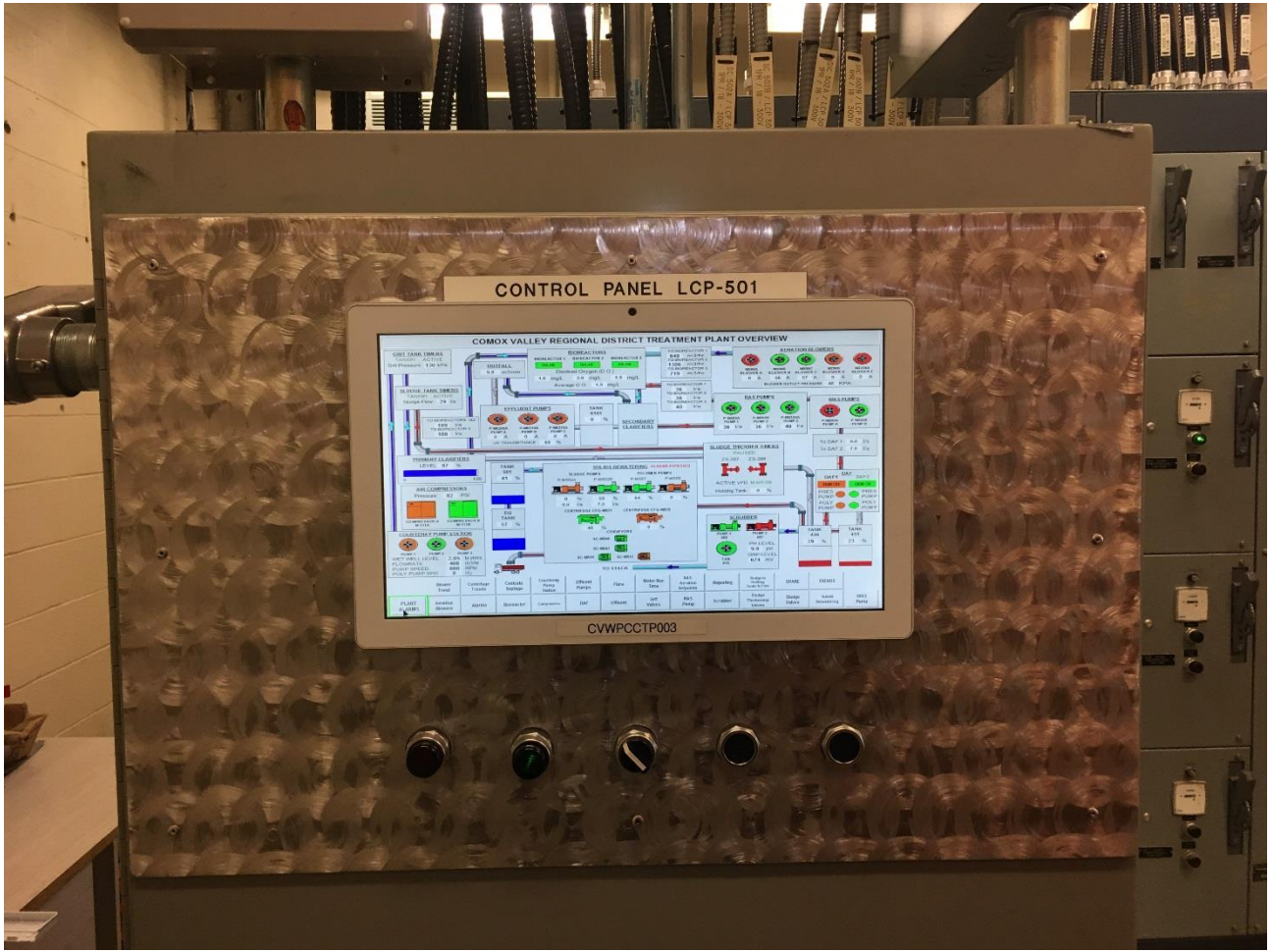
Idle in 9:59

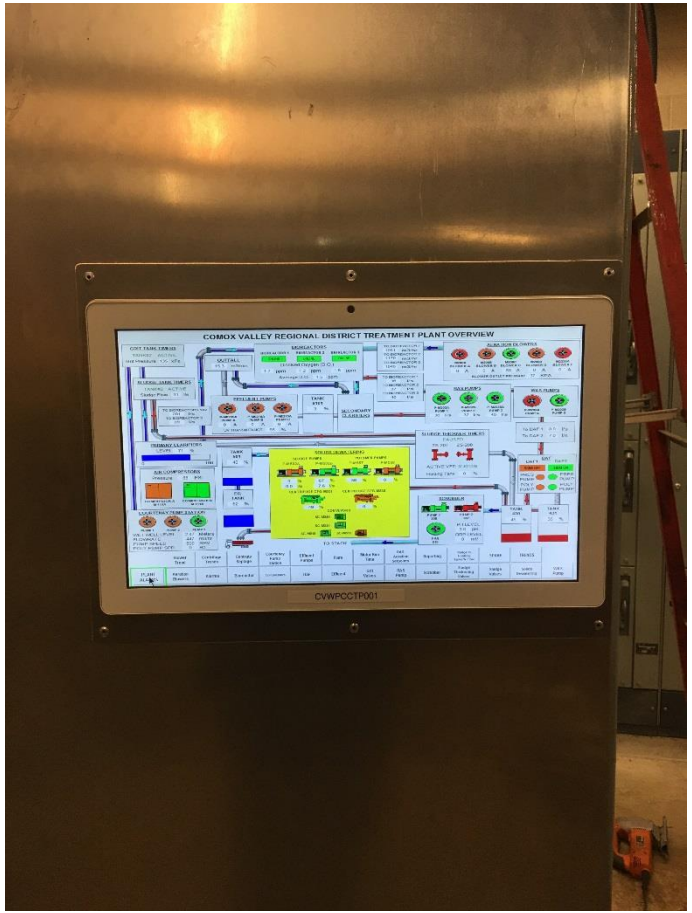
Original chart recorders for data collection

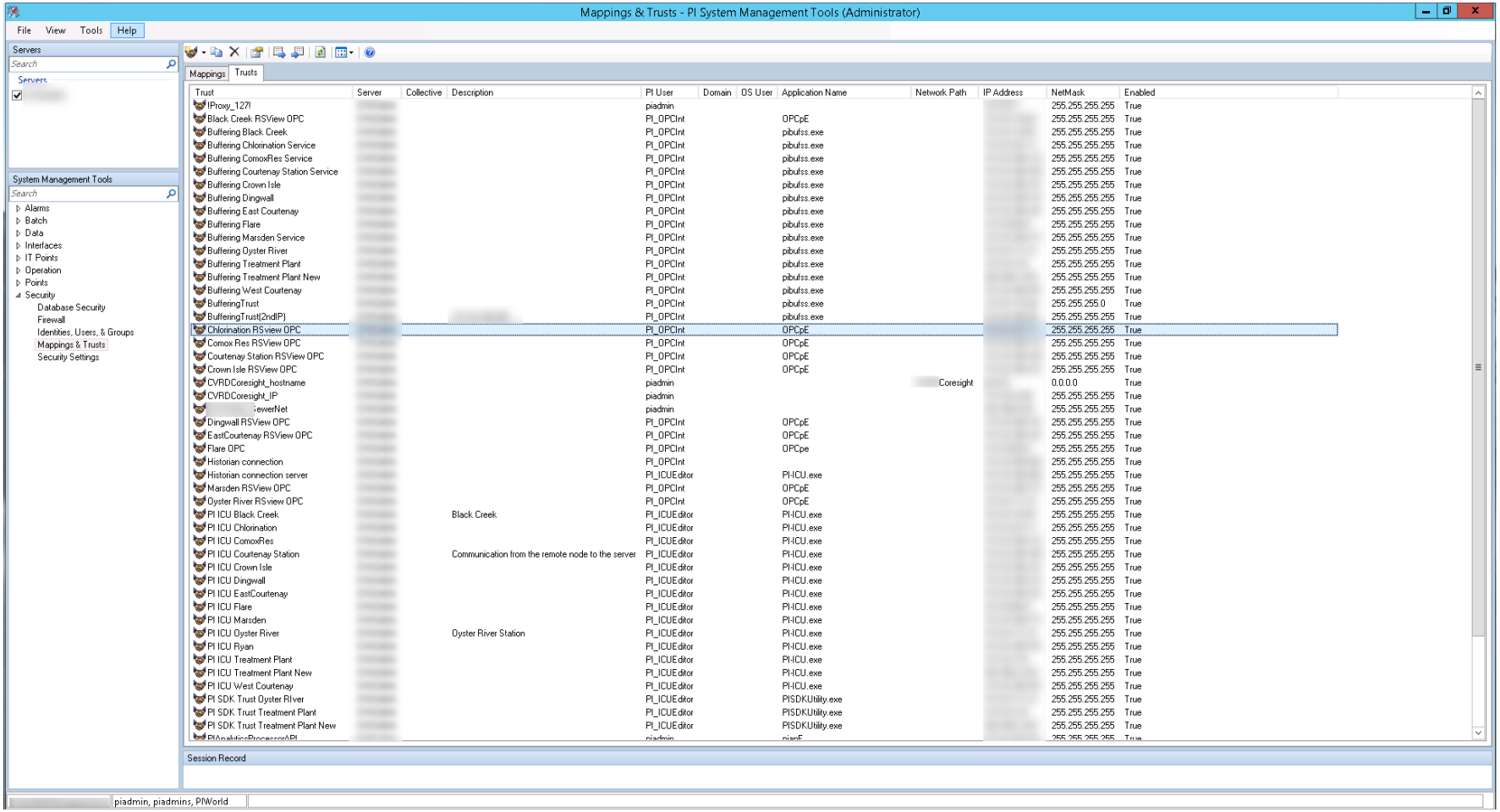
PI System® – PI Server™

Standard Configuration at Remote Sites

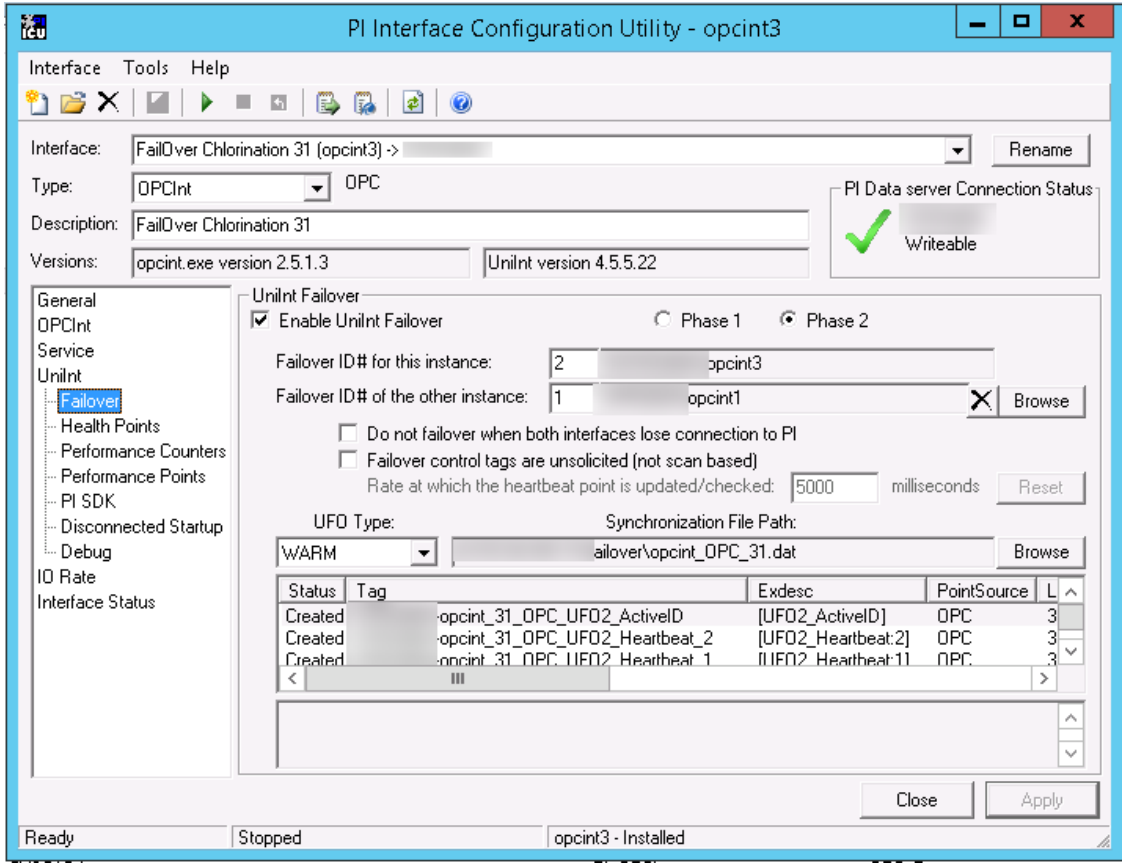




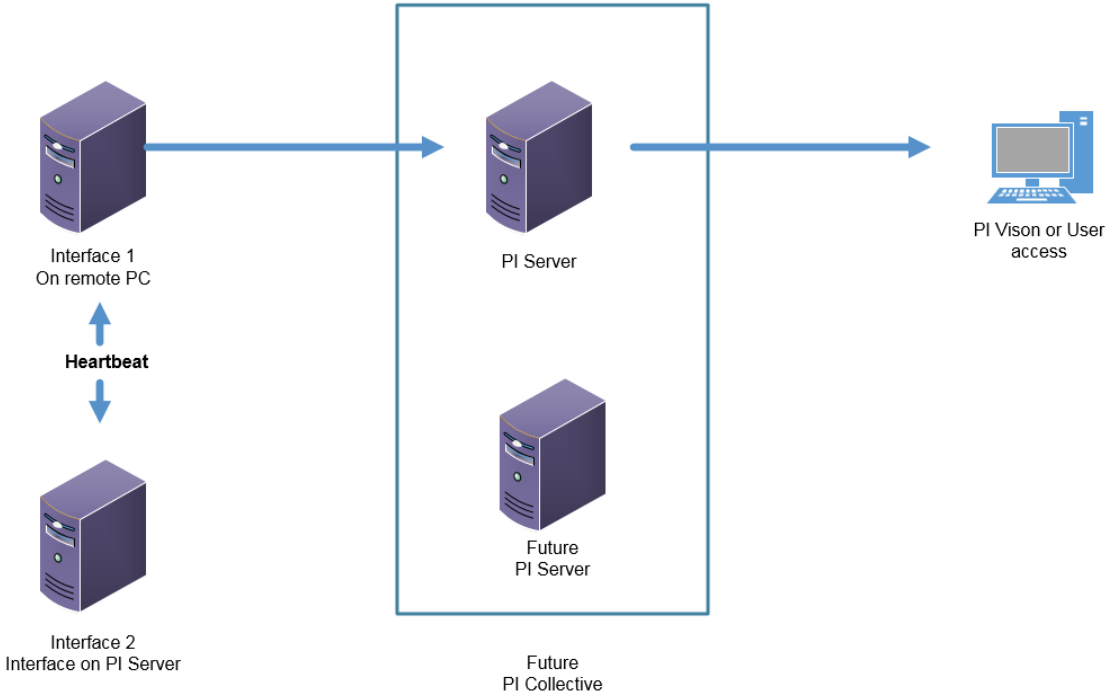




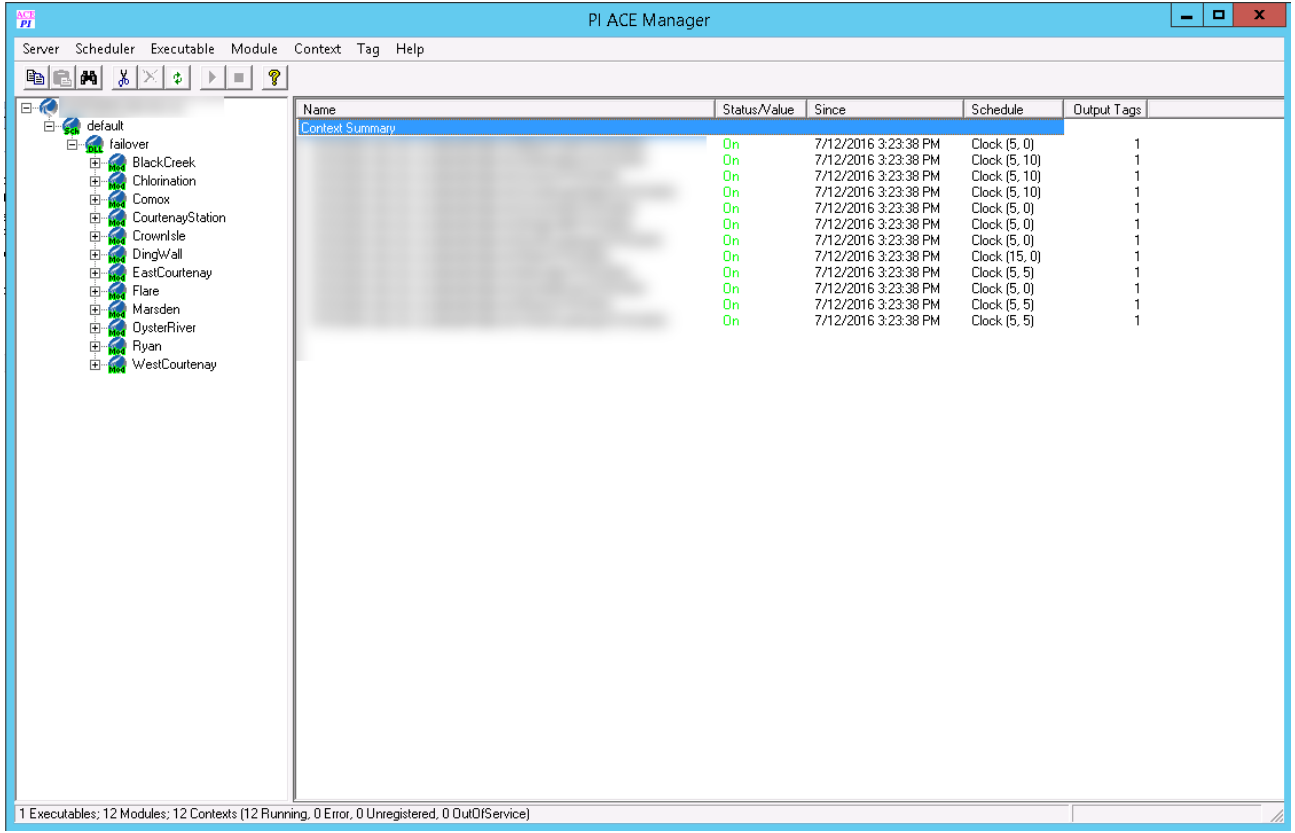
PI System Interface Failover



Failover and High Availability (HA)



Advanced Computing Engine (ACE)



PI Vision™
and
PI ProcessBook®
Visualization

PI Coresight

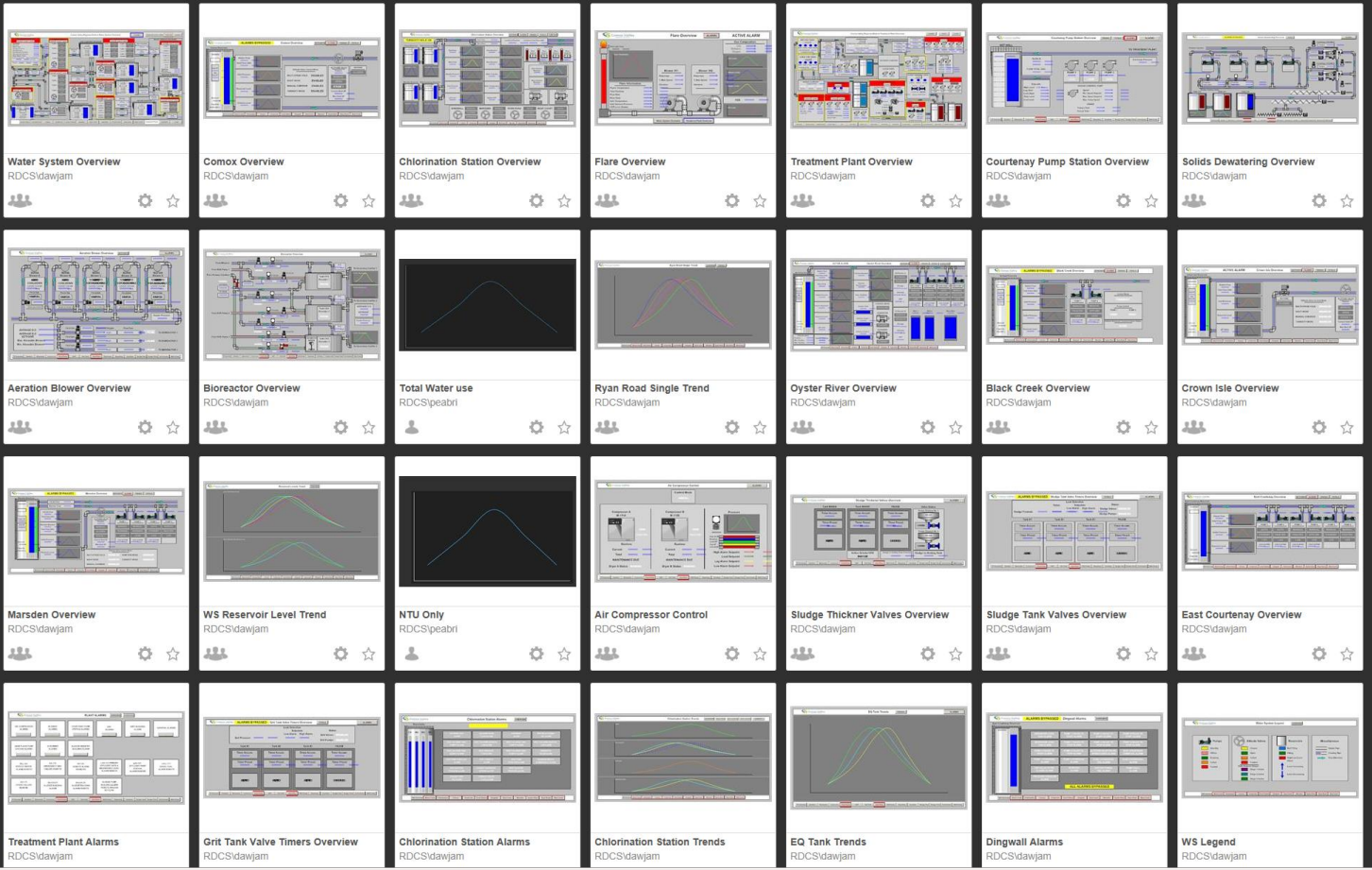
New Display | Brian Pearson

Search All Displays

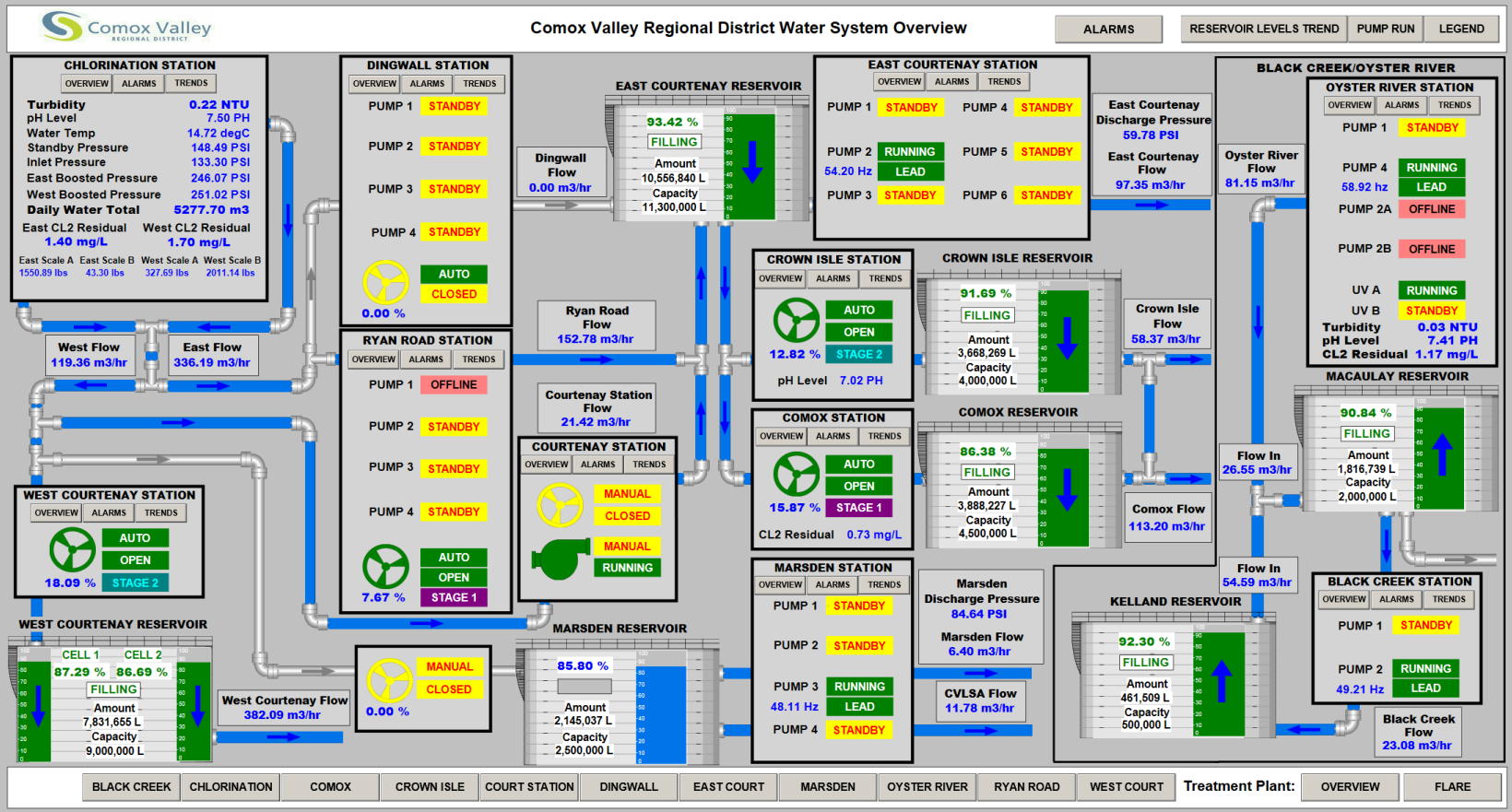
Filter by Keywords

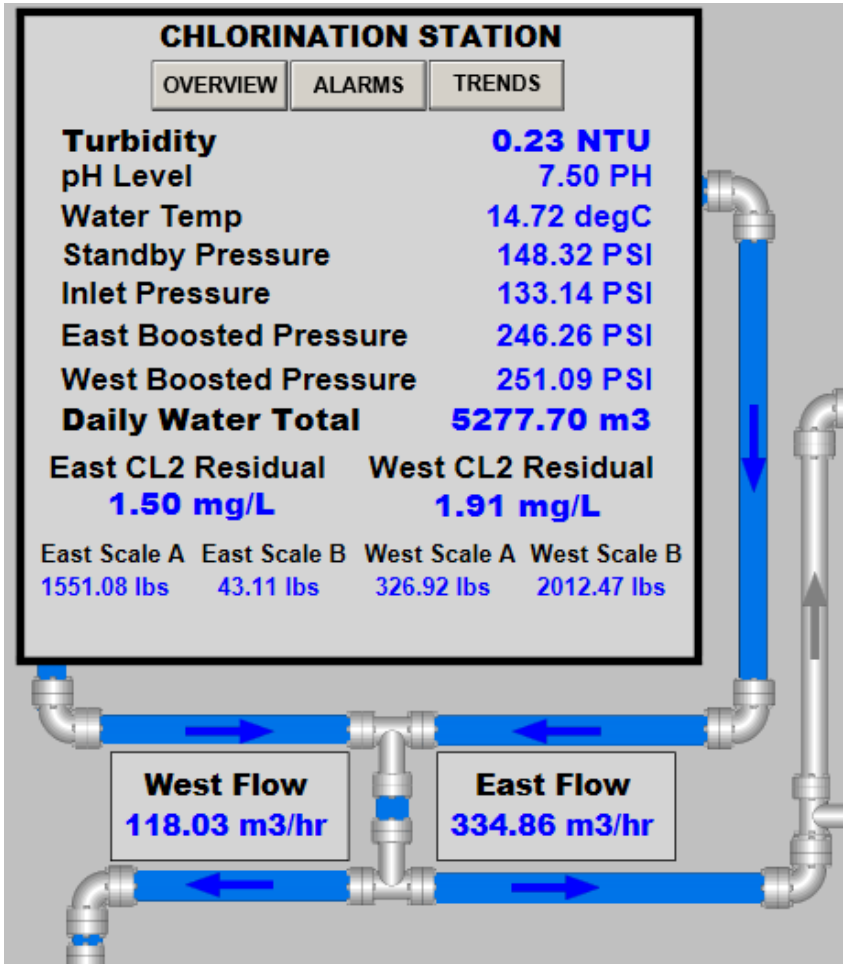
- All Displays
- Favorites
- My Displays
- Recent
- ProcessBook

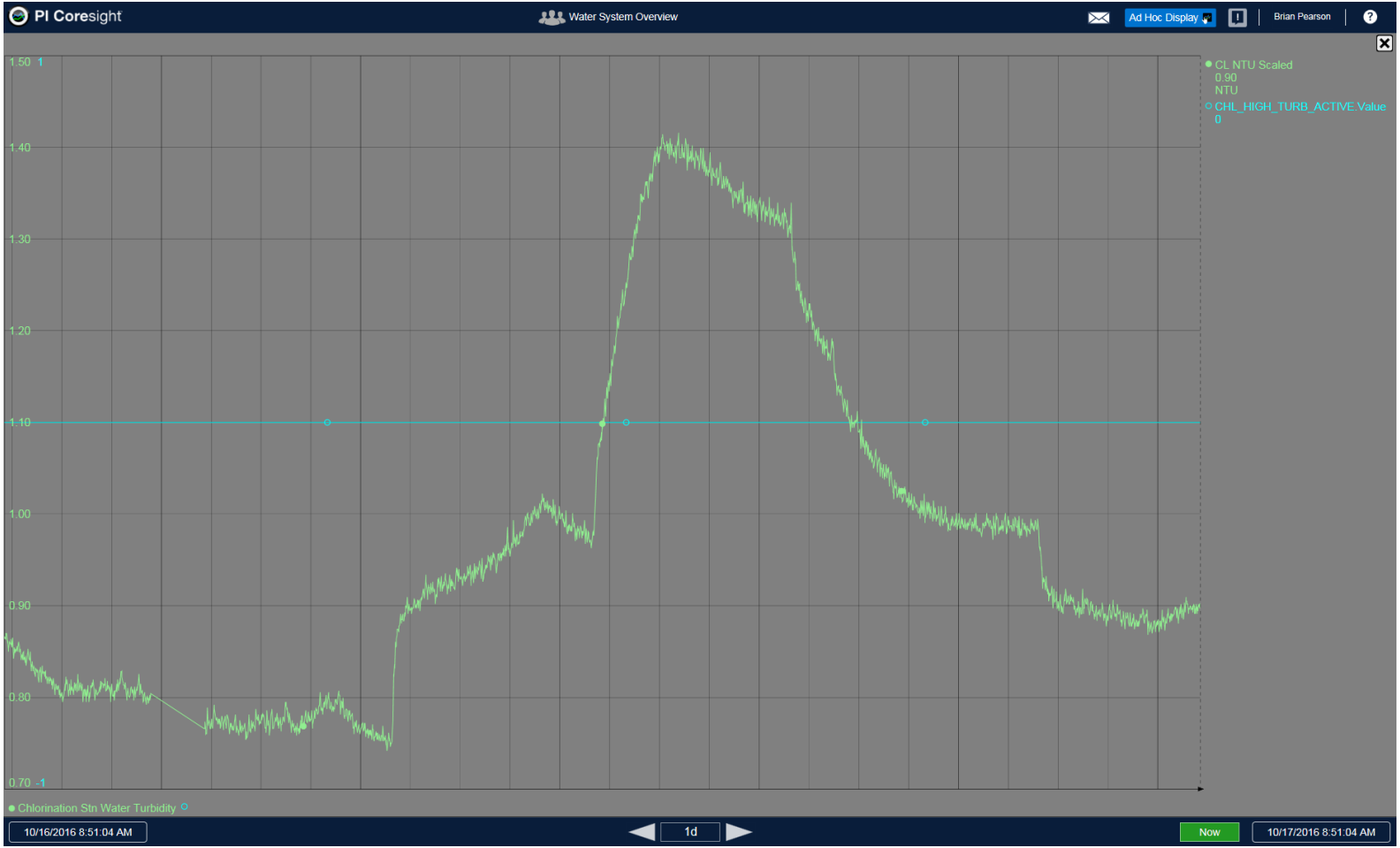
All Displays (148)

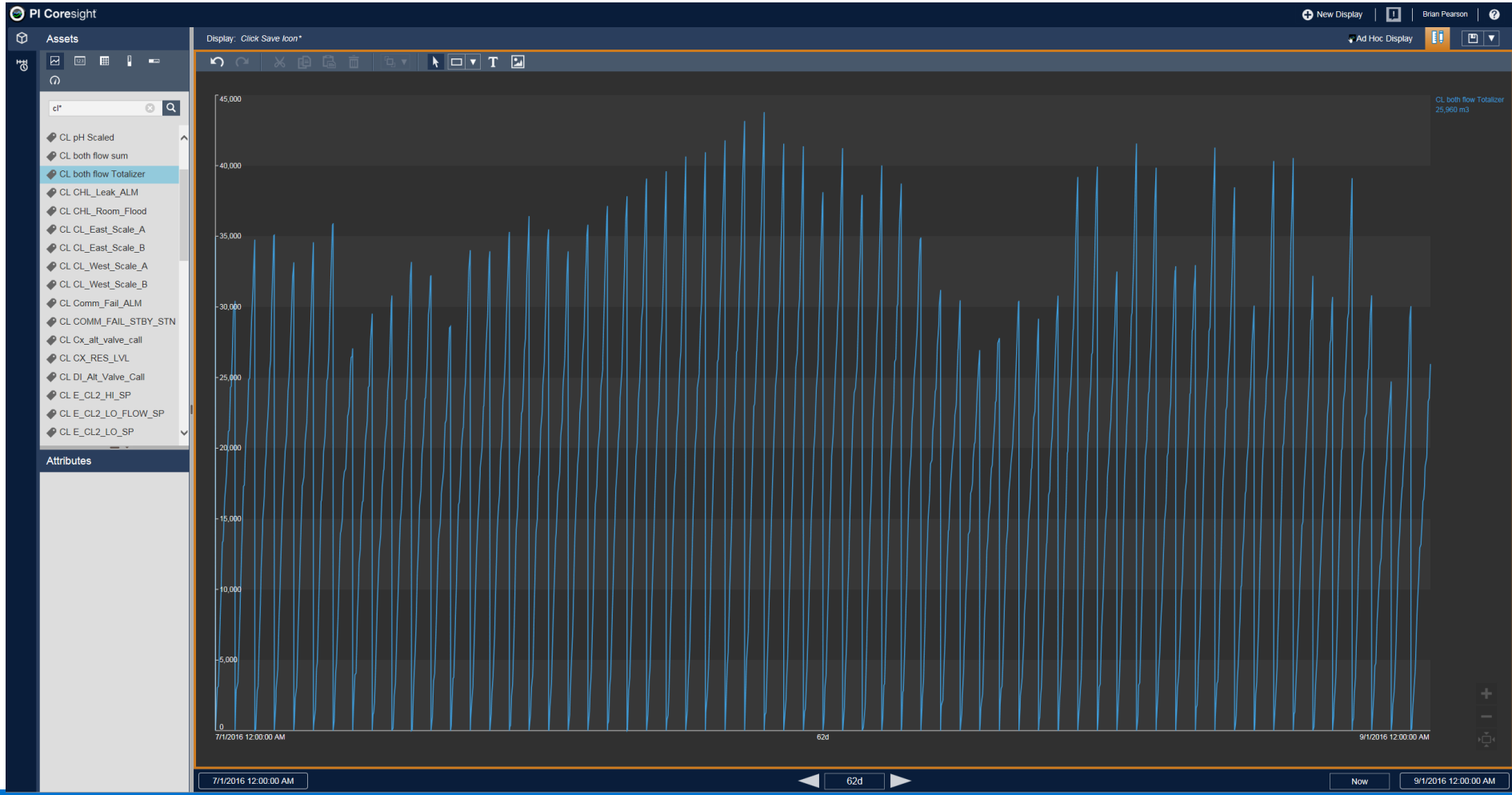


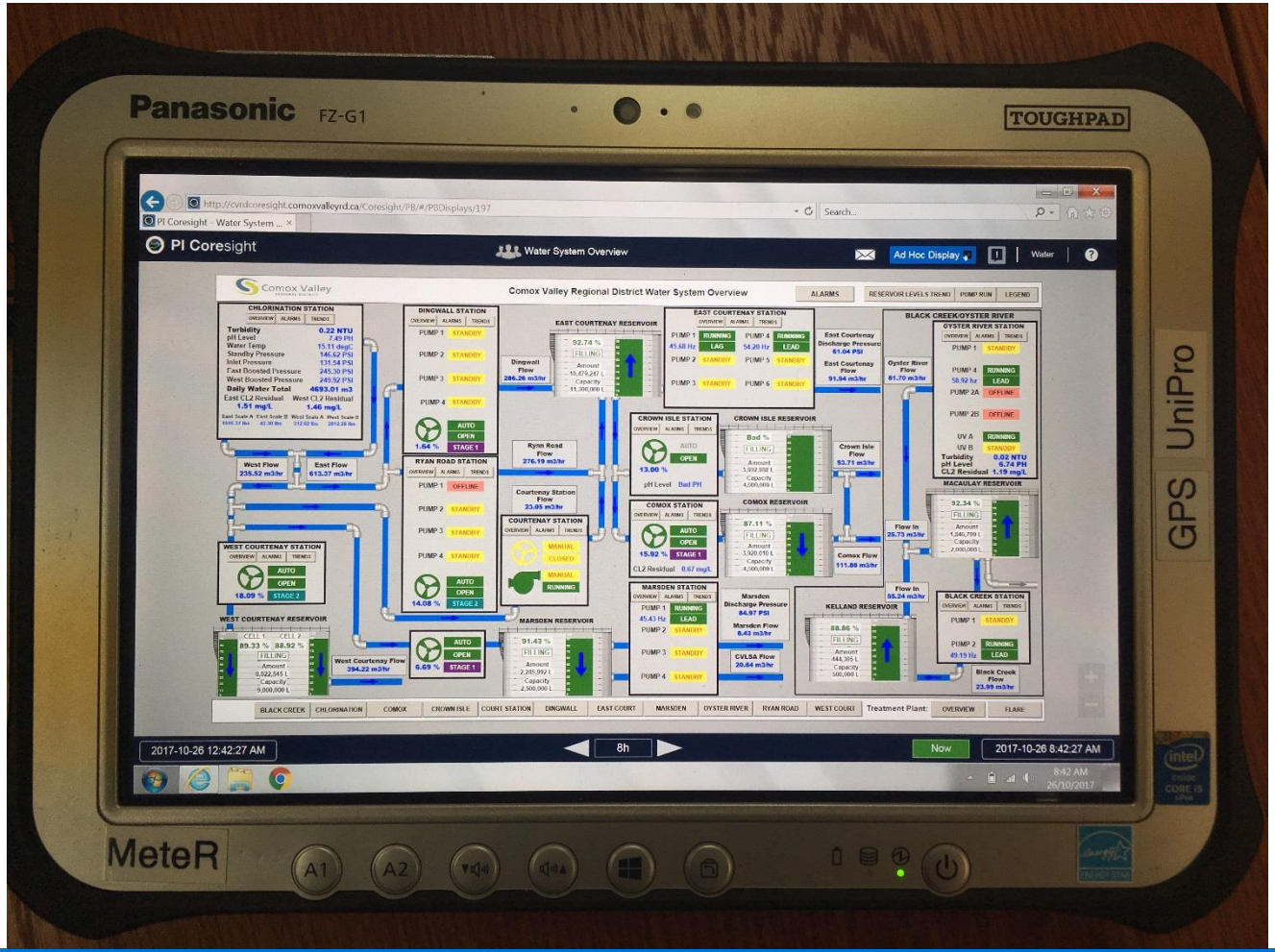
100%

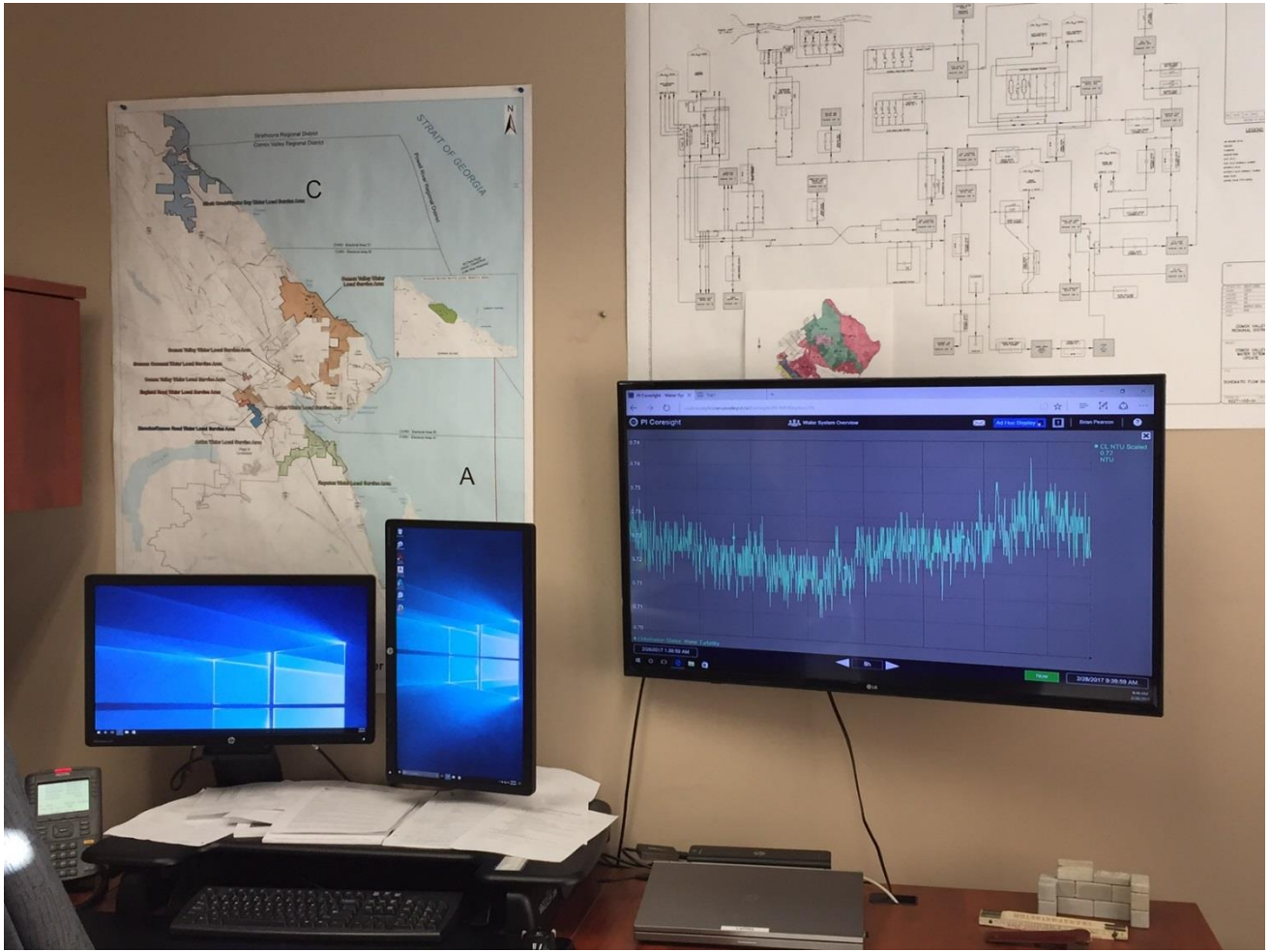


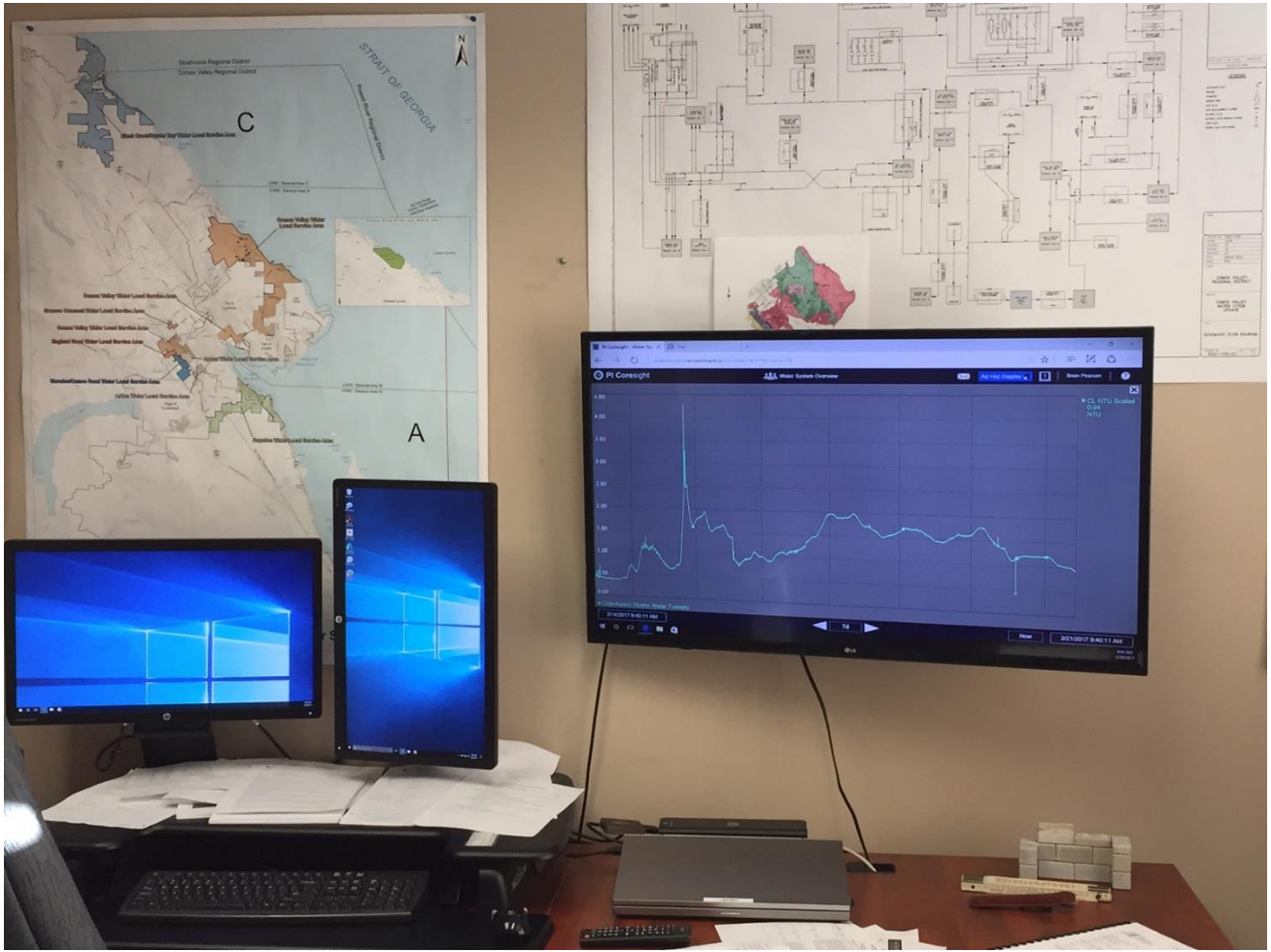


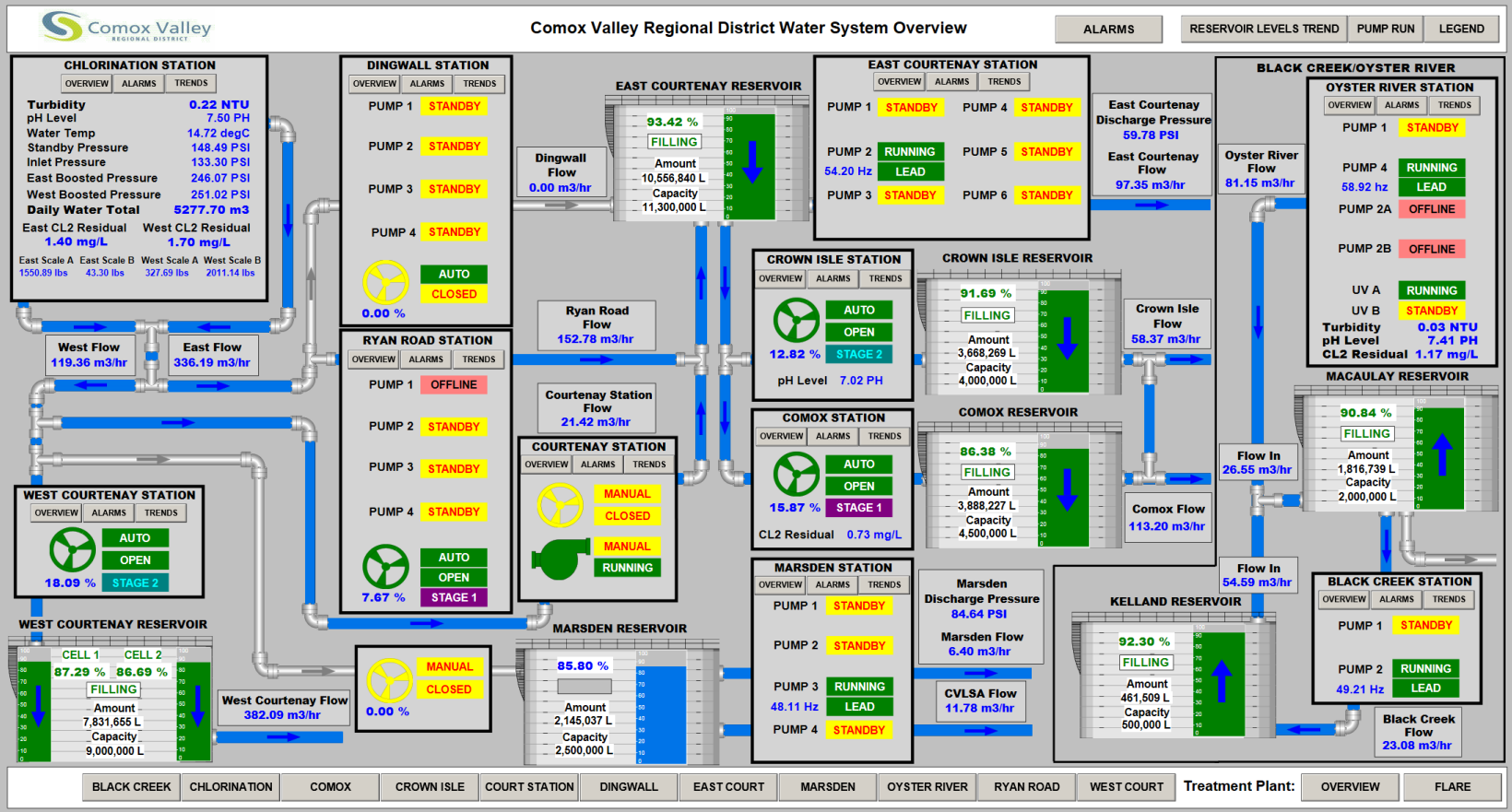










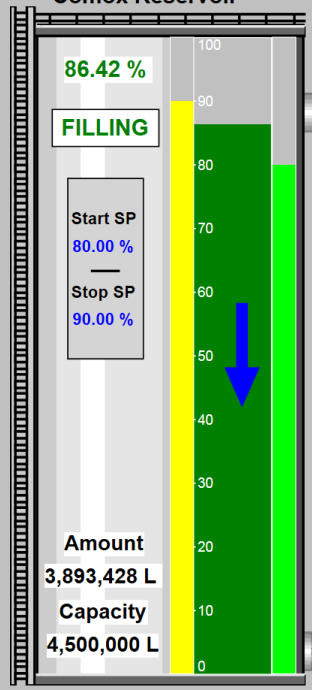


Comox Valley Regional District

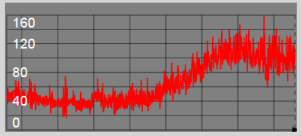
Comox Overview

SETPOINTS | ALARMS | TRENDS | TOTALS

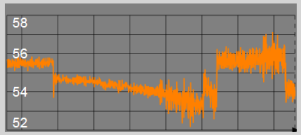
Comox Reservoir



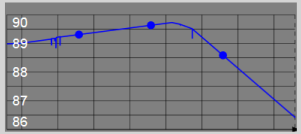
Station Flow
105.13 m3/hr
Total Flow (24h)
617.61 m3



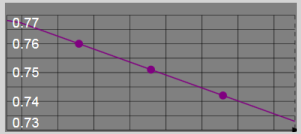
Inlet Pressure
54.08 PSI

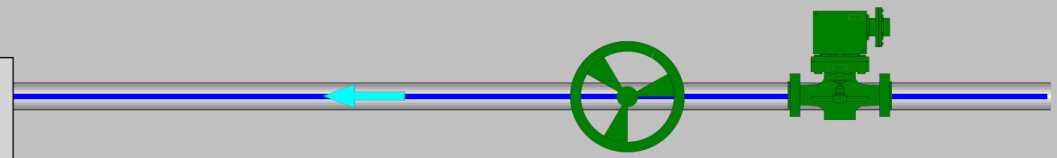


Reservoir Level
86.42 %



Chlorine Level
0.73 mg/L





Altitude Valve Control Mode

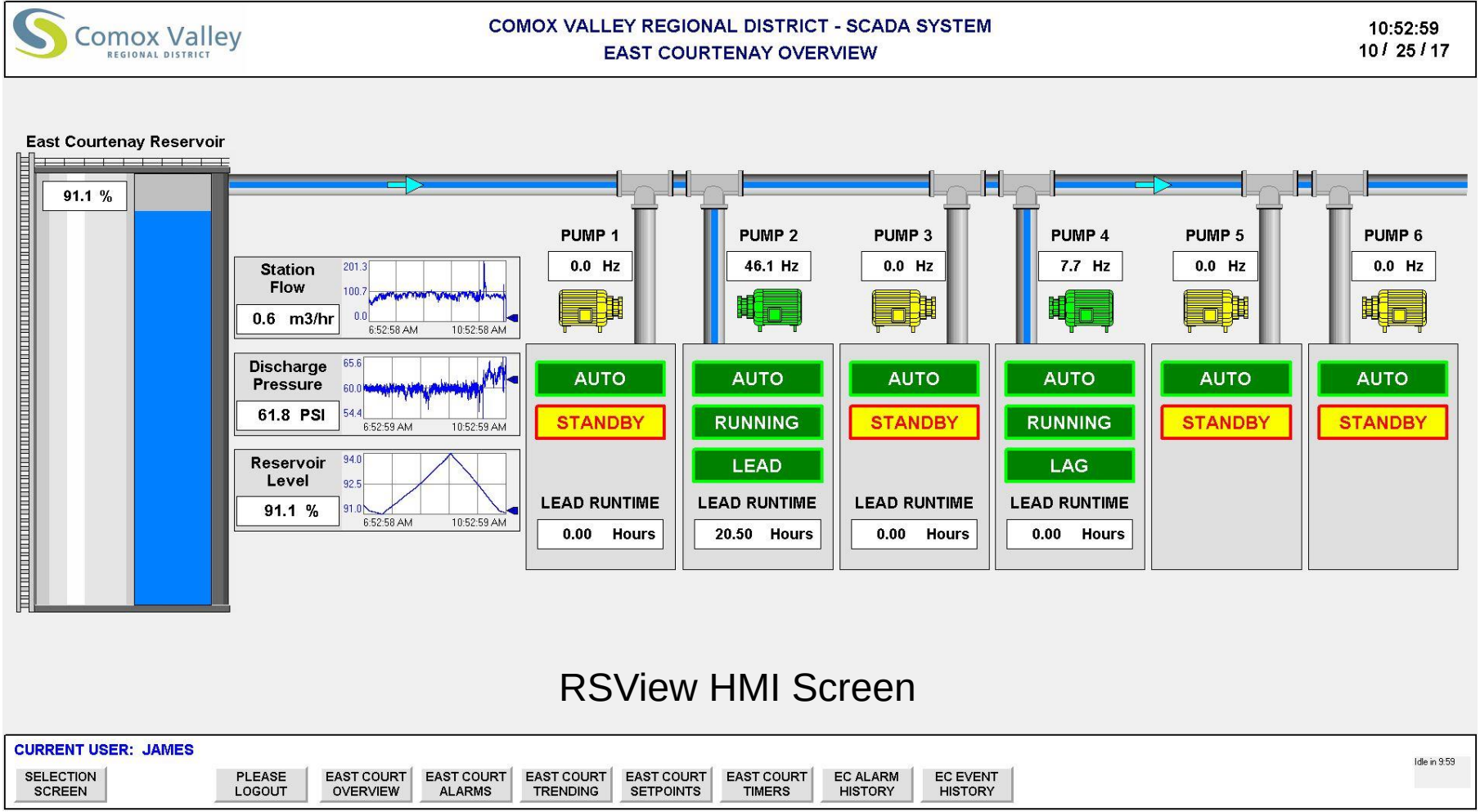
MULTI-STAGE HOLD	ENABLED
NIGHT MODE	DISABLED
MANUAL OVERRIDE	DISABLED
TURBIDITY MODE	DISABLED

ALTITUDE VALVE
Postion
15.93 %
AUTO
OPEN
STAGE 1
Current Hold SP
13.33 %
Max Hold SP
40.00 %

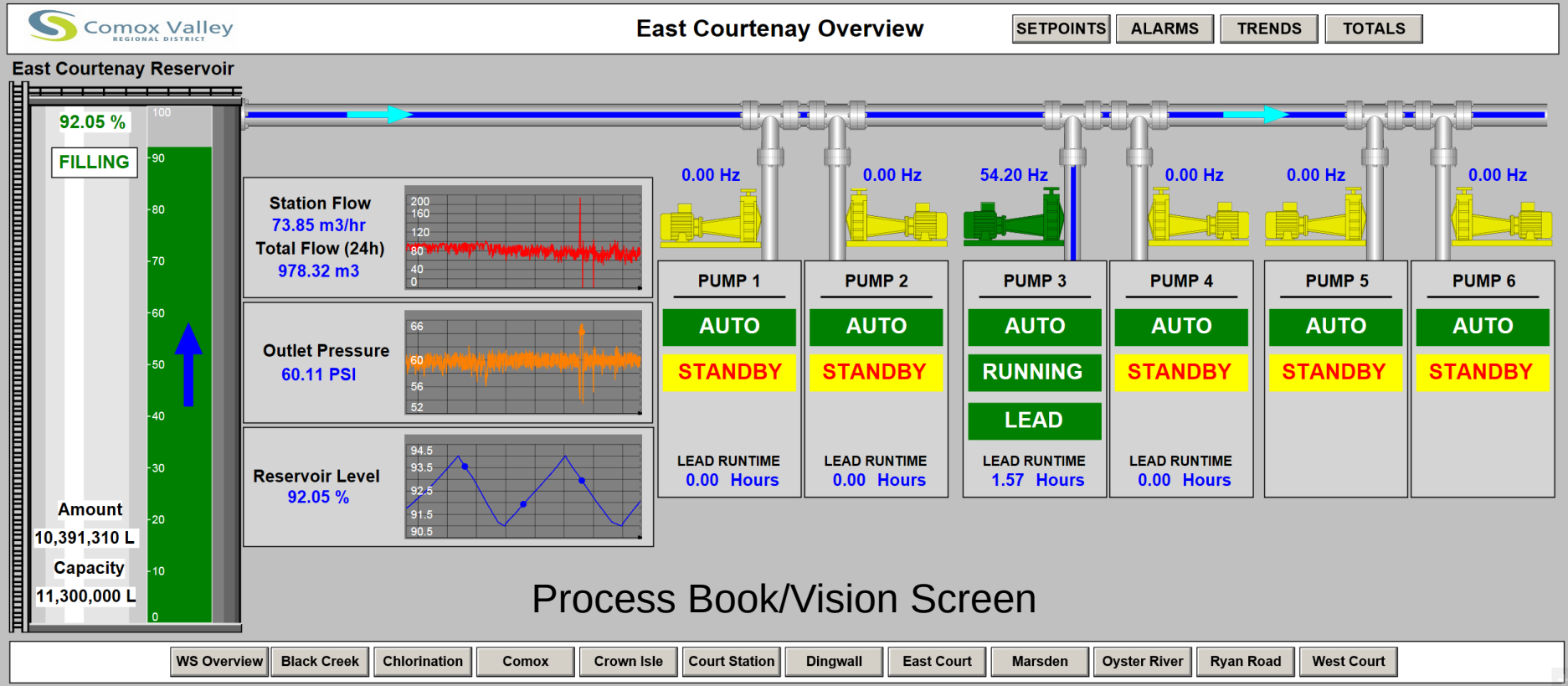
ROTORK
OPEN

WS Overview | Black Creek | Chlorination | Comox | Crown Isle | Court Station | Dingwall | East Court | Marsden | Oyster River | Ryan Road | West Court

10/25/2017 1:35:17 AM | 8h | Now | 10/25/2017 9:35:17 AM

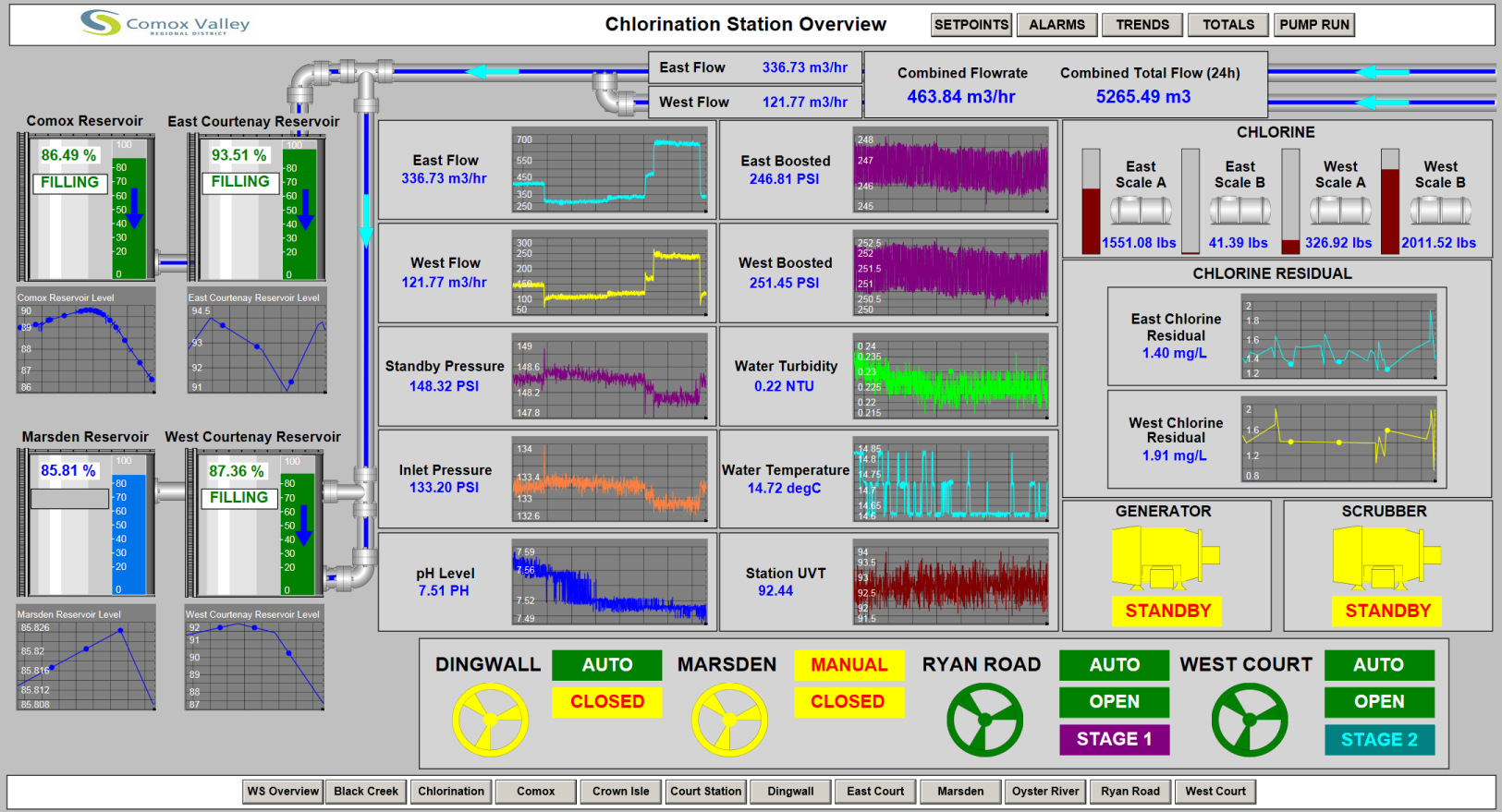


RSView HMI Screen



Process Book/Vision Screen

WS Overview | Black Creek | Chlorination | Comox | Crown Isle | Court Station | Dingwall | East Court | Marsden | Oyster River | Ryan Road | West Court

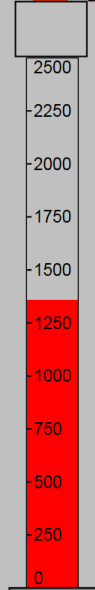


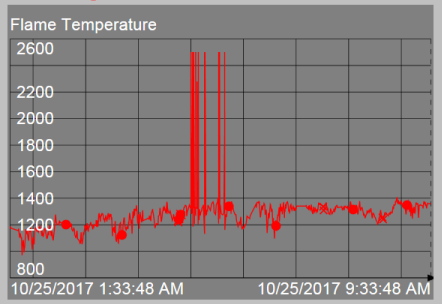
Comox Valley Regional District

Flare Overview

ALARMS

Pilot Light Temp
852 DegF





Flare Information

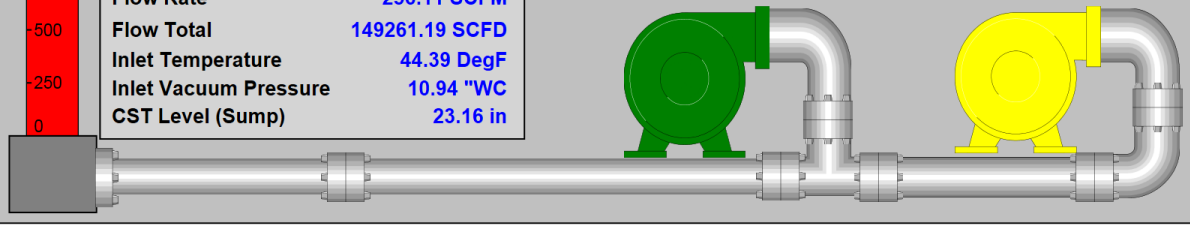
Flame Temperature	1358.20 DegF
Total Runtime	12190.00 Hrs
Flow Rate	256.11 SCFM
Flow Total	149261.19 SCFD
Inlet Temperature	44.39 DegF
Inlet Vacuum Pressure	10.94 "WC
CST Level (Sump)	23.16 in

Blower 301

Amperage	8.46 A
% Max Speed	37.73 %
Vibration	0.09 In/S

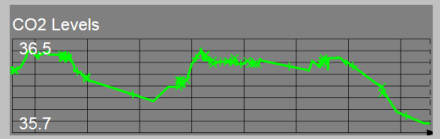
Blower 302

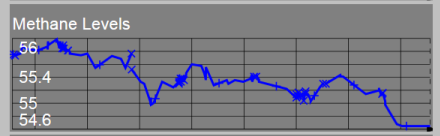
Amperage	0.19 A
% Max Speed	0.00 %
Vibration	0.04 In/S

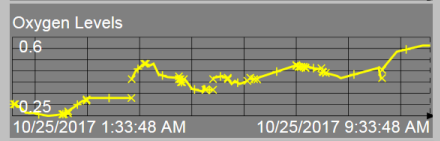


Gas Composition

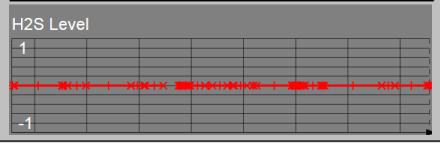
C02	35.78 %
Methane	54.65 %
Oxygen	0.56 %



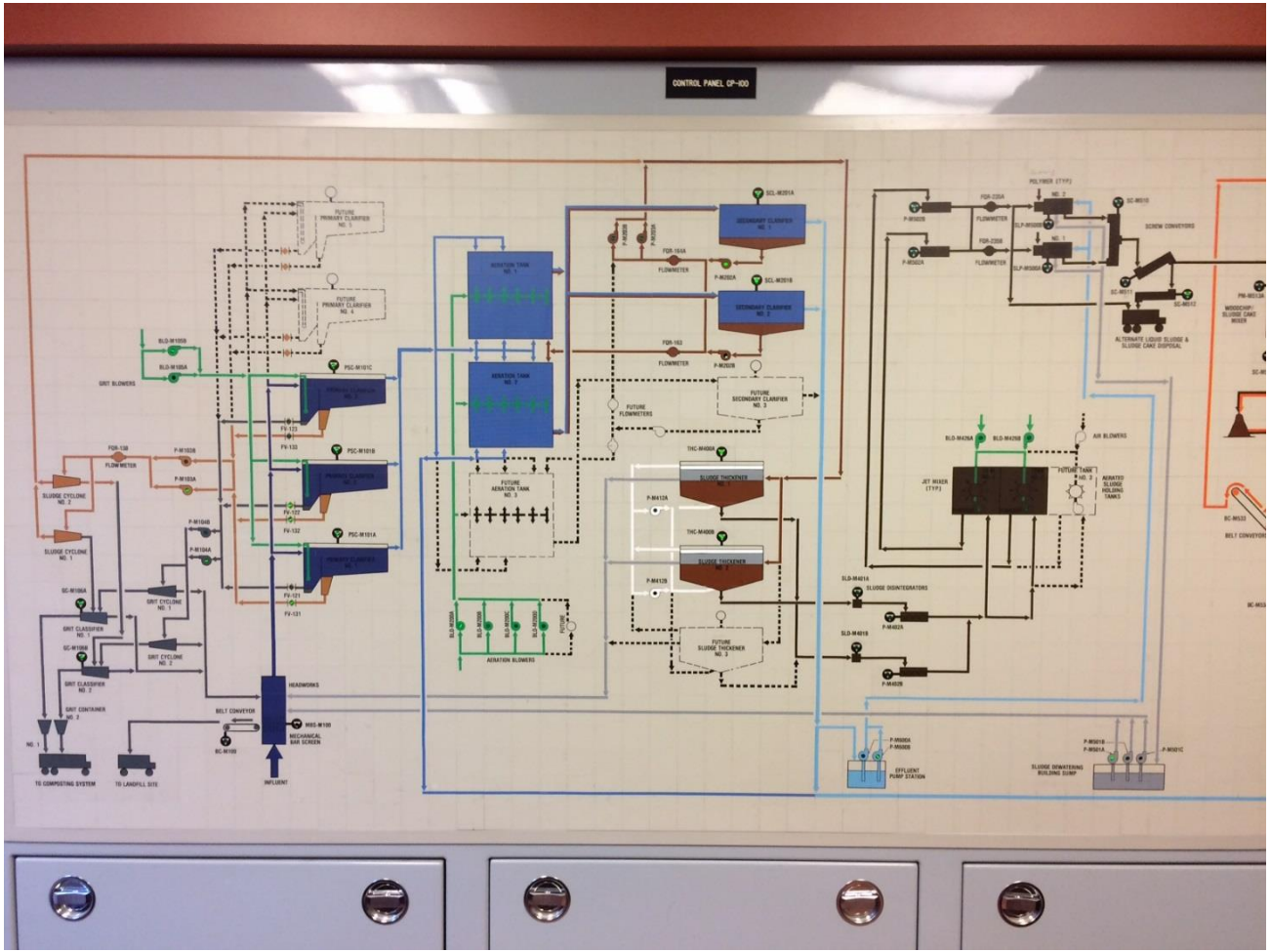


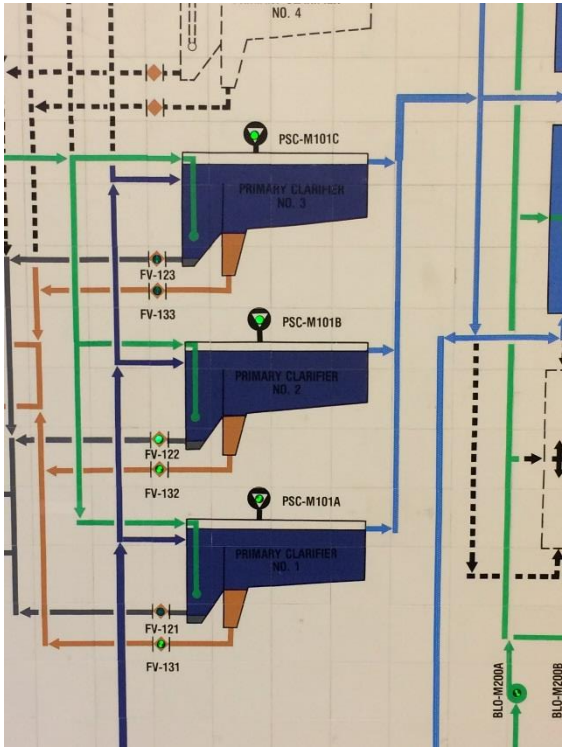


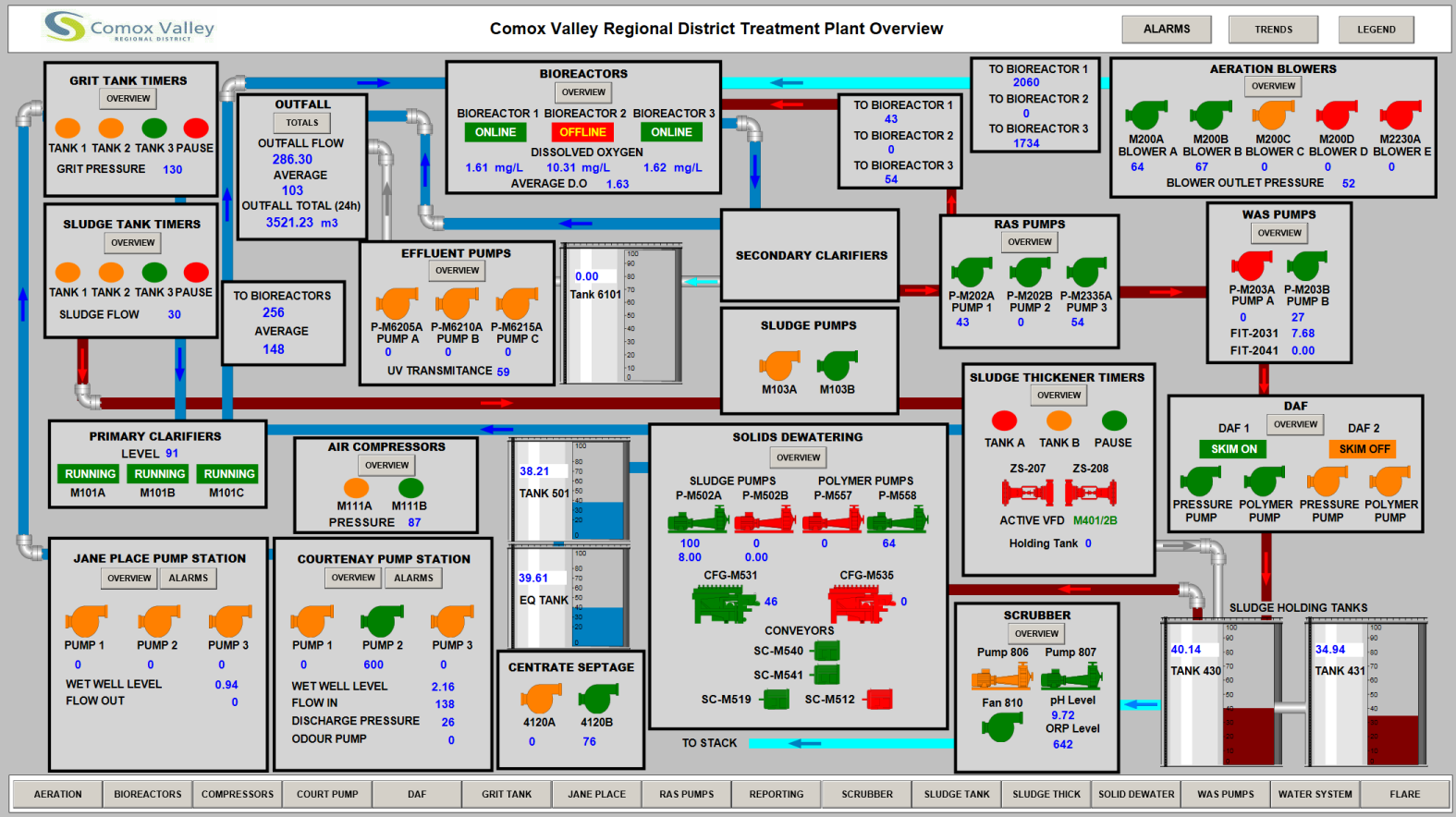
H2S 0.00 ppm

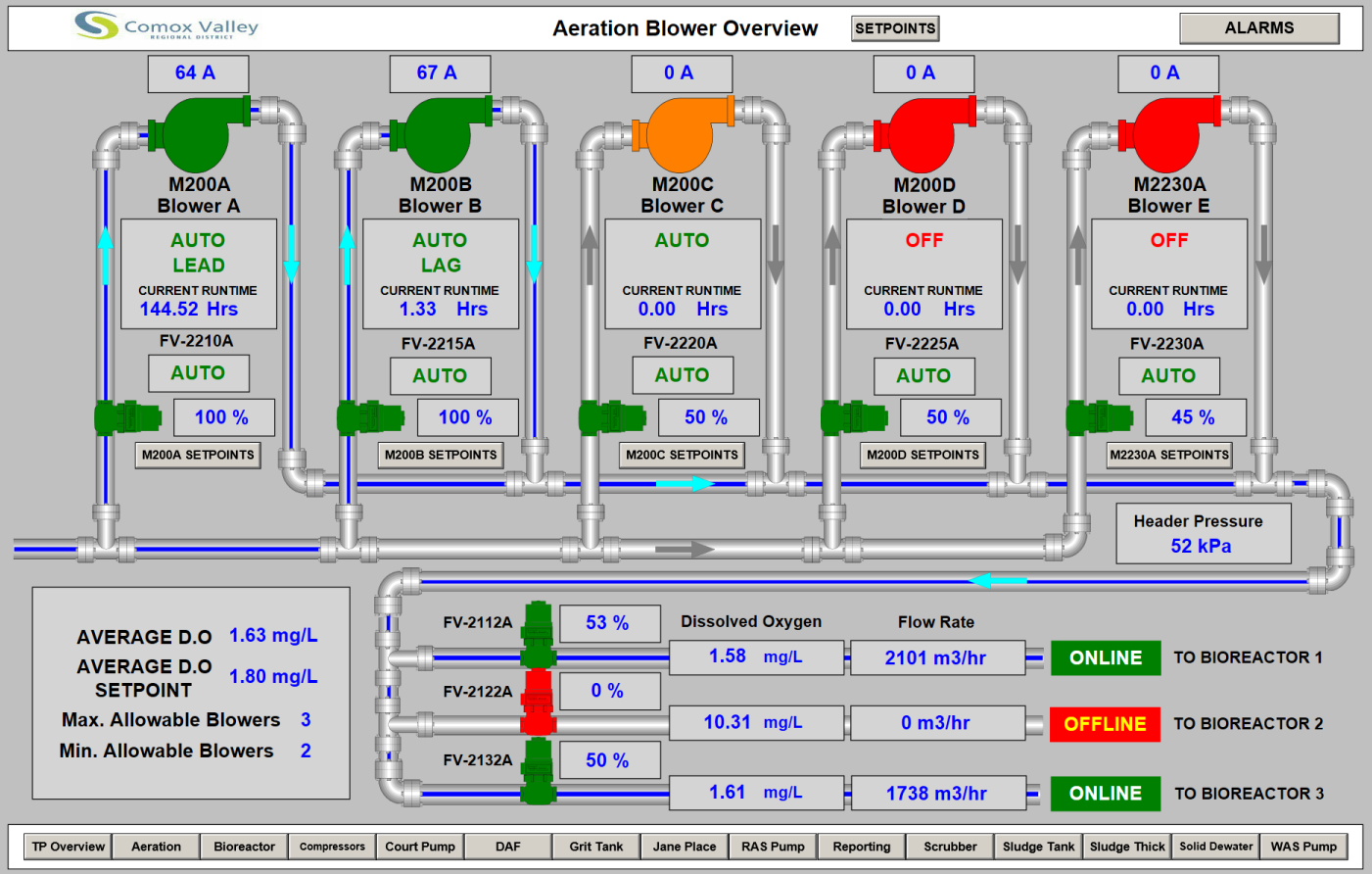


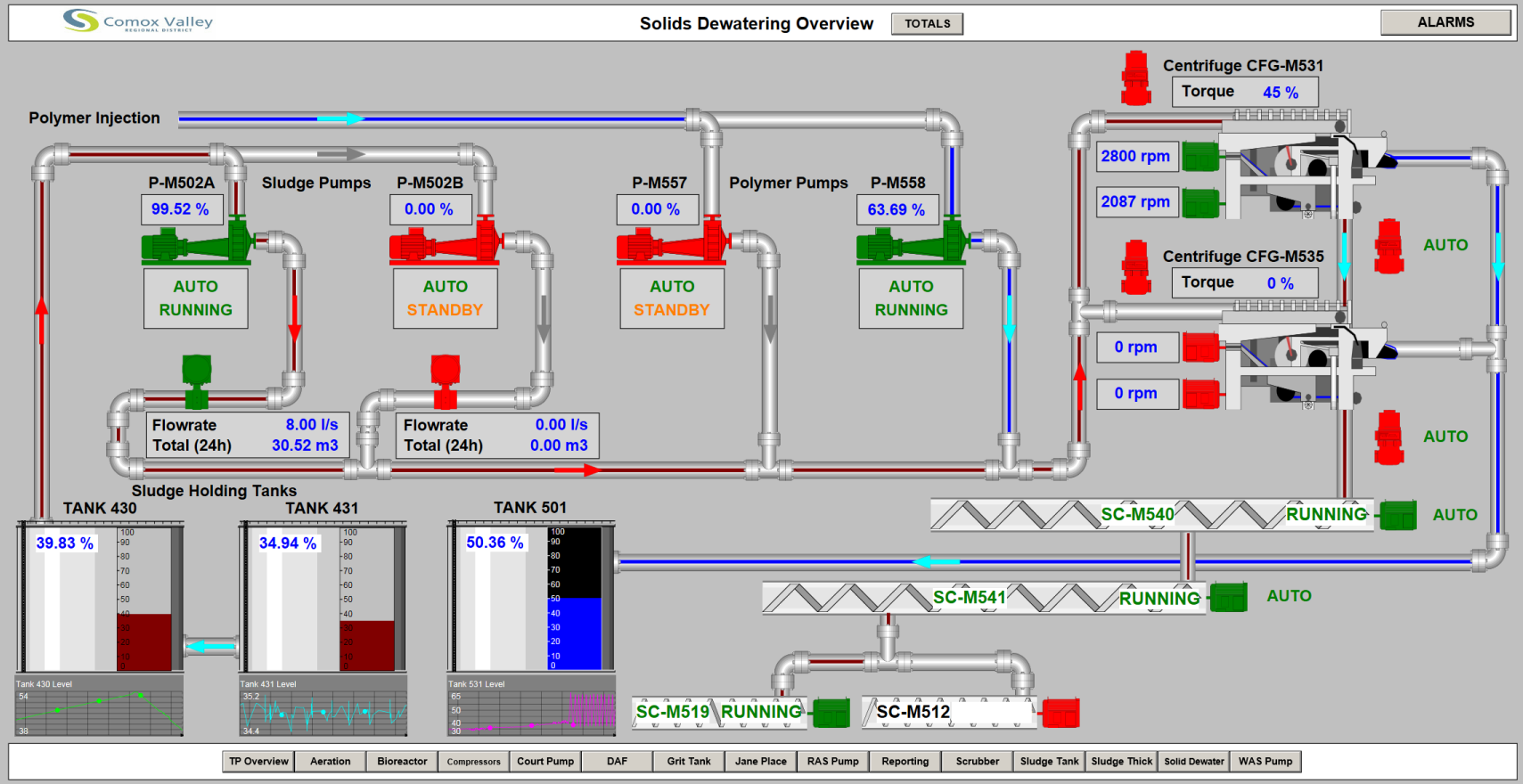
Water System Overview | Treatment Plant Overview









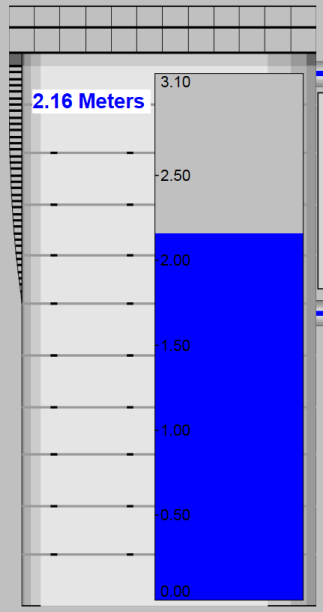


Comox Valley Regional District

Courtenay Pump Station Overview

TRENDS | TOTALS | ALARMS | ALARMS

WET WELL



FLOW IN
148 l/s
531 m3/hr

FLOW TOTAL (24h)
2324.93 m3

Setpoints

High Level	3.10 Meters
Lag Start	2.90 Meters
Lead Start	2.60 Meters
Stop Level	1.60 Meters
Low Level	1.50 Meters

TO TREATMENT PLANT

Discharge Pressure
26 PSI

PUMP 1	PUMP 2	PUMP 3
0 RPM	598 RPM	0 RPM
	LEAD	

ODOUR CONTROL PUMP

Speed	0 %
Min. Speed Setpoint	0 l/s
Max. Speed Setpoint	180 l/s
Max. Pump Speed	0 %

USAGE

Today's Total	104 Liters
Overall Total	407 Liters

TP Overview | Aeration | Bioreactor | Compressors | Court Pump | DAF | Grit Tank | Jane Place | RAS Pump | Reporting | Scrubber | Sludge Tank | Sludge Thick | Solid Dewater | WAS Pump

10/25/2017 1:32:54 AM | 8h | Now | 10/25/2017 9:32:54 AM

Meeting our Business needs

- **PI System®** allows us to bring all data from remote water, sewer and Solid waste stations to central office, and to all points on the WAN
- **PI System®** allows for collection through many methods as well as providing failover for the many different network connections between remote sites
- **PI System®** centrally stores and archives data from remote sites and allows for data analysis and monitoring in real time, anywhere
- **PI Vision™** allows staff members in several different departments, at many remote sites to view, monitor and analyze collected data quickly and easily.

PI Server™ - Metrics

- **Data Archive** and **PI Interface™** have created a redundant, easily accessible data system
- **PI Server™** has centralized data collection for 27 remote sites
- Removed the need for sneaker net – staff going to remote sites to fetch data
- Extensive savings in record management, staff time, and time required to maintain historic data. (some sites were still using chart recorders)
  - 4 hours a week saved to collect scan and store chart records – Approx savings $8K/year

PI ProcessBook® - Metrics

- **PI ProcessBook®** has given the ability to create graphic rich HMIs for all PLC controlled sites.

- Has quickly become the standard viewing HMI for all sites, local site control is still RSView and Factory Talk

- **PI ProcessBook®** has allowed single point control of set points for reservoir filling, water control and pumping
  - Savings of 3 man hours per set point change – this can happened several times a week, or day. Savings : $8K /year

PI Vision™ - Metrics

Water

- **PI Vision™** has allowed the water department to monitor in real time the effects of changes to our water system that enable the CVRD to develop a more dynamic water delivery system
  - Reducing water pumping
  - Electricity use
  - Wear and tear on all aspects of water system
  - Real time monitoring allows for prioritization of site visits
  - Increased safety for operators – less late night traveling to sites
  - Savings in late night call outs per year: Approx $10K/year

PI Vision™ - Metrics

Sewer

- **PI Vision™** has allowed the sewer department to monitor in real time remote sites that are 25+ kilometers away
  - Reducing staff travel time and efficiencies during the day
  - Allows for prioritization of site visits for the day/week
  - Electricity use through real time monitoring and adjustments
  - Reductions in wear and tear on all aspects of the treatment plant systems and pumping systems

PI Vision™ - Metrics

Engineering and management staff

- **PI Vision™** allows staff to easily access data and generate needed analytics on data.
  - Saving many hours a week of SCADA tech time using PI Datalink®: Savings of approx. $5k – 8k/yr
  - Managers and Staff generate their own graphs, analytics or data downloads that they need through the course of a day.
  - All data is accessible, exportable and usable in many applications

Next Steps with data and PI system

Incorporating really remote Field Data

- Two rivers affecting water turbidity in Comox Lake, regional source of drinking water
- Need to collect turbidity data from remote data recorders
- No access to power, microwave connections or cellular data
- Satellite data connection through NOAA satellite
- Data to be incorporated into the PI System® using PI UFL Connector
- Compare turbidity from source to entry to water system

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- Senior Manager of Information Systems & GIS
- Comox Valley Regional District

Questions

Please wait for the **microphone** before asking your questions

State your **name & company**

Complete the Post Event Survey