MPE Engineering Ltd.

Report for:

Municipality of Crowsnest Pass

SCADA PHASE III ENGINEERING SERVICES

CONTROL SYSTEM MASTER PLAN

Date: January 2018
Project #: 1776-001-00

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Executive Summary

The Municipality of Crowsnest Pass provides water and waste water services to residents within the Municipality. By using a Supervisory Control and Data Acquisition (SCADA) system the operators are able to monitor and control the water and waste water facilities. For the SCADA system to function properly all components that make up the SCADA system must be functioning properly, available for replacement and performing to meet current industry standards.

The Municipality commissioned MPE Engineering to complete an assessment of the current installed controlled system. MPE visited each control location and documented all control components. A worksheet for each site was then created listing all the control components and providing pictures of the sites. The control components were then compiled and it was determined if they were still active and supported or discontinued and needing a replacement.

MPE then met with operators and managers from the Municipality to ascertain their requirements on how the SCADA system should operate. The requirements the Municipality developed were: core functionalities of a modern SCADA system, be able to control and monitor the system, be a sustainable system and get training that will improve their ability to use the SCADA system.

Through the assessment and requirements MPE created this document, Control System Master Plan. It details a list of recommendations that should be completed to keep the SCADA system operating smoothly and with limited interruptions in future years. By completing the recommendations, the SCADA system will receive the following benefits:

- Increased system uptime
- Improved ability to monitor and control the system
- Keeping the SCADA system sustainable by replacing outdated components

This report provides a detailed examination of the SCADA system as well as the requirements and recommendations for system improvements. Each recommendation is costed and scheduled, resulting in a recommended investment of **$315,000** in the SCADA systems over the next five years.

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January 18, 2018
File: 17\76\001\00\R01

Attention: Mr. Patrick Thomas
Director of Development, Engineering and Operations

Dear Mr. Patrick:

Re: Control System Master Plan

We are pleased to submit the final copy of the above noted report. We thank you for the opportunity to be of service and to have prepared this report on your behalf. We look forward to assisting you in any further study on your water and wastewater systems, continuing to help you improve upon the services that are provided to your residents.

If you have any inquiries regarding our report or if clarification is required, please contact the undersigned.

Yours truly,

MPE ENGINEERING LTD.

Zane Spencer, P.Tech.(Eng.)
Senior Controls Technologist

zs/ns

Enclosure

CORPORATE AUTHORIZATION

This report has been prepared by MPE Engineering Ltd. under authorization of the Municipality of Crowsnest Pass. The material in this report represents the best judgment of MPE Engineering Ltd. given the available information. Any use that a third party makes of this report, or reliance on or decisions made based upon it is the responsibilities of the third party. MPE Engineering Ltd. accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or actions taken based upon this report.

Should any questions arise regarding content of this report, please contact the undersigned.

MPE ENGINEERING LTD.

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Zane Spencer, P.Tech.(Eng.)
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TABLE OF CONTENTS

Appendix A – Network Map
Appendix B – Spare Parts Inventory List
Appendix C – Recommended Spare Parts List
Appendix D – Site Assessment Sheets

1.0 INTRODUCTION

1.1 Project Background

MPE was commissioned by the Municipality of Crowsnest Pass (Municipality) to complete an assessment of the control systems in use at the Municipality's Water and Wastewater Utilities. Specifically, the Municipality wishes to identify deficiencies in the existing system and determine what new features and functionality is available for the Municipality's consideration as systems are upgraded in years to come.

The purpose of this report is to provide the Municipality with an overall assessment of the existing control system infrastructure as well as a benchmark against industry standards and best practices. Recommendations are then presented for the Municipality's consideration.

1.2 Scope of Work

Major tasks for this project included:

- Complete site investigations of existing control system equipment and spare parts
- Develop and deliver preliminary version of this report with information from site investigations
- Host a working group session with Municipality staff to discuss the requirements and goals of the SCADA and control system
- Update report with discussions from working group session and Municipality's vision for control system
- Update report with recommendations, schedules and cost estimates
- Meet with Municipality to finalize report and plan steps forward

2.0 EXISTING CONTROL SYSTEMS

In November of 2017 MPE completed a site assessment tour of all control locations within the Municipality. Each site was visited to document control components installed; which included getting model and part numbers and photographs of the components. Once each site was visited a worksheet was completed that documented the findings and gave a brief overview of each site. By completing this exercise all PLC and HMI model and part numbers were collected and used to check the status of all parts.

2.1 Programmable Logic Controllers

An inventory of the Frank STP, Bellevue WWTP, and other remote sites components were compiled and are included in the Site Assessment Sheets in Appendix B. The Municipality uses Allen Bradley PLCs, ELPRO Wireless I/O modules and Schneider Electric TSX Momentum PLC's throughout the control system.

2.1.1 PLC Hardware Components

The Allen Bradley PLC's used are either MicroLogix 1500 or SLC 5/05. The MicroLogix 1500 controllers that are used extensively throughout the Municipality are now discontinued by Allen-Bradley and the product is no longer manufactured and not readily available for purchase. The SLC 5/05 used at the Frank STP are now considered active mature and the product is fully supported but a new product exists.

The ELPRO I/O radio's used are either the 905U-4 or 905U-2; with the different end number indicating different I/O points available on the module. The I/O Radios are used at sites that are monitoring values but have no PLC's at that location. The Gateway Radio, 905U-G-MD1, are used at sites which have a PLC and the Radio communicates back to Frank STP. The I/O Radios and Gateway Radios are still supported and available from ELPRO with no plans to discontinue the product at this time.

The TSX Momentum processors used are the 171 CCC 960 30 and the 171 CC 760 10 and are used at the Kananaskis Wilds Pump House and the Southmore Pump House respectively. These are the two stations that are scheduled to be added to the SCADA system in the near future. The controllers have been discontinued by Schneider Electric and are no longer readily available but there are replacement controllers available which would allow the existing I/O modules to be re-utilized. The modern series of controllers use the latest programming software (unity Pro XL).

2.1.2 PLC Programming Environment

The MicroLogix and SLC 5/05 PLC's are programmed using RSLogix 500 which is considered an active mature product. This programming software is still widely used and readily available.

The ELPRO Radios are programmed using the E-Series Configuration Utility software which is still available from Eaton.

The TSX Momentum PLC's are programmed using Concept from Schneider Electric and this programming software is still available for purchase.

2.2 Networking

The PLC at the Frank STP acts as a data concentrator for all the remote sites throughout the Municipality. Each site uses an ELPRO radio to communicate back to the Frank STP radio. At sites that have a PLC the ELPRO 905U-G-MD1 is used and the sites that have no PLC use either the ELPRO 905U-2 or 905U-4. The data is networked through the radios to come back to the radio at the Frank STP and the data is then brought from the radio to the PLC. See Appendix A for the radio network map. The PLC at the Frank STP is connected to the SCADA system via an Ethernet network, which is also extended to the backup SCADA computer at the Municipal office over a secure VPN.

2.3 SCADA Software

In the fall of 2017 the Municipality completed a SCADA software upgrade at the Frank STP. As part of this upgrade, VTScada version 11.3.03 was installed and the graphics were updated to high performance graphics.

2.3.1 Naming Conventions & Tag Database

All water and wastewater stations are assigned a unique site identifier to aid with organizing the SCADA system and provide consistency in the database. The W prefix refers to pump houses or booster station and uses the 100 series of numbers. The S prefix refers to treatment facilities and uses the 200 series of numbers. The P prefix refers to the pressure relief valve sites and uses the 800 series of numbers. The R

prefix refers to the repeater stations and uses the 900 series of numbers. Not all stations are connected to the SCADA system but each station is shown on the map overview page for reference.

Blairmore Pump House	W100	Bellevue Wastewater	S200
Bellevue Booster Station	W101	Frank Sewage Treatment Plant	S201
Coleman Booster Station	W102	Riverbottom Lift Station	S202
Coleman Metering Station	W103		
Hillcrest Pump House	W104	Pineview PRV	P800
Hillcrest Reservoir	W105	Sports Complex PRV	P801
Ski Hill	W106	Bushtown PRV	P802
Southmore Pump House	W107	Woodhaven PRV	P803
Willow Drive Pump House	W109	Highway 940 PRV	P804
Kananaskis Wild Pump House	W110	Trotz PRV	P805
Sentinel Reservoir	W111	Hillcrest 1 PRV	P806
Coleman Reservoir	W112	Hillcrest 2 PRV	P807
Blairmore Reservoir	W113	Riverbottom PRV	P808
Bellevue Reservoir	W114	Pineview PRV	P800
Bowie Booster Station	W115	Sports Complex PRV	P801
Carbondale Booster Station	W116	Bushtown PRV	P802
Woodhaven Booster Station	W117	Woodhaven PRV	P803
Nez Perce Booster Station	W118		
SE Subdivision Booster Station	W119	Coleman Repeater	R900
Willow Drive Pump House	W109	Frank Slide Visitor Centre	R901
		Sentinel Radio Repeater	R902

The VTSCADA tag database uses the following file structure for tags: Area/Device/Attributes. Below is a sample of a tag in VTSCADA:

VTSCADA Tag = W100\FT1\YA

Where W100 is Blairmore Pump House identifier

FT1 = Equipment Identifier (Flow Transmitter 1)

YA = Attribute Identifier (Out of Range Alarm)

2.3.2 Graphics Conventions

Industry best practices, as highlighted by the International Society of Automation (ISA) 101 standard, advocate for the use of High Performance graphics to increase an operator's situational awareness of process systems.

As part of the high performance graphics convention bright and intricate graphics have been replaced with grey scale colours and simple graphics. The bright colours are only used to indicate that there is an alarm condition. This will draw the operators eye to areas of concern that need immediate attention. These conventions were utilized during the 2017 SCADA upgrades.

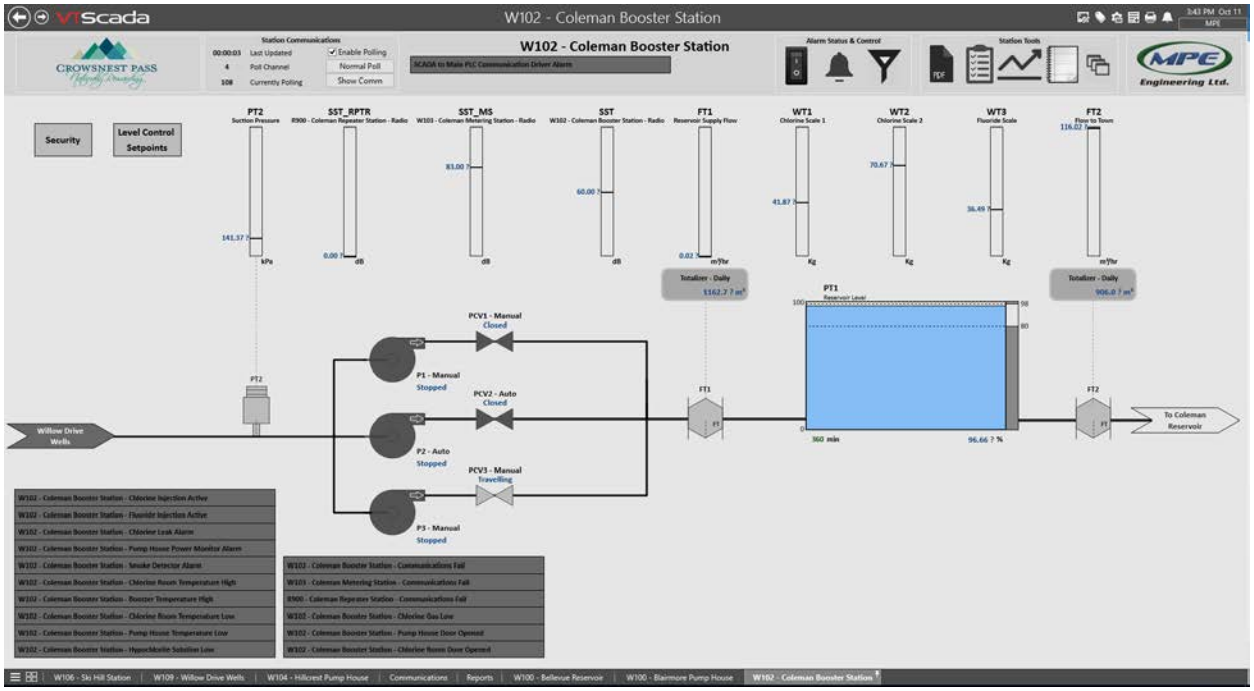


Figure 2.1 – Example Process Graphic

2.3.3 Alarming Conventions

New SCADA computers were installed at the Frank STP and the Municipal Office in the fall of 2017. When an alarm is configured for a callout the VTScada software will use the modem to call the operator. Each of the computers have a modem installed, to provide redundancy, which provides an extra layer of availability should one of the computers go offline.

ISA 18.2 – Alarm Management for Process Industries defines a number of best practices for Alarm System Management and interaction for operators. Within VTScada there are many different ways to interact with alarms. There is a screen showing all alarms configured in the system. There is also the ability to disable all alarms for a given site and to shelve individual alarms for a period of time. VTScada also keeps a history of all alarms so that past actions can be viewed.

2.3.4 Security Conventions

Within the SCADA system there are individual usernames and passwords for each operator. The security regime is configured as a role-based security system. Each user is assigned to a specific role (guest, operator, supervisor) which determine which application privileges that user inherits. An operator must login to use the system and by doing this each of the operator's actions can be tracked. This creates better accountability and also prevents unauthorized users from making any changes to the system.

2.4 HMI

Some of the remote locations in the Municipality use HMI's to display local values and provide local control to the operators. HMI are used to display only local variables and alarms; whereas the SCADA system display variables and alarms from all stations. There is no security on the HMI's as access to the station is restricted to certain personnel. The graphics do not follow the high performance standard used on the SCADA system and are more of a graphic representation of the process, which is typically acceptable for local HMIs. There are currently two different HMI brands installed in the Municipality: Allen-Bradley and Eaton.

2.4.1 HMI Hardware Components

The Allen-Bradley HMI's used are the 2711P series of HMI's with three variations of the part numbers used throughout the Municipality. One variation is used at the Bellevue WWTP in the filter building and is currently still supported. One variation is used at the Bellevue WWTP in the Auger panel and is discontinued. There is one other variation used at 6 other locations and this variation is an active product.

The Eaton HMI's used are the HMI06CE part number and are located at the Southmore and Kananaskis Wilds Pump Houses. These products are no longer available for purchase from Eaton.

2.4.2 HMI Programming Environment

The Allen-Bradley HMI's are programmed using the Factory Talk View Studio Machine Edition. The Eaton HMI's are programmed using the HMi Soft programming software. Both of these programming software are available from the supplier.

3.0 SYSTEM BENCHMARKING

After completion of the site assessments and determining what was installed at each station the installed components were compared against industry best practices. The benchmark is determined by using industry standards as well as experience that MPE has gained from undertaking similar projects with clients of the same size and nature as the Municipality.

3.1 Programmable Logic Controllers

The Allen Bradley brand of PLC's are a common PLC and are widely used throughout the industry. The MicroLogix 1500 controller has recently been announced as discontinued and should be considered for replacement in the future. The I/O modules used with the MicroLogix 1500 controller are the "1769" model line and are still active and do not need replacement. The replacement PLC for the MicroLogix 1500 is either the CompactLogix or MicroLogix 1400 line. The MicroLogix 1400 has a lower price point for its components, but would require replacing all IO cards within the panel. The CompactLogix line has a slightly higher base price but will allow the existing I/O cards to be reused, making the overall cost comparable. In respect to programming function and features, the CompactLogix line is superior to the MicroLogix line.

The Allen Bradley SLC 5/05 PLC used at the Frank STP is still an active product with replacement parts for all components available. Although an older PLC the SLC 5/05 is still widely used but older versions of the PLC have been discontinued (including the SLC 5/01, 5/02 and 5/03).

Backup copies of all Allen Bradley PLC programs, are available and were reviewed for structure, ease of understanding and compliance to best practices. In general, all PLC programs are well structured, fully documented, clearly organized and comply with industry best practices.

With the MicroLogix 1500 being discontinued the Municipality should consider having spare parts available in the event of PLC failure. Replacing the PLC at a couple of strategic locations would give the Municipality the spare parts required in the event of PLC failure. When replacing the PLC's, it should be noted that the ELPRO radio would need to be replaced with one that supports Ethernet communications.

The TSX Momentum PLC are used at the Kananaskis Wilds and Southmore Pump House and this particular type of controller has been discontinued beginning in April 2015. These parts still have support until 2023

but no new parts are being manufactured. There are direct replacement parts available from Schneider which re-use all existing I/O cards but use the newest programming software from Schneider.

There are no backup copies of the TSX Momentum PLC's currently and it is recommended to obtain backup copies to prevent extended periods of downtime.

The ELPRO radios used for I/O management have direct replacement parts which can be purchased, configured and commissioned in relatively short time frames. There is a backup of the radio program available which would allow for future configuration of the radio network.

3.2 Networking

Networking between sites is done through the use of ELPRO radios. Each site has either a wireless gateway or wireless I/O radio to communicate back to the Frank STP. Included in the network are three repeater sites which are used to strengthen signal and pass information to the Frank STP. Each site can also be used as a repeater as well meaning any location can be used to help push data along the network (see network map in Appendix A). By networking this way each site being available on the network is dependent on other sites being available. While this configuration is not normally a problem it is important to ensure UPS and batteries providing back-up to radios have preventative maintenance done at regular intervals to avoid unnecessary network downtime.

While the current radio configuration works and brings data back to the SCADA system there are a couple of concerns with the current radio setup: lack of remote connection to PLCs and difficulty of adding new I/O points to SCADA. With the ELPRO radios it is not possible to use the network to connect to PLC's remotely; instead a programmer has to go to the site location and connect directly to the PLC to do any troubleshooting. To add an I/O point to SCADA in this configuration the PLC at the location needs to be configured, the radio at the site has to be configured, any radios in between need to be configured and the PLC at Frank needs to configured. By changing the network to an Ethernet network remote PLC support would be available and adding I/O points to SCADA would be only need the local PLC configured. Modern communications network designs will typically utilize an Ethernet network topology to provide connectivity directly from the SCADA system to each remote station.

3.3 SCADA Software

One area of concern in the SCADA system is a lack of setpoints and the ability to make adjustments to stations using the central computer system. There are a limited number of setpoints currently being brought back to the SCADA system over the network. While the current SCADA arrangement works for monitoring values within the Municipality it would be beneficial to add more control setpoints to SCADA to improve overall system performance.

4.0 REQUIREMENTS

In November 2017 MPE met with staff from the Municipality to discuss their requirements for the SCADA system and what can be added to make it more functional. During a round table discussion five key criteria were identified as requirements for improved SCADA system performance and usage: core functionality, control, monitoring, sustainability and training. In the following sections each of these five criteria will be defined, how the criteria will be met and goals to improve the criteria.

4.1 Core Functionality

The following were listed as the core functions of the SCADA system: alarm management, visualization and reporting.

Functionality of the SCADA system was recently improved with the installation of the new SCADA software. The new SCADA software added improved alarm management which gives the operators the ability to shelve alarms, access alarm diagnostics and set alarm priority levels. The visualization was improved with addition of high performance graphics which will aid operators in making quicker process based decisions. Another aspect of visualization that was improved with the new SCADA system is remote access; this will assist in troubleshooting issues when operators are not at a SCADA computer.

The functionality of the system can be improved with the addition of automated reporting and alarm rationalization. Through the implementation of an automation reporting system the operators will have better overall system awareness and be able to see how the system is reacting on a day to day basis. Alarm rationalization will make use of the alarm diagnostic tools and limit the number of callout alarms operators receive.

An automated reporting task is currently planned for completion as part of the SCADA Phase III project; as such this is not included in the recommendations.

4.2 Control

The SCADA system allows for system control through the adjustment of setpoints and override control of pumps and valves.

The control capabilities of the SCADA system have been carried forward through the last two SCADA system upgrades. There is a small amount of equipment that can be controlled and setpoints that can be managed from the SCADA system.

The control of the SCADA system can be improved with the addition of more control points. There are multiple system setpoints and manual control points for valves and pumps that can be added to the SCADA system to give operators more control. As operators use the new SCADA system they should begin to make notes of equipment and process that need more control added to SCADA.

4.3 Monitoring

The control system is used to monitor operation of infrastructure using: trending, historical data, totalizers and live process values.

The recently upgraded SCADA system provides improved trending capabilities with the addition of trends for each area and each analog value having an easily accessible trend as well. The history of each of these trends goes back to when the new SCADA system was installed and can be accessed with the use of drop down menus on the trend. Any totalizers that were in the old SCADA system were brought across to the new SCADA system and put on a single page.

The number of process variable being monitored on SCADA was kept the same from the old to the new system. During the round table discussion, the following are monitors the Municipality would like added to the SCADA system: heat sensors, energy use monitoring, harmonics, temperature, levels, flows, run time, mechanical trending and camera visuals. Any and all of these items can be added to the SCADA system at any of the sites. The next step is determining what process needs more attention and installing new monitoring devices at those locations.

4.4 Sustainability

An important consideration when reviewing the control system was to ensure that the system is constructed and operated in a sustainable manner. In order to achieve a sustainable state, the system must be reliable, supportable and scalable.

The reliability of the SCADA system was improved with the addition of a second SCADA computer at the Municipal Office. This will give the operators a second computer to access in the event either of the SCADA computers goes down. Another advantage of having a redundant computer is that gaps in historical data will not occur if one of the SCADA computers fails. If a computer does go down when the new computer is brought online, it will automatically sync all data from the computer that stayed online.

Remote access also allows remote support from system integrators to support the SCADA system and diagnose problems without having to drive to site. Each SCADA computer has an external hard drive which is used to create daily backups of the computer and should a computer fail these backups can be used to replicate the computer in short order. The replacement schedule for the SCADA computers should be planned for every 5 years.

Scalability was improved with the new VTScada software which gives the ability to add users easily and assign a role to that new user. Any time a new user needs to be added or deleted this is easily managed within VTScada. If new control or monitoring points are added to the system, they also can be added easily within VTScada by adding tags to the existing database. This will allow the system to grow as new points and features are added to stations.

The reliability of the entire SCADA system can be improved by purchasing spare parts for the control system components of the SCADA system. There should be a copy of all PLC and HMI program backups available and saved in a safe location. The supportability and scalability of the SCADA can be improved with installation of a new radio network. This would give the ability to have remote support for remote sites and make additions to sites much more straightforward. A replacement schedule for control and SCADA system components should be developed to keep the system using modern equipment.

4.5 Training

Additional training related to the core functionality of the SCADA system would allow system operators to better understand and utilize the tools available to them. Through this understanding, operators will increase their efficiency and effectiveness when utilizing the SCADA system.

During the last SCADA upgrade, basic operations training was provided. This included screen navigation, basic control functions and how to use the new displays. The training manual is accessible from the SCADA software and can be reviewed at any time if questions should arise.

A basic training course outlining PLC and radio components would add value by allowing operations staff to perform basic troubleshooting for these components.

5.0 RECOMMENDATIONS

Based on the requirements that the Municipality has laid out the following are the recommendations put forward for consideration to improve the overall control system. Each recommendation is presented along with a cost estimate. Recommendations are then grouped into deliverable projects with proposed implementation timelines for the Municipality's consideration.

5.1 Site Additions - Southmore and Kananaskis Wilds

Southmore Pump House and the Kananaskis Wilds Booster Station will be added to the SCADA system in the near future. These additions will improve the control of the SCADA system by adding a couple of sites that are important to the overall operability of the distribution system. It will also improve the monitoring of the entire SCADA system by adding sites and giving the operators the ability to view the site details without having to drive to site.

The breakdown of the work required for each of the stations is shown below:

- Kananaskis Wilds Booster Station
    - Prepare Engineering Drawings
    - Addition of Radio with Ethernet port
    - Addition of mast for Radio
    - Upgrade PLC Controller
    - Configure PLC program to pass data to radio
    - Configure Radio at Kananaskis Wilds to pass data to Radio at Frank STP
    - Configure Radio at Frank STP to pass data to PLC
    - Configure PLC at Frank STP to pass data to SCADA
    - Addition of Door Open Switch
    - Ensure Building Low Temperature Switch is working
    - Ensure Fire (Heat) Monitors are working
- Southmore Pump House
    - Prepare Engineering Drawings
    - Upgrade Radio to one with Ethernet port
    - Upgrade PLC Controller

- Configure PLC program to pass data to radio
- Configure Radio at Southmore to pass data to Radio at Frank STP
- Configure Radio at Frank STP to pass data to PLC
- Configure PLC at Frank STP to pass data to SCADA
- Ensure Door Open Switch is working
- Ensure Building Low Temperature Switch is working
- Ensure Fire (Heat) Monitors are working

The estimated cost for the site additions is **$50,000.** This cost includes installation of new mast, radios, PLC controllers, PLC and Radio configuration and commissioning.

5.2 Radio Battery Backup

The radio network is dependent on all radios working and transmitting data properly. To improve uptime of the network all radio repeater sites will be checked that they have battery backup installed. By completing this recommendation, it would improve sustainability by improving reliability with decreased downtimes.

The breakdown of the work required for each of the stations is shown below:

- Coleman Repeater Station
  - Install Battery
  - Add fused terminal for battery input
  - Wire in new battery
- Frank Slide Interpretative Center Repeater
  - No work required
- Sentinel Repeater Station
  - Install Battery
  - Add fused terminal for battery input
  - Wire in new battery

The estimated cost for the battery additions would be **$4,000.00.** This cost includes hardware, wiring and commissioning requirements.

5.3 Alarm Rationalization

In order to improve the functionality of the SCADA system MPE recommends going through an alarm rationalization exercise. The current SCADA alarms are configured with a large amount of high priority alarms. By using the alarm diagnostic tools within VTScada the alarms can be tailored to match the recommendations laid out in ISA 18.2. By completing this exercise, the operators would receive far less nuisance dial out alarms and would instead only get called out on items that need their immediate attention.

With that in mind MPE recommends having alarm rationalization workshops with the Municipality. The first workshop would explain the objectives of alarm rationalization and go through a site to demonstrate how to change alarm priorities in VTScada. After the first workshop the Municipality would review the other sites and go through the alarm rationalization exercise. MPE would co-ordinate two more workshops to review findings and double check work progress. These workshops will include operations and management staff, as well as other interested or applicable parties.

The cost estimate for three one-day alarm configuration workshops would be **$5,000.00.** This cost is for one MPE employee completing the initial alarm rationalization exercise then two more site meetings to review alarm rationalization completed by the Municipality.

5.4 Spare Parts

To improve the reliability of the SCADA system MPE recommends that the Municipality have a complete set of spare parts for the control system. In the event of a failure of any component the Municipality will be able to replace the part quickly without having to wait to order new parts. This is especially critical for components of the control system that are no longer available to purchase from the manufacturer. This would be a valuable project in terms of impact versus difficulty by keeping any downtime to a minimum.

MPE has collected information on what the Municipality has on hand for spare PLC's and parts and is included in Appendix C. Based on the available spare parts MPE recommends to purchase the items shown in the table below. Any items that have quantity 2 listed in the table is an item no longer available from the manufacturer and would need to be purchased from a secondary provider.

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
Spare Parts - Allen Bradley					
1	MicroLogix 1500 Base - 1764-24AWA	2	ea	1,195.18	2,390.36
2	MicroLogix 1500 Controller - 1764-LRP	2	ea	1,295.98	2,591.96
3	Advanced Interface Converter - 1761-NET-AIC+	2	ea	909.79	1,819.58
4	16 Point DI - 1769-IA16	1	ea	373.95	373.95
5	8 Point AI - 1769-IF8	1	ea	1,019.95	1,019.95
6	4 Point AI - 1769-IF4	1	ea	637.95	637.95
7	2 Point AO - 1769-OF2	1	ea	643.95	643.95
8	8 Point RO - 1769-OW8I	1	ea	383.95	383.95
Subtotal					**$ 9,861.65**
Spare Parts - ELPRO					
1	Wireless Radio Modem - 905U-2	1	ea	2,056.46	2,056.46
2	Wireless Radio Modem - 905U-4	1	ea	1,967.26	1,967.26
Subtotal					**$ 4,023.72**
Spare Parts - Schneider					
1	4 AI / 2 AO / 4 DI / 2 DO - 170 AMM 090 00	1	ea	1,410.57	1,410.57
2	Communication Adapter - 170 INT 110 03	1	ea	320.67	320.67
3	16 DI / 16 DO - 170 ADM 350 10	1	ea	507.40	507.40
4	M1E CPU - 171 CBU 980 90	1	ea	1,004.65	1,004.65
5	Interbus Cable - 170 MCI 007 00	1	ea	71.03	71.03
Subtotal					**$ 3,314.32**
				Total	**$ 17,199.69**

5.5 Increased Monitoring

To improve the monitoring capabilities of the SCADA system additional sensors, transmitters and other measurement devices would be added to different sites. As the Municipality uses the SCADA system they will become aware of areas where increased monitoring would improve system performance. MPE recommends allocating funds to these improvements project on a yearly basis. The scope of the improvements will be defined as budget become available.

5.6 Training

MPE can develop and deliver a day long training course on the Municipality's PLC's to increase the operators understanding of these components and provide some basic troubleshooting techniques. This course would be a day in length and would be tailored to the type of PLC's and Radios currently installed in the Municipality.

The cost estimate for a one-day training session would be **$5,000.00.** This includes time to develop the course, day of training, and copies of manuals for all participants.

5.7 Increased Control

To improve the control aspect of the SCADA system additional control points should be added to SCADA. Areas of control that can be improved would be the addition of more alarm setpoints for the analog transmitters used in the system, additional control setpoints, and more control of equipment (motors, pumps, valves, etc.). As the operators used the system it will become apparent where they can use more control of alarms, setpoints and equipment.

MPE recommends allocating funds to these improvements project on a yearly basis. The scope of the improvements will be defined as budget become available.

5.8 Radio Improvements

To improve the future operability of the SCADA system it would be prudent to improve the radio network. Currently the Municipality is using ELPRO Radios to transfer data from each site back to the PLC at the Frank STP. While the system is currently working with the Radio's installed they have limitations on how information is passed from site to site. In order to get information from one site back to SCADA there are multiple steps that need to be followed: configure PLC at remote location to have data available for Radio, configure Radio at remote location to pass data to Radio at Frank STP, configure Radio at Frank STP to pass data to Frank PLC, configure Frank PLC to receive data from Radio, configure SCADA system to get data from Frank PLC. With an Ethernet Radio system, it would be possible for the SCADA system to communicate directly with the remote site.

Another issue with the current Radio system is the inability to do remote support. If connected to the Radio at the Frank STP it is not possible to connect to a remote radio or PLC. To do any troubleshooting on a remote Radio or PLC a direct connection to the remote device must be made. With an Ethernet radio network, connections to remote sites can be made with the VPN network already configured for the new SCADA project. This gives the ability to do remote support without having to be physically located at the device.

Changing the radio network from an ELPRO based system to an Ethernet network would provide a lot of positives but there are other challenges in upgrading the network. First, all PLC's would need to be upgraded to have Ethernet ports embedded on the controllers to support the Ethernet communications

and the sites that have ELPRO radios with I/O wired directly to them would need to be replaced with PLC's. Second, there would be some PLC configuration to take place to re-create the data transfers that occurred between the radios to pass data from one PLC to the other. Third, the SCADA system would need address reprogramming to point to the new PLC's installed at each site. Lastly, all the ELPRO radios would need to be replaced with Ethernet radios and a study done to ensure the new radios would work on the existing radio infrastructure in place in the Municipality.

If the Municipality would like MPE to provide a more in depth study on the cost of replacing the radio network MPE can provide pricing on how much a study would cost. This recommendation is not a project that needs to be completed in the next five and as such has been left off of the five-year plan but should be revisited when the Control System Master Plan renewal is completed.

5.9 PLC Upgrade at remote sites

In consideration of creating a sustainable system the MicroLogix 1500 PLC's installed at most remotes sites should be considered for replacement. The MicroLogix 1500 were announced as discontinued products from Allen Bradley. These PLC's were installed within the last ten years and the average PLC normally has a lifespan of 20 years. If the Municipality purchases spare PLC's (as per recommendation 5.4) it is feasible to continue to operate the system and rely on spare parts, rather than embark on a number of PLC replacements. If the Municipality decides to go forward with PLC replacements these would be some of the steps required to accomplish this goal

- Replace PLC with controller that is compatible with existing I/O cards
- Add I/O cards to replace on board I/O points from old controller
- Replace current ELPRO serial radio with ELPRO Ethernet radio

Over time it will make sense to replace PLC's with more modern equipment but if the Municipality purchases adequate spare parts these PLC's can be expected to work for ten to twenty additional years. This recommendation is not a project that needs to be completed in the next five and as such has been left off of the five-year plan but should be revisited when the Control System Master Plan renewal is completed.

5.10 Frank STP Upgrades

The Frank STP is currently in initial stages of a major upgrade project and it may make sense during this time to replace the PLC to maintain the future operability of the Frank STP. The PLC installed is an Allen Bradley 5/05 which is considered an active mature product from Allen Bradley, which means it is still available but new products exist. While this PLC is still supported it is reaching the end of its supported life and replacement should be considered.

The estimate to replace the current PLC with a modern version would be **$50,000.** This includes all hardware, replacement re-wiring costs and programming costs for the PLC and SCADA. All remote PLC programming would be left as is with the Frank STP PLC still working as a data concentrator. MPE would upgrade the PLC programming with our standards and would update the Frank STP portion of the SCADA program with new popups that work with MPE's PLC programming. This cost estimate is for a like to like replacement of the current PLC and does not include any engineering required for new I/O points and control needed as part of the upgrade.

5.11 Control System Master Plan Renewal

Every five years the Master Plan should be revisited to continue to plan for the following five years of system operation. Reviewing the core functionality, control, monitoring, training requirements and sustainability of the system will ensure the control system stays current. The cost estimate for a Control System Master Plan Renewal would be **$10,000.00** and would include meeting with the Municipality to review this report, revise report with comments from meeting and review revised report with the Municipality.

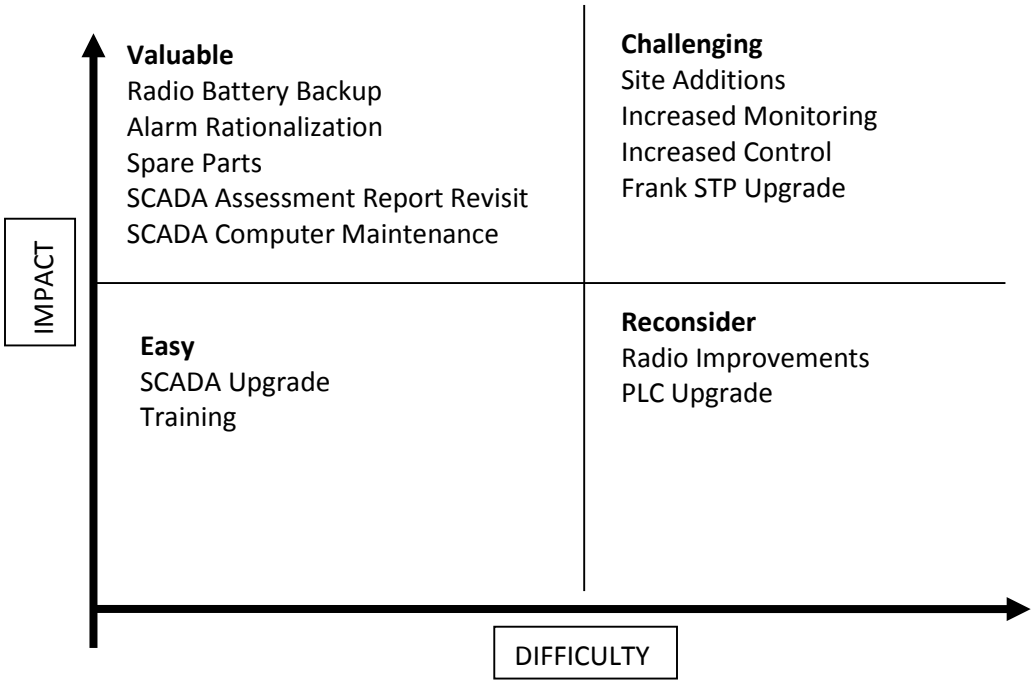
5.12 SCADA Computer Maintenance

With the new SCADA software installed in the Municipality it is important the software stays current to ensure the sustainability and functionality of the SCADA system. VTScada offers one year free of support and then offers support contracts on a yearly basis. MPE can also continue to provide monthly SCADA system health checks and provide unscheduled support and maintenance for the entire system (SCADA, PLCs and Radios). The VTScada support, SCADA health checks and MPE support can be provided at an annual cost of **$10,000.00.**

At the end of the 5 year cycle the SCADA computers should be considered for replacement. This will keep the SCADA system working reliably and avoid unexpected computer failures. For replacement parts and setup fees the cost for two new SCADA computers would be **$20,000.00**.

5.13 Impact Versus Difficulty

Each of the aforementioned recommendations was evaluated against an impact versus difficulty chart. Doing this exercise helps determine if a recommendation is easy (low impact, low difficulty), valuable (high impact, low difficulty), challenging (high impact, high difficulty) or should be reconsidered entirely (low impact, high difficulty). Recommendations which were to be re-considered also require further investigation and were not assigned cost estimates or scheduled in this report.



5.14 Proposed Schedule

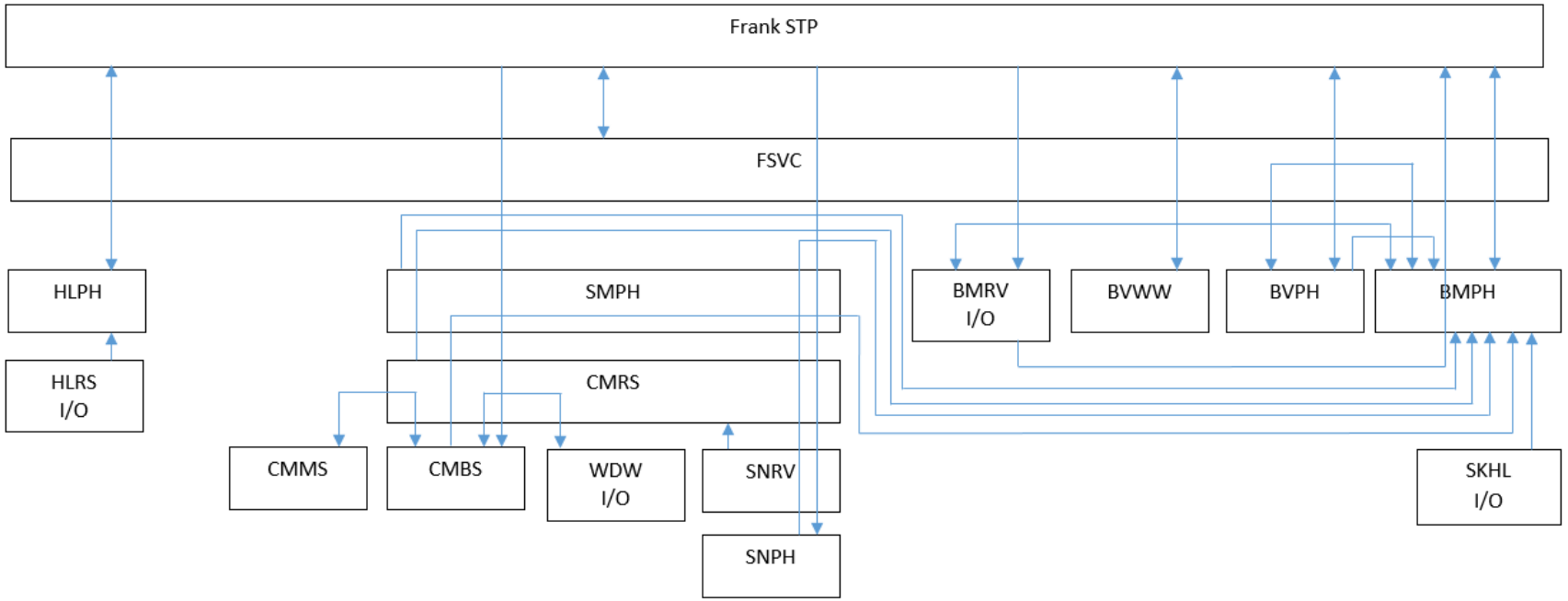
After examining the recommendations and evaluating them on impact versus difficulty the following five yeah schedule is proposed. Only recommendations that fell in the easy, valuable and challenging were included in the schedule. Any recommendations that should be reconsidered that the Municipality would like to pursue would need further evaluation of costing.

Recommendation	2018	2019	2020	2021	2022
Site Additions	$50,000				
Radio Battery Backup	$4,000				
Alarm Rationalization	$5,000				
Training Course on PLC's	$5,000				
Spare Parts	$20,000				
Monitoring and Control Improvements		$30,000	$30,000	$30,000	$30,000
SCADA Maintenance and Support		$10,000	$10,000	$10,000	$10,000
SCADA Computer Replacement					$20,000
Master Plan Renewal					$10,000
Yearly Subtotals	**$84,000**	**$40,000**	**$40,000**	**$40,000**	**$70,000**
Contingency	$13,000	$6,000	$6,000	$6,000	$10,000
Totals	**$97,000**	**$46,000**	**$46,000**	**$46,000**	**$80,000**

The total amount for the project proposed over a five-year period is $**315,000.**

Appendix A – Network Map

This map shows the traffic in the radio network. Lines passing through sites indicate that the signal is repeated through this site.



Appendix B – Spare Parts Inventory List

Manufacturer	Part Number	Description	Quantity
ICP CON	i-7520AR	RS232 to RS485 Converter	2
ELPRO	905U-G-MD1	Wireless Gateway Modem	1

Appendix C – Recommended Spare Parts List

Manufacturer	Part Number	Description	Quantity Required
Allen Bradley	1764-24AWA	MicroLogix 1500 Base	2
Allen Bradley	1764-LRP	MicroLogix 1500 Controller	2
Allen Bradley	1761-NET-AIC+	Advanced Interface Converter	2
Allen Bradley	1769-IA16	16 Point DI	1
Allen Bradley	1769-IF8	8 Point AI	1
Allen Bradley	1769-IF4	4 Point AI	1
Allen Bradley	1769-OF2	2 Point AO	1
Allen Bradley	1769-OW8I	8 Point RO	1
ELPRO	905U-2	Wireless Radio Modem	1
ELPRO	905U-4	Wireless Radio Modem	1
Schneider	170 AMM 090 00	4 AI / 2 AO / 4 DI / 2 DO	1
Schneider	170 INT 110 03	Communication Adapter	1
Schneider	170 ADM 350 10	16 DI / 16 DO	1
Schneider	171 CBU 980 90	M1E CPU	1
Schneider	170 MCI 007 00	Interbus Cable	1

Appendix D – Site Assessment Sheets

SCADA Phase III - Phase 3: Site Assessment

Site - R900 - Coleman Repeater

Client: Municipality of Crowsnest Pass

Project: SCADA Phase III

MPE Job #: 1776-001-00

Checked By: Nick Sawatzky

Date: Nov. 3, 2017

Site Information	
Longitude from GPS	-114.496982
Latitude from GPS	49.634522
Elevation from GPS	4419.5 feet

Site Description : Site - R900 - Coleman Repeater

Site Photo - Overall

N/A

Process Photo

Control Cabinet Photo

N/A

SCADA Workstation / PLC Photo

Electrical Service Info		
Type (OH / UG)	Overhead	
Voltage / Current	120V	
Generator Info	N/A	
Transfer Switch	N/A	
Lighting Panel	N/A	

PLC Information		
Make / Model		
Program Backup ?	☐	
AI Cards / Points		
AO Cards / Points		
DI Cards / Points		
DO Cards / Points		
Radio	ELPRO	905U-G-MD1

Control Cabinet Information		
Width	16	in
Height	18	in
Depth	10	in
Make / Model	Hoffman	A181610CHQRFGCSA
HMI cutout size	N/A	mm
HMI Make / Model		

SCADA Computer Information (If Applicable)		
Operating System		
SW Make / Vers		
Additional SW		
Backups Taken	☐	

Internet Service (If Applicable)		
ISP		
Router Model		
WAN Ports		
LAN Ports		
VLANS		
Backups Taken	☐	

Radio Network (If Applicable		
Network Type		
Radio Model		
Ethernet		
Serial		
Antenna/Azm		
Backups Taken	☐	

Photograph Checklist		
Site Photo 1	North	☐
Site Photo 2	East	☐
Site Photo 3	South	☐
Site Photo 4	West	☐
Site Photo 5	Towards WTP	☐
Electrical Service 1	Pole / TFRM	☐
Electrical Service 2	Meter Base	☐
Electrical Service 3	Transfer SW	☐
Electrical Service 4	Generator	☐
Electrical Service 5	Panelboard	☐
Electrical Service 6	PB Legend	☐
MCC 1	MCC Lineup	☐
MCC 2	MCC Nameplate	☐
MCC 3	Buckets	☐
Control Cabinet 1	Wall 1	☐
Control Cabinet 2	Wall 2	☐
Control Cabinet 3	Wall 3	☐
Control Cabinet 4	Wall 4	☐
Control Cabinet 5	Panel Door Ext	☐
Control Cabinet 6	Panel Door Int	☐
Control Cabinet 7	Mounted Equip	☐
Control Cabinet 8	Cable Entries	☐
Control Cabinet 9	Backpanel	☐
Control Cabinet 10	PLC Rack	☐
Control Cabinet 11	PLC Processor	☐
Control Cabinet 12	IO Cards	☐
Control Cabinet 13	Field Terminals	☐
SCADA 1	Computer Desk	☐
SCADA 2	PC Front	☐
SCADA 3	PC Back	☐
SCADA 4	PC Model	☐
SCADA 5	Serial Conn.	☐
SCADA 6	Ethernet Conn.	☐
SCADA 7	Switch / Router	☐
General 1	Inst. Mounting	☐
General 2	Inst. Nameplate	☐
General 3	Process Piping	☐
General 4	Ext Wall 1	☐
General 5	Ext Wall 2	☐
General 6	Ext Wall 3	☐
General 7	Ext Wall 4	☐

Instrumentation Information

Tag	Make	Model	SN	Description

Field Notes :

SCADA Phase III - Phase 3: Site Assessment
Site - R901 - Frank Slide Visitor Centre

CROWSNEST PASS *Naturally Rewarding* — MPE Engineering Ltd.

Client: Municipality of Crowsnest Pass
Checked By: Nick Sawatzky
Project: SCADA Phase III
Date: Nov. 3, 2017
MPE Job #: 1776-001-00

Site Information	
Longitude from GPS	-114.3936275
Latitude from GPS	49.6005485
Elevation from GPS	4525.2 feet

Site Description : Site - R901 - Frank Slide Visitor Centre

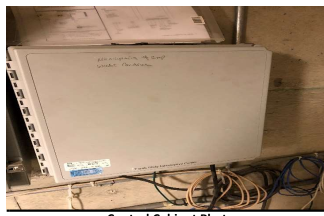
Site Photo - Overall

N/A

Process Photo

Electrical Service Info		
Type (OH / UG)	Overhead	
Voltage / Current	120V	2A
Generator Info	N/A	
Transfer Switch	N/A	
Lighting Panel	N/A	

PLC Information		
Make / Model		
Program Backup ?	☐	
AI Cards / Points		
AO Cards / Points		
DI Cards / Points		
DO Cards / Points		
Radio	ELPRO	905U-G-MD1



Control Cabinet Photo

SCADA Workstation / PLC Photo

Control Cabinet Information		
Width	14	in
Height	16	in
Depth	8	in
Make / Model	Hoffman	A16148CHQRFG
HMI cutout size	N/A	mm
HMI Make / Model		

SCADA Computer Information (If Applicable)		
Operating System		
SW Make / Vers		
Additional SW		
Backups Taken	☐	

Internet Service (If Applicable)		
ISP		
Router Model		
WAN Ports		
LAN Ports		
VLANS		
Backups Taken	☐	

Radio Network (If Applicable		
Network Type		
Radio Model		
Ethernet		
Serial		
Antenna/Azm		
Backups Taken	☐	

Photograph Checklist		
Site Photo 1	North	☑
Site Photo 2	East	☑
Site Photo 3	South	☑
Site Photo 4	West	☑
Site Photo 5	Towards WTP	☑
Electrical Service 1	Pole / TFRM	☐
Electrical Service 2	Meter Base	☐
Electrical Service 3	Transfer SW	☐
Electrical Service 4	Generator	☐
Electrical Service 5	Panelboard	☐
Electrical Service 6	PB Legend	☐
MCC 1	MCC Lineup	☐
MCC 2	MCC Nameplate	☐
MCC 3	Buckets	☐
Control Cabinet 1	Wall 1	☑
Control Cabinet 2	Wall 2	☑
Control Cabinet 3	Wall 3	☑
Control Cabinet 4	Wall 4	☑
Control Cabinet 5	Panel Door Ext	☑
Control Cabinet 6	Panel Door Int	☑
Control Cabinet 7	Mounted Equip	☑
Control Cabinet 8	Cable Entries	☑
Control Cabinet 9	Backpanel	☑
Control Cabinet 10	PLC Rack	☑
Control Cabinet 11	PLC Processor	☑
Control Cabinet 12	IO Cards	☐
Control Cabinet 13	Field Terminals	☐
SCADA 1	Computer Desk	☐
SCADA 2	PC Front	☐
SCADA 3	PC Back	☐
SCADA 4	PC Model	☐
SCADA 5	Serial Conn.	☐
SCADA 6	Ethernet Conn.	☐
SCADA 7	Switch / Router	☐
General 1	Inst. Mounting	☐
General 2	Inst. Nameplate	☐
General 3	Process Piping	☐
General 4	Ext Wall 1	☐
General 5	Ext Wall 2	☐
General 6	Ext Wall 3	☐
General 7	Ext Wall 4	☐

Instrumentation Information

Tag	Make	Model	SN	Description

Field Notes :

SCADA Phase III - Phase 3: Site Assessment

Site - R902 - Sentinel Radio Repeater

Client: Municipality of Crowsnest Pass

Checked By: Nick Sawatzky

Project: SCADA Phase III

Date: Nov. 3, 2017

MPE Job #: 1776-001-00

Site Information	
Longitude from GPS	-114.588498
Latitude from GPS	49.6281506
Elevation from GPS	4458.4 feet

Electrical Service Info		
Type (OH / UG)	Overhead	
Voltage / Current	120V	2A
Generator Info	N/A	
Transfer Switch	N/A	
Lighting Panel	N/A	

PLC Information		
Make / Model		
Program Backup ?	☐	
AI Cards / Points		
AO Cards / Points		
DI Cards / Points		
DO Cards / Points		
Radio	ELPRO	905U-G-MD1

Control Cabinet Information		
Width	16	in
Height	18	in
Depth	10	in
Make / Model	Hoffman	A181610CHQRFGCSA
HMI cutout size	N/A	mm
HMI Make / Model		

SCADA Computer Information (If Applicable)		
Operating System		
SW Make / Vers		
Additional SW		
Backups Taken	☐	

Site Description : Site - R902 - Sentinel Radio Repeater

Site Photo - Overall

N/A

Process Photo

Control Cabinet Photo

SCADA Workstation / PLC Photo

Internet Service (If Applicable)		
ISP		
Router Model		
WAN Ports		
LAN Ports		
VLANS		
Backups Taken	☐	

Radio Network (If Applicable		
Network Type		
Radio Model		
Ethernet		
Serial		
Antenna/Azm		
Backups Taken	☐	

Photograph Checklist		
Site Photo 1	North	☑
Site Photo 2	East	☑
Site Photo 3	South	☑
Site Photo 4	West	☑
Site Photo 5	Towards WTP	☑
Electrical Service 1	Pole / TFRM	☑
Electrical Service 2	Meter Base	☐
Electrical Service 3	Transfer SW	☐
Electrical Service 4	Generator	☐
Electrical Service 5	Panelboard	☐
Electrical Service 6	PB Legend	☐
MCC 1	MCC Lineup	☐
MCC 2	MCC Nameplate	☐
MCC 3	Buckets	☐
Control Cabinet 1	Wall 1	☑
Control Cabinet 2	Wall 2	☑
Control Cabinet 3	Wall 3	☑
Control Cabinet 4	Wall 4	☑
Control Cabinet 5	Panel Door Ext	☑
Control Cabinet 6	Panel Door Int	☑
Control Cabinet 7	Mounted Equip	☑
Control Cabinet 8	Cable Entries	☑
Control Cabinet 9	Backpanel	☑
Control Cabinet 10	PLC Rack	☐
Control Cabinet 11	PLC Processor	☐
Control Cabinet 12	IO Cards	☐
Control Cabinet 13	Field Terminals	☐
SCADA 1	Computer Desk	☐
SCADA 2	PC Front	☐
SCADA 3	PC Back	☐
SCADA 4	PC Model	☐
SCADA 5	Serial Conn.	☐
SCADA 6	Ethernet Conn.	☐
SCADA 7	Switch / Router	☐
General 1	Inst. Mounting	☐
General 2	Inst. Nameplate	☐
General 3	Process Piping	☐
General 4	Ext Wall 1	☐
General 5	Ext Wall 2	☐
General 6	Ext Wall 3	☐
General 7	Ext Wall 4	☐

Instrumentation Information

Tag	Make	Model	SN	Description

Field Notes :

SCADA Phase III - Phase 3: Site Assessment
Site - S200 - Belleuve Wastewater

CROWSNEST PASS *Naturally Rewarding*

MPE Engineering Ltd.

Client: Municipality of Crowsnest Pass

Project: SCADA Phase III

MPE Job #: 1776-001-00

Checked By: Nick Sawatzky

Date: Nov. 2, 2017

Site Information	
Longitude from GPS	-114.3705856
Latitude from GPS	49.5770502
Elevation from GPS	4116.6 feet

Electrical Service Info		
Type (OH / UG)	Underground	
Voltage / Current	600V	150A
Generator Info	Cummins - GGLA-2592061	
Transfer Switch	ASCO - 7000 Series	
Lighting Panel	225	

Radio Information		
Make / Model		
Program Backup ?	☐	
AI Cards / Points		
AO Cards / Points		
DI Cards / Points		
DO Cards / Points		
Radio	ELPRO	905U-G-MD1

Control Cabinet Information		
Width	48	in
Height	36	in
Depth	18	in
Make / Model	Hoffman	A364812WFLP/SPL
HMI cutout size	12in W x 8.5in H	in
HMI Make / Model	Allen-Bradley	2711P-RDT10C Ser B

PLC Information - LCP-01		
Make / Model	MicroLogix 1500	1764-LRP 1764-24AWA
Program Backup ?	☑	
AI Cards / Points	1769-IF8	8
AO Cards / Points	1769-OF4CI	4
DI Cards / Points	On Board 1769-IA16 - Qty. 2	12 - 120VAC 16 - 120VAC
DO Cards / Points	On Board	12 - RO
Interface Converter	1761-NET-AIC - Qty. 2	

Control Cabinet Information		
Width	16	in
Height	18	in
Depth	10	in
Make / Model	Hoffman	A181610CHQRFGCSA
HMI cutout size	N/A	in
HMI Make / Model		

PLC Information - LCP-02		
Make / Model	MicroLogix 1500	1764-LRP 1764-AWA
Program Backup ?	☑	
AI Cards / Points	1769-IF4 - Qty. 2	4
AO Cards / Points	1769-OF2	2
DI Cards / Points	On Board	12 - 120VAC
DO Cards / Points	On Board	12 - RO
Interface Converter	1761-NET-AIC	

Control Cabinet Information		
Width	20	in
Height	24	in
Depth	8.5	in
Make / Model	Hoffman	CSD24208
HMI cutout size	N/A	in
HMI Make / Model		

PLC Information - LCP-03		
Make / Model	MicroLogix 1500	1764-LRP 1764-AWA
Program Backup ?	☑	
AI Cards / Points		
AO Cards / Points		
DI Cards / Points	On Board	12 - 120VAC
DO Cards / Points	On Board	12 - RO
Interface Converter	1761-NET-AIC	

Control Cabinet Information		
Width	36	in
Height	36	in
Depth	12	in
Make / Model		
HMI cutout size	7in W x 6in H	in
HMI Make / Model		

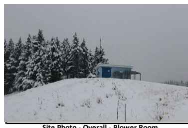
PLC Information - LCP-04		
Make / Model	MicroLogix 1500	1764-LRP 1764-AWA
Program Backup ?	☑	
AI Cards / Points	1769-IF8	8
AO Cards / Points		
DI Cards / Points	On Board 1769-IA16	12 - 120VAC 16 - 120VAC
DO Cards / Points	On Board	12 - RO
Interface Converter	1761-NET-AIC	

Control Cabinet Information		
Width	36	in
Height	36	in
Depth	12	in
Make / Model		
HMI cutout size	7in W x 6in H	in
HMI Make / Model	Allen-Bradley	2711P-K4M5D

SCADA Computer Information (If Applicable)		
Operating System		
SW Make / Vers		
Additional SW		
Backups Taken	☐	

Photograph Checklist		
Site Photo 1	North	☑
Site Photo 2	East	☑
Site Photo 3	South	☑
Site Photo 4	West	☑
Site Photo 5	Towards WTP	☑
Electrical Service 1	Pole / TFRM	☑
Electrical Service 2	Meter Base	☑
Electrical Service 3	Transfer SW	☑
Electrical Service 4	Generator	☑
Electrical Service 5	Panelboard	☑
Electrical Service 6	PB Legend	☑
MCC 1	MCC Lineup	☑
MCC 2	MCC Nameplate	☑
MCC 3	Buckets	☑
Control Cabinet 1	Wall 1	☑
Control Cabinet 2	Wall 2	☑
Control Cabinet 3	Wall 3	☑
Control Cabinet 4	Wall 4	☑
Control Cabinet 5	Panel Door Ext	☑
Control Cabinet 6	Panel Door Int	☑
Control Cabinet 7	Mounted Equip	☑
Control Cabinet 8	Cable Entries	☑
Control Cabinet 9	Backpanel	☑
Control Cabinet 10	PLC Rack	☑
Control Cabinet 11	PLC Processor	☑
Control Cabinet 12	IO Cards	☑
Control Cabinet 13	Field Terminals	☑
SCADA 1	Computer Desk	☐
SCADA 2	PC Front	☐
SCADA 3	PC Back	☐
SCADA 4	PC Model	☐
SCADA 5	Serial Conn.	☐
SCADA 6	Ethernet Conn.	☐
SCADA 7	Switch / Router	☐
General 1	Inst. Mounting	☐
General 2	Inst. Nameplate	☐
General 3	Process Piping	☐
General 4	Ext Wall 1	☐
General 5	Ext Wall 2	☐
General 6	Ext Wall 3	☐
General 7	Ext Wall 4	☐

Site Description :	Site - S200 - Belleuve Wastewater


Site Photo - Overall - Blower Room

Process Photo - Blower Room


Radio - Blower Room

N/A

SCADA Workstation / PLC Photo

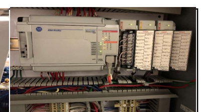

Site Photo - Overall - Filter Room

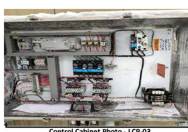

Process Photo - Filter Room


Control Cabinet Photo - LCP-01


SCADA Workstation / PLC Photo - LCP-01


Control Cabinet Photo - LCP-02


SCADA Workstation / PLC Photo - LCP-02


Control Cabinet Photo - LCP-03


SCADA Workstation / PLC Photo - LCP-03


Control Cabinet Photo - LCP-04

SCADA Workstation / PLC Photo - LCP-04

Internet Service (If Applicable)			Radio Network (If Applicable		
ISP			Network Type		
Router Model			Radio Model		
WAN Ports			Ethernet		
LAN Ports			Serial		
VLANS			Antenna/Azm		
Backups Taken	☐		Backups Taken	☐	

Instrumentation Information

Tag	Make	Model	SN	Description

Field Notes :

SCADA Phase III - Phase 3: Site Assessment
Site - S201 - Frank Sewage Treatment

Client: Municipality of Crowsnest Pass
Checked By: Nick Sawatzky
Project: SCADA Phase III
Date: Nov. 2, 2017
MPE Job #: 1776-001-00

Site Information	
Longitude from GPS	-114.409314
Latitude from GPS	49.596884
Elevation from GPS	4198.7 feet

Site Description : Site - S201 - Frank Sewage Treatment

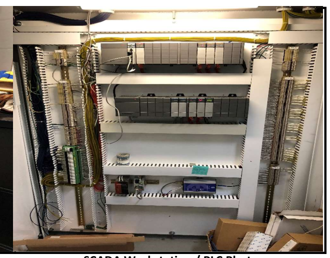
Site Photo - Overall

Process Photo

Electrical Service Info		
Type (OH / UG)	Underground	
Voltage / Current	600V	
Generator Info	N/A	
Transfer Switch	N/A	
Lighting Panels	225A, 225A	

PLC Information		
Make / Model	Allen-Bradley	SLC 5/05 1747-L552
Program Backup ?	☐	
AI Cards / Points	1746 - NI8 - Qty. 1	8
AO Cards / Points	N/A	
DI Cards / Points	1746-IA16 - Qty. 1 1746-IV32 - Qty. 2 1746-IV16 - Qty. 1 1746-IB16 - Qty. 1	16 - 120VAC 32 - 24VDC 16 - 24VDC 16 - 24VDC
DO Cards / Points	1746-OW16 - Qty. 3	16 - 120VAC
Interface Converter	1761-NET-AIC	16 - 120VAC
Radio	ELPRO	905U-G-MD1

Control Cabinet Photo



SCADA Workstation / PLC Photo

Control Cabinet Information		
Width	1980	mm
Height	1524	mm
Depth	610	mm
Make / Model		
HMI cutout size	N/A	mm
HMI Make / Model		

Internet Service (If Applicable)		
ISP		
Router Model		
WAN Ports		
LAN Ports		
VLANS		
Backups Taken	☐	

Radio Network (If Applicable		
Network Type		
Radio Model		
Ethernet		
Serial		
Antenna/Azm		
Backups Taken	☐	

SCADA Computer Information (If Applicable)		
Operating System		
SW Make / Vers		
Additional SW		
Backups Taken	☐	

Photograph Checklist		
Site Photo 1	North	☑
Site Photo 2	East	☑
Site Photo 3	South	☑
Site Photo 4	West	☑
Site Photo 5	Towards WTP	☑
Electrical Service 1	Pole / TFRM	☐
Electrical Service 2	Meter Base	☑
Electrical Service 3	Transfer SW	☑
Electrical Service 4	Generator	☐
Electrical Service 5	Panelboard	☐
Electrical Service 6	PB Legend	☐
MCC 1	MCC Lineup	☑
MCC 2	MCC Nameplate	☑
MCC 3	Buckets	☑
Control Cabinet 1	Wall 1	☑
Control Cabinet 2	Wall 2	☑
Control Cabinet 3	Wall 3	☑
Control Cabinet 4	Wall 4	☑
Control Cabinet 5	Panel Door Ext	☑
Control Cabinet 6	Panel Door Int	☑
Control Cabinet 7	Mounted Equip	☑
Control Cabinet 8	Cable Entries	☑
Control Cabinet 9	Backpanel	☑
Control Cabinet 10	PLC Rack	☑
Control Cabinet 11	PLC Processor	☑
Control Cabinet 12	IO Cards	☑
Control Cabinet 13	Field Terminals	☑
SCADA 1	Computer Desk	☐
SCADA 2	PC Front	☐
SCADA 3	PC Back	☐
SCADA 4	PC Model	☐
SCADA 5	Serial Conn.	☐
SCADA 6	Ethernet Conn.	☐
SCADA 7	Switch / Router	☐
General 1	Inst. Mounting	☐
General 2	Inst. Nameplate	☐
General 3	Process Piping	☐
General 4	Ext Wall 1	☐
General 5	Ext Wall 2	☐
General 6	Ext Wall 3	☐
General 7	Ext Wall 4	☐

Instrumentation Information

Tag	Make	Model	SN	Description

Field Notes :

SCADA Phase III - Phase 3: Site Assessment

Site - W100 - Blairmore Pump House

CROWSNEST PASS *Naturally Rewarding*

MPE Engineering Ltd.

Client: Municipality of Crowsnest Pass

Checked By: Nick Sawatzky

Project: SCADA Phase III

Date: Nov. 1, 2017

MPE Job #: 1776-001-00

Site Information	
Longitude from GPS	-114.450584
Latitude from GPS	49.611859
Elevation from GPS	4376.3 feet

Electrical Service Info		
Type (OH / UG)	Overhead	
Voltage / Current	480V / 600A	
Generator Info	N/A	
Transfer Switch	N/A	
Lighting Panel	225A	

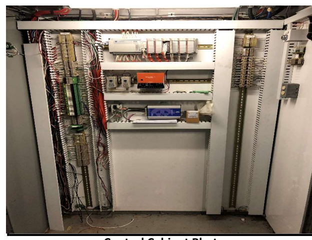
PLC Information		
Make / Model	Allen Bradley	MicroLogix 1500 1769-LRP 1769-24AWA
Program Backup ?	☐	
AI Cards / Points	1769-IF4 - Qty. 3	4
AO Cards / Points		
DI Cards / Points	On Board 1769-IA16 - Qty. 2	12 - 120VAC 16 - 120VAC
DO Cards / Points	On Board 1769-OW8I - Qty. 1	12 8
Radio	ELPRO	905U-G-MD1

Control Cabinet Information		
Width	1219	mm 48 in
Height	1980	mm 78 in
Depth	610	mm 24 in
Make / Model		
HMI cutout size	5H x 6W	in
HMI Make / Model	Allen-Bradley	2711P-T6C20A8

Site Description :	Blairemore Pump House

Site Photo - Overall

Process Photo



Control Cabinet Photo

SCADA Workstation / PLC Photo

SCADA Computer Information (If Applicable)		
Operating System		
SW Make / Vers		
Additional SW		
Backups Taken	☐	

Internet Service (If Applicable)		
ISP		
Router Model		
WAN Ports		
LAN Ports		
VLANS		
Backups Taken	☐	

Radio Network (If Applicable		
Network Type		
Radio Model		
Ethernet		
Serial		
Antenna/Azm		
Backups Taken	☐	

Photograph Checklist		
Site Photo 1	North	☑
Site Photo 2	East	☑
Site Photo 3	South	☑
Site Photo 4	West	☑
Site Photo 5	Towards WTP	☑
Electrical Service 1	Pole / TFRM	☑
Electrical Service 2	Meter Base	☑
Electrical Service 3	Transfer SW	☐
Electrical Service 4	Generator	☐
Electrical Service 5	Panelboard	☑
Electrical Service 6	PB Legend	☑
MCC 1	MCC Lineup	☑
MCC 2	MCC Nameplate	☑
MCC 3	Buckets	☑
Control Cabinet 1	Wall 1	☑
Control Cabinet 2	Wall 2	☑
Control Cabinet 3	Wall 3	☑
Control Cabinet 4	Wall 4	☑
Control Cabinet 5	Panel Door Ext	☑
Control Cabinet 6	Panel Door Int	☑
Control Cabinet 7	Mounted Equip	☑
Control Cabinet 8	Cable Entries	☑
Control Cabinet 9	Backpanel	☑
Control Cabinet 10	PLC Rack	☑
Control Cabinet 11	PLC Processor	☑
Control Cabinet 12	IO Cards	☑
Control Cabinet 13	Field Terminals	☑
SCADA 1	Computer Desk	☐
SCADA 2	PC Front	☐
SCADA 3	PC Back	☐
SCADA 4	PC Model	☐
SCADA 5	Serial Conn.	☐
SCADA 6	Ethernet Conn.	☐
SCADA 7	Switch / Router	☐
General 1	Inst. Mounting	☑
General 2	Inst. Nameplate	☑
General 3	Process Piping	☑
General 4	Ext Wall 1	☑
General 5	Ext Wall 2	☑
General 6	Ext Wall 3	☑
General 7	Ext Wall 4	☑

Instrumentation Information

Tag	Make	Model	SN	Description

Field Notes :
Blairmore Pump House Flow Switch #3 not working

SCADA Phase III - Phase 3: Site Assessment

Site - W101 - Bellevue Booster Station

Client: Municipality of Crowsnest Pass

Checked By: Nick Sawatzky

Project: SCADA Phase III

Date: Nov. 2, 2017

MPE Job #: 1776-001-00

Site Information	
Longitude from GPS	-114.3688261
Latitude from GPS	49.5918593
Elevation from GPS	4398.9 feet

Electrical Service Info		
Type (OH / UG)	Overhead	
Voltage / Current	480V / 200A	
Generator Info	N/A	
Transfer Switch	N/A	
Lighting Panel	225A	

PLC Information		
Make / Model	Allen Bradley	MicroLogix 1500 1764-LRP 1764-24AWA
Program Backup ?	☐	
AI Cards / Points	1769-IF4 - Qty. 2	4
AO Cards / Points	N/A	
DI Cards / Points	On Board 1769-IA16	12 - 120VAC 16 - 120VAC
DO Cards / Points	On Board RO	12
Ethenet Card		

Control Cabinet Information		
Width	48	in
Height	36	in
Depth	18	in
Make / Model		
HMI cutout size	6W x 5H	in
HMI Make / Model	Allen-Bradley	2711P-T6C20A8

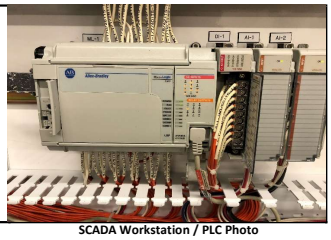
SCADA Computer Information (If Applicable)		
Operating System		
SW Make / Vers		
Additional SW		
Backups Taken	☐	

Site Description :	Site - W101 - Bellevue Booster Station

Site Photo - Overall

Process Photo

Control Cabinet Photo



SCADA Workstation / PLC Photo

Internet Service (If Applicable)			Radio Network (If Applicable		
ISP			Network Type		
Router Model			Radio Model		
WAN Ports			Ethernet		
LAN Ports			Serial		
VLANS			Antenna/Azm		
Backups Taken	☐		Backups Taken	☐	

Photograph Checklist		
Site Photo 1	North	☑
Site Photo 2	East	☑
Site Photo 3	South	☑
Site Photo 4	West	☑
Site Photo 5	Towards WTP	☑
Electrical Service 1	Pole / TFRM	☑
Electrical Service 2	Meter Base	☑
Electrical Service 3	Transfer SW	☐
Electrical Service 4	Generator	☐
Electrical Service 5	Panelboard	☑
Electrical Service 6	PB Legend	☑
MCC 1	MCC Lineup	☑
MCC 2	MCC Nameplate	☑
MCC 3	Buckets	☑
Control Cabinet 1	Wall 1	☑
Control Cabinet 2	Wall 2	☑
Control Cabinet 3	Wall 3	☑
Control Cabinet 4	Wall 4	☑
Control Cabinet 5	Panel Door Ext	☑
Control Cabinet 6	Panel Door Int	☑
Control Cabinet 7	Mounted Equip	☑
Control Cabinet 8	Cable Entries	☑
Control Cabinet 9	Backpanel	☑
Control Cabinet 10	PLC Rack	☑
Control Cabinet 11	PLC Processor	☑
Control Cabinet 12	IO Cards	☑
Control Cabinet 13	Field Terminals	☐
SCADA 1	Computer Desk	☑
SCADA 2	PC Front	☐
SCADA 3	PC Back	☐
SCADA 4	PC Model	☐
SCADA 5	Serial Conn.	☐
SCADA 6	Ethernet Conn.	☐
SCADA 7	Switch / Router	☐
General 1	Inst. Mounting	☑
General 2	Inst. Nameplate	☑
General 3	Process Piping	☑
General 4	Ext Wall 1	☑
General 5	Ext Wall 2	☑
General 6	Ext Wall 3	☑
General 7	Ext Wall 4	☑

Instrumentation Information				
Tag	Make	Model	SN	Description
	Fischer & Porter	10D1435A	8011B5805/1/B1	Distribution Flow
	Rosemount	2088G1S22A1M5B4C6	0258495	Reservoir Level 1
	Rosemount	2088G1S22A1M5B4C6	0258494	Reservoir Level 2

Field Notes :

SCADA Phase III - Phase 3: Site Assessment
Site - W102 - Coleman Booster Station

CROWSNEST PASS *Naturally Rewarding*

MPE Engineering Ltd.

Client: Municipality of Crowsnest Pass
Checked By: Nick Sawatzky
Project: SCADA Phase III
Date: Nov. 2, 2017
MPE Job #: 1776-001-00

Site Information	
Longitude from GPS	-114.4817917
Latitude from GPS	49.6279527
Elevation from GPS	4294.6 feet

Site Description :	Site - W102 - Coleman Booster Station


Site Photo - Overall


Process Photo

Electrical Service Info		
Type (OH / UG)	Underground	
Voltage / Current	600V / 800A	
Generator Info	N/A	
Transfer Switch	N/A	
Lighting Panel	No amperage listed	

PLC Information		
Make / Model	Allen Bradley	MicroLogix 1500 1764-LRP 1764-24AWA
Program Backup ?	☑	
AI Cards / Points	1769-IF4 - Qty. 2	4
AO Cards / Points		
DI Cards / Points	On Board 1769-IA16 - Qty. 2	12 - 120VAC 16 - 120VAC
DO Cards / Points	On Board RO	12
Communication Card	1760-NET-AIC	
Radio	ELPRO	905U-G-MD1


Control Cabinet Photo


SCADA Workstation / PLC Photo

Control Cabinet Information		
Width	1219	mm 48 in
Height	1168	mm 45 in
Depth	457	mm 18 in
Make / Model		
HMI cutout size	6in W x 5in H	in
HMI Make / Model	Allen-Bradley	2711P-T6C20A8

SCADA Computer Information (If Applicable)		
Operating System		
SW Make / Vers		
Additional SW		
Backups Taken	☐	

Internet Service (If Applicable)		
ISP		
Router Model		
WAN Ports		
LAN Ports		
VLANS		
Backups Taken	☐	

Radio Network (If Applicable		
Network Type		
Radio Model		
Ethernet		
Serial		
Antenna/Azm		
Backups Taken	☐	

Photograph Checklist		
Site Photo 1	North	☑
Site Photo 2	East	☑
Site Photo 3	South	☑
Site Photo 4	West	☑
Site Photo 5	Towards WTP	☑
Electrical Service 1	Pole / TFRM	☑
Electrical Service 2	Meter Base	☑
Electrical Service 3	Transfer SW	☐
Electrical Service 4	Generator	☐
Electrical Service 5	Panelboard	☑
Electrical Service 6	PB Legend	☑
MCC 1	MCC Lineup	☑
MCC 2	MCC Nameplate	☑
MCC 3	Buckets	☑
Control Cabinet 1	Wall 1	☑
Control Cabinet 2	Wall 2	☑
Control Cabinet 3	Wall 3	☑
Control Cabinet 4	Wall 4	☑
Control Cabinet 5	Panel Door Ext	☑
Control Cabinet 6	Panel Door Int	☑
Control Cabinet 7	Mounted Equip	☑
Control Cabinet 8	Cable Entries	☑
Control Cabinet 9	Backpanel	☑
Control Cabinet 10	PLC Rack	☑
Control Cabinet 11	PLC Processor	☑
Control Cabinet 12	IO Cards	☑
Control Cabinet 13	Field Terminals	☑
SCADA 1	Computer Desk	☐
SCADA 2	PC Front	☐
SCADA 3	PC Back	☐
SCADA 4	PC Model	☐
SCADA 5	Serial Conn.	☐
SCADA 6	Ethernet Conn.	☐
SCADA 7	Switch / Router	☐
General 1	Inst. Mounting	☑
General 2	Inst. Nameplate	☑
General 3	Process Piping	☑
General 4	Ext Wall 1	☑
General 5	Ext Wall 2	☑
General 6	Ext Wall 3	☑
General 7	Ext Wall 4	☑

Instrumentation Information				
Tag	Make	Model	SN	Description

Field Notes :

SCADA Phase III - Phase 3: Site Assessment

Site - W103 - Coleman Metering Station

Client: Municipality of Crowsnest Pass

Project: SCADA Phase III

MPE Job #: 1776-001-00

Checked By: Nick Sawatzky

Date: Nov. 1, 2017

Site Information	
Longitude from GPS	-114.5060915
Latitude from GPS	49.6429005
Elevation from GPS	4578.2 feet

Site Description :	Site - W103 - Coleman Metering Station

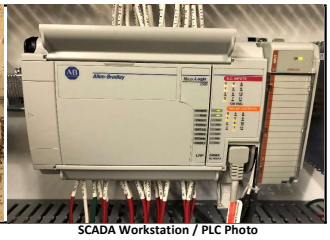
Site Photo - Overall

Process Photo

Electrical Service Info	
Type (OH / UG)	Underground
Voltage / Current	240V / 100A
Generator Info	N/A
Transfer Switch	N/A
Lighting Panel	100A

PLC Information		
Make / Model	Allen Bradley	MicroLogix 1500 1764-LRP 1764-24AWA
Program Backup ?	☐	
AI Cards / Points	1769-IF4 - Qty. 1	4
AO Cards / Points		
DI Cards / Points	On Board	12 - 120VAC
DO Cards / Points	On Board RO	12
Communication Card	1760-NET-AIC	
Radio	ELPRO	905U-G-MD1

Control Cabinet Photo



SCADA Workstation / PLC Photo

Control Cabinet Information		
Width	48	in
Height	36	in
Depth	18	in
Make / Model	ACE	Series 7000
HMI cutout size	5H x 6W	in
HMI Make / Model	Allen-Bradley	2711P-T6C20A8

SCADA Computer Information (If Applicable)		
Operating System		
SW Make / Vers		
Additional SW		
Backups Taken	☐	

Internet Service (If Applicable)			Radio Network (If Applicable		
ISP			Network Type		
Router Model			Radio Model		
WAN Ports			Ethernet		
LAN Ports			Serial		
VLANS			Antenna/Azm		
Backups Taken	☐		Backups Taken	☐	

Photograph Checklist		
Site Photo 1	North	☑
Site Photo 2	East	☑
Site Photo 3	South	☑
Site Photo 4	West	☑
Site Photo 5	Towards WTP	☑
Electrical Service 1	Pole / TFRM	☑
Electrical Service 2	Meter Base	☑
Electrical Service 3	Transfer SW	☐
Electrical Service 4	Generator	☐
Electrical Service 5	Panelboard	☑
Electrical Service 6	PB Legend	☑
MCC 1	MCC Lineup	☑
MCC 2	MCC Nameplate	☑
MCC 3	Buckets	☑
Control Cabinet 1	Wall 1	☑
Control Cabinet 2	Wall 2	☑
Control Cabinet 3	Wall 3	☑
Control Cabinet 4	Wall 4	☑
Control Cabinet 5	Panel Door Ext	☑
Control Cabinet 6	Panel Door Int	☑
Control Cabinet 7	Mounted Equip	☑
Control Cabinet 8	Cable Entries	☑
Control Cabinet 9	Backpanel	☑
Control Cabinet 10	PLC Rack	☑
Control Cabinet 11	PLC Processor	☑
Control Cabinet 12	IO Cards	☑
Control Cabinet 13	Field Terminals	☑
SCADA 1	Computer Desk	☐
SCADA 2	PC Front	☐
SCADA 3	PC Back	☐
SCADA 4	PC Model	☐
SCADA 5	Serial Conn.	☐
SCADA 6	Ethernet Conn.	☐
SCADA 7	Switch / Router	☐
General 1	Inst. Mounting	☑
General 2	Inst. Nameplate	☑
General 3	Process Piping	☑
General 4	Ext Wall 1	☑
General 5	Ext Wall 2	☑
General 6	Ext Wall 3	☑
General 7	Ext Wall 4	☑

Instrumentation Information				
Tag	Make	Model	SN	Description
	Fischer & Porter	10D1435A	8306B5724/2/B1	Flow to Town
	Fischer & Porter	10D1435A	8306B5724/6/B1	Flow to Reservoir
	Rosemount	C1151GP6E12C6	C37299	Reservoir Level (Pressure)

Field Notes :

SCADA Phase III - Phase 3: Site Assessment

Site - W104 - Hillcrest Pump House

Client: Municipality of Crowsnest Pass
Checked By: Nick Sawatzky
Project: SCADA Phase III
Date: Nov. 2, 2017
MPE Job #: 1776-001-00

Site Information	
Longitude from GPS	-114.3714849
Latitude from GPS	49.566098
Elevation from GPS	4219.2 feet

Electrical Service Info		
Type (OH / UG)	Underground	
Voltage / Current	480V / 200A	
Generator Info	N/A	
Transfer Switch	N/A	
Lighting Panel	100A	

PLC Information		
Make / Model	Allen Bradley	MicroLogix 1500 1769-LRP 1769-24AWA
Program Backup ?	☐	
AI Cards / Points	1769-IF4 - Qty. 1	4
AO Cards / Points		
DI Cards / Points	On Board 1769-IA16 - Qty. 1	12 - 120VAC 16 - 120VAC
DO Cards / Points	On Board RO	12
Communication Card	1760-NET-AIC	
Radio	ELPRO	905U-G-MD1

Control Cabinet Information		
Width	48	in
Height	36	in
Depth	18	in
Make / Model	ACE Manufacturing	Series 7000
HMI cutout size	6 W x 5 H	in
HMI Make / Model	Allen-Bradley	2711P-T6C20A8

SCADA Computer Information (If Applicable)		
Operating System		
SW Make / Vers		
Additional SW		
Backups Taken	☐	

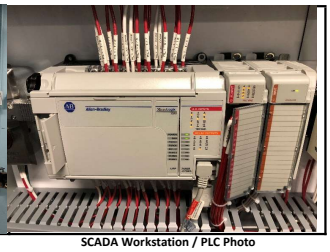
Photograph Checklist		
Site Photo 1	North	☑
Site Photo 2	East	☑
Site Photo 3	South	☑
Site Photo 4	West	☑
Site Photo 5	Towards WTP	☑
Electrical Service 1	Pole / TFRM	☑
Electrical Service 2	Meter Base	☑
Electrical Service 3	Transfer SW	☐
Electrical Service 4	Generator	☐
Electrical Service 5	Panelboard	☑
Electrical Service 6	PB Legend	☑
MCC 1	MCC Lineup	☑
MCC 2	MCC Nameplate	☑
MCC 3	Buckets	☑
Control Cabinet 1	Wall 1	☑
Control Cabinet 2	Wall 2	☑
Control Cabinet 3	Wall 3	☑
Control Cabinet 4	Wall 4	☑
Control Cabinet 5	Panel Door Ext	☑
Control Cabinet 6	Panel Door Int	☑
Control Cabinet 7	Mounted Equip	☑
Control Cabinet 8	Cable Entries	☑
Control Cabinet 9	Backpanel	☑
Control Cabinet 10	PLC Rack	☑
Control Cabinet 11	PLC Processor	☑
Control Cabinet 12	IO Cards	☑
Control Cabinet 13	Field Terminals	☑
SCADA 1	Computer Desk	☐
SCADA 2	PC Front	☐
SCADA 3	PC Back	☐
SCADA 4	PC Model	☐
SCADA 5	Serial Conn.	☐
SCADA 6	Ethernet Conn.	☐
SCADA 7	Switch / Router	☐
General 1	Inst. Mounting	☑
General 2	Inst. Nameplate	☑
General 3	Process Piping	☑
General 4	Ext Wall 1	☑
General 5	Ext Wall 2	☑
General 6	Ext Wall 3	☑
General 7	Ext Wall 4	☑

Site Description :	Site - W104 - Hillcrest Pump House

Site Photo - Overall

Process Photo

Control Cabinet Photo



SCADA Workstation / PLC Photo

Internet Service (If Applicable)			Radio Network (If Applicable		
ISP			Network Type		
Router Model			Radio Model		
WAN Ports			Ethernet		
LAN Ports			Serial		
VLANS			Antenna/Azm		
Backups Taken	☐		Backups Taken	☐	

Instrumentation Information				
Tag	Make	Model	SN	Description
				Hypochlorite Weight
	Fischer & Porter	10D1419A	7908B2077/8/B1	Distribution Flow

Field Notes :

SCADA Phase III - Phase 3: Site Assessment

Site - W105 - Hillcrest Reservoir

Client: Municipality of Crowsnest Pass

Checked By: Jason Ogertschnig

Project: SCADA Phase III

Date: Nov. 8, 2017

MPE Job #: 1776-001-00

Site Information	
Longitude from GPS	-114.3819793
Latitude from GPS	49.5665086
Elevation from GPS	4441.6 feet

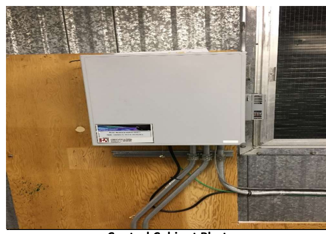
Site Description :	Site - W105 - Hillcrest Reservoir


Site Photo - Overall


Process Photo

Electrical Service Info		
Type (OH / UG)	Underground	
Voltage / Current		
Generator Info	N/A	
Transfer Switch	N/A	
Lighting Panel		

PLC Information		
Make / Model	ELPRO	905U-2
Program Backup ?	☐	
AI Cards / Points	On Board	6
AO Cards / Points	N/A	
DI Cards / Points	On Board	4 DI 4 PI
DO Cards / Points	On Board	1
Ethenet Card	N/A	


Control Cabinet Photo

SCADA Workstation / PLC Photo

Control Cabinet Information		
Width		in
Height		in
Depth		in
Make / Model		
HMI cutout size		mm
HMI Make / Model		

SCADA Computer Information (If Applicable)		
Operating System		
SW Make / Vers		
Additional SW		
Backups Taken	☐	

Internet Service (If Applicable)		
ISP		
Router Model		
WAN Ports		
LAN Ports		
VLANS		
Backups Taken	☐	

Radio Network (If Applicable		
Network Type		
Radio Model		
Ethernet		
Serial		
Antenna/Azm		
Backups Taken	☐	

Photograph Checklist		
Site Photo 1	North	☐
Site Photo 2	East	☐
Site Photo 3	South	☐
Site Photo 4	West	☐
Site Photo 5	Towards WTP	☐
Electrical Service 1	Pole / TFRM	☐
Electrical Service 2	Meter Base	☐
Electrical Service 3	Transfer SW	☐
Electrical Service 4	Generator	☐
Electrical Service 5	Panelboard	☐
Electrical Service 6	PB Legend	☐
MCC 1	MCC Lineup	☐
MCC 2	MCC Nameplate	☐
MCC 3	Buckets	☐
Control Cabinet 1	Wall 1	☐
Control Cabinet 2	Wall 2	☐
Control Cabinet 3	Wall 3	☐
Control Cabinet 4	Wall 4	☐
Control Cabinet 5	Panel Door Ext	☐
Control Cabinet 6	Panel Door Int	☐
Control Cabinet 7	Mounted Equip	☐
Control Cabinet 8	Cable Entries	☐
Control Cabinet 9	Backpanel	☐
Control Cabinet 10	PLC Rack	☐
Control Cabinet 11	PLC Processor	☐
Control Cabinet 12	IO Cards	☐
Control Cabinet 13	Field Terminals	☐
SCADA 1	Computer Desk	☐
SCADA 2	PC Front	☐
SCADA 3	PC Back	☐
SCADA 4	PC Model	☐
SCADA 5	Serial Conn.	☐
SCADA 6	Ethernet Conn.	☐
SCADA 7	Switch / Router	☐
General 1	Inst. Mounting	☐
General 2	Inst. Nameplate	☐
General 3	Process Piping	☐
General 4	Ext Wall 1	☐
General 5	Ext Wall 2	☐
General 6	Ext Wall 3	☐
General 7	Ext Wall 4	☐

Instrumentation Information				
Tag	Make	Model	SN	Description

Field Notes :

SCADA Phase III - Phase 3: Site Assessment

Site - W106 - Ski Hill Station

Client: Municipality of Crowsnest Pass

Project: SCADA Phase III

MPE Job #: 1776-001-00

Checked By: Jason Ogertschnig

Date: Nov. 8, 2017

Site Information	
Longitude from GPS	-114.450955
Latitude from GPS	49.603048
Elevation from GPS	4639.6 feet

Electrical Service Info		
Type (OH / UG)	Overhead	
Voltage / Current	120V	2A
Generator Info	N/A	
Transfer Switch	N/A	
Lighting Panel	N/A	

PLC Information		
Make / Model	ELPRO	905U-2
Program Backup ?	☐	
AI Cards / Points	On Board	4
AO Cards / Points	N/A	
DI Cards / Points	On Board	4 DI 4 PI
DO Cards / Points	On Board	1
Ethenet Card		

Control Cabinet Information		
Width		in
Height		in
Depth		in
Make / Model		
HMI cutout size	N/A	mm
HMI Make / Model		

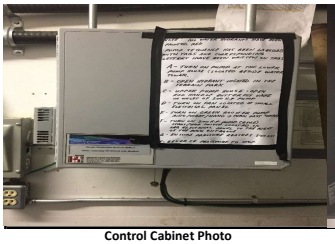
SCADA Computer Information (If Applicable)		
Operating System		
SW Make / Vers		
Additional SW		
Backups Taken	☐	

Site Description :	Site - W106 - Ski Hill Station

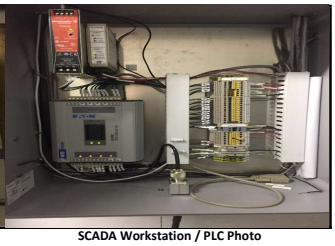
Site Photo - Overall

N/A

Process Photo



Control Cabinet Photo



SCADA Workstation / PLC Photo

Internet Service (If Applicable)			Radio Network (If Applicable		
ISP			Network Type		
Router Model			Radio Model		
WAN Ports			Ethernet		
LAN Ports			Serial		
VLANS			Antenna/Azm		
Backups Taken	☐		Backups Taken	☐	

Photograph Checklist		
Site Photo 1	North	☑
Site Photo 2	East	☑
Site Photo 3	South	☑
Site Photo 4	West	☑
Site Photo 5	Towards WTP	☑
Electrical Service 1	Pole / TFRM	☑
Electrical Service 2	Meter Base	☑
Electrical Service 3	Transfer SW	☐
Electrical Service 4	Generator	☐
Electrical Service 5	Panelboard	☑
Electrical Service 6	PB Legend	☑
MCC 1	MCC Lineup	☑
MCC 2	MCC Nameplate	☑
MCC 3	Buckets	☑
Control Cabinet 1	Wall 1	☑
Control Cabinet 2	Wall 2	☑
Control Cabinet 3	Wall 3	☑
Control Cabinet 4	Wall 4	☑
Control Cabinet 5	Panel Door Ext	☑
Control Cabinet 6	Panel Door Int	☑
Control Cabinet 7	Mounted Equip	☑
Control Cabinet 8	Cable Entries	☑
Control Cabinet 9	Backpanel	☑
Control Cabinet 10	PLC Rack	☑
Control Cabinet 11	PLC Processor	☑
Control Cabinet 12	IO Cards	☑
Control Cabinet 13	Field Terminals	☑
SCADA 1	Computer Desk	☐
SCADA 2	PC Front	☐
SCADA 3	PC Back	☐
SCADA 4	PC Model	☐
SCADA 5	Serial Conn.	☐
SCADA 6	Ethernet Conn.	☐
SCADA 7	Switch / Router	☐
General 1	Inst. Mounting	☑
General 2	Inst. Nameplate	☑
General 3	Process Piping	☑
General 4	Ext Wall 1	☑
General 5	Ext Wall 2	☑
General 6	Ext Wall 3	☑
General 7	Ext Wall 4	☑

Instrumentation Information				
Tag	Make	Model	SN	Description
				Blairmore Reservoir Level
				Ski Hill Flow

Field Notes :

SCADA Phase III - Phase 3: Site Assessment

Site - W107 - Southmore Pump House

Client: Municipality of Crowsnest Pass

Checked By: Nick Sawatzky

Project: SCADA Phase III

Date: Nov. 1, 2017

MPE Job #: 1776-001-00

Site Information	
Longitude from GPS	-114.4505627
Latitude from GPS	49.6056097
Elevation from GPS	4379.3 feet

Site Description :	Site - W107 - Southmore Pump House

Site Photo - Overall

Process Photo

Electrical Service Info	
Type (OH / UG)	Underground
Voltage / Current	600V / 200A
Generator Info	Katolight - NL130FRG4
Transfer Switch	ASCO - Series 300
Lighting Panel	100A

PLC Information		
Make / Model	Schneider Electric	TSX Momentum 171CCC76010
Program Backup ?	☐	
AI Cards / Points	170 ADM 350 10 - Qty. 1 170 AMM 090 00 - Qty. 2 170 INT 110 00 - Qty. 2	AMM - 4
AO Cards / Points		AMM - 2
DI Cards / Points		AMM - 4 ADM - 16
DO Cards / Points		AMM - 2 ADM - 16
Radio	ELPRO	905U-G-MD1

Control Cabinet Photo

SCADA Workstation / PLC Photo

Control Cabinet Information		
Width	36	in
Height	36	in
Depth	8	in
Make / Model	Hoffman	CSD363610
HMI cutout size	7H x 5W	in
HMI Make / Model	Eaton	HMI06CE

SCADA Computer Information (If Applicable)		
Operating System		
SW Make / Vers		
Additional SW		
Backups Taken	☐	

Internet Service (If Applicable)		
ISP		
Router Model		
WAN Ports		
LAN Ports		
VLANS		
Backups Taken	☐	

Radio Network (If Applicable		
Network Type		
Radio Model		
Ethernet		
Serial		
Antenna/Azm		
Backups Taken	☐	

Photograph Checklist		
Site Photo 1	North	☑
Site Photo 2	East	☑
Site Photo 3	South	☑
Site Photo 4	West	☑
Site Photo 5	Towards WTP	☑
Electrical Service 1	Pole / TFRM	☑
Electrical Service 2	Meter Base	☑
Electrical Service 3	Transfer SW	☑
Electrical Service 4	Generator	☑
Electrical Service 5	Panelboard	☑
Electrical Service 6	PB Legend	☑
MCC 1	MCC Lineup	☑
MCC 2	MCC Nameplate	☑
MCC 3	Buckets	☑
Control Cabinet 1	Wall 1	☑
Control Cabinet 2	Wall 2	☑
Control Cabinet 3	Wall 3	☑
Control Cabinet 4	Wall 4	☑
Control Cabinet 5	Panel Door Ext	☑
Control Cabinet 6	Panel Door Int	☑
Control Cabinet 7	Mounted Equip	☑
Control Cabinet 8	Cable Entries	☑
Control Cabinet 9	Backpanel	☑
Control Cabinet 10	PLC Rack	☑
Control Cabinet 11	PLC Processor	☑
Control Cabinet 12	IO Cards	☑
Control Cabinet 13	Field Terminals	☑
SCADA 1	Computer Desk	☐
SCADA 2	PC Front	☐
SCADA 3	PC Back	☐
SCADA 4	PC Model	☐
SCADA 5	Serial Conn.	☐
SCADA 6	Ethernet Conn.	☐
SCADA 7	Switch / Router	☐
General 1	Inst. Mounting	☑
General 2	Inst. Nameplate	☑
General 3	Process Piping	☑
General 4	Ext Wall 1	☑
General 5	Ext Wall 2	☑
General 6	Ext Wall 3	☑
General 7	Ext Wall 4	☑

Instrumentation Information				
Tag	Make	Model	SN	Description
	Siemens	7MF8023-1CA14-1MJ6-Z	IX-X622-9046810	Pump 1 Suction
	Siemens	7MF8023-1CA14-1MJ6-Z	IX-X622-9046809	Pump 2 Suction
	Siemens	7MF8023-1DA14-1MJ6-Z	IX-X622-9046811	Distribution Pressure
	Siemens	7ME6520-4HJ13-2AA2	&ME652 164802U269	Hi Zone Flow
				Mid Zone Flow

Field Notes :

SCADA Phase III - Phase 3: Site Assessment
Site - W108 - Sentinel Pump House

Client: Municipality of Crowsnest Pass
Checked By: Nick Sawatzky
Project: SCADA Phase III
Date: Nov. 3, 2017
MPE Job #: 1776-001-00

Site Information	
Longitude from GPS	-114.6015356
Latitude from GPS	49.6316298
Elevation from GPS	4425.9 feet

Electrical Service Info		
Type (OH / UG)	Underground	
Voltage / Current	600 V / 100A	
Generator Info	N/A	
Transfer Switch	N/A	
Lighting Panel	225A	

PLC Information		
Make / Model	Allen Bradley	MicroLogix 1500 1769-LRP 1769-24AWA
Program Backup ?	☐	
AI Cards / Points	1769-IF4 - Qty. 1	4
AO Cards / Points		
DI Cards / Points	On Board 1769-IA16 - Qty. 1	12 - 120VAC 16 - 120VAC
DO Cards / Points	On Board RO	12
Communication Card	1760-NET-AIC	
Radio	ELPRO	905U-G-MD1

Control Cabinet Information		
Width	48	in
Height	36	in
Depth	18	in
Make / Model	ACE Manufacturing	Series 7000
HMI cutout size	5 H x 6 W	in
HMI Make / Model	Allen-Bradley	2711P-T6C20A8

SCADA Computer Information (If Applicable)		
Operating System		
SW Make / Vers		
Additional SW		
Backups Taken	☐	

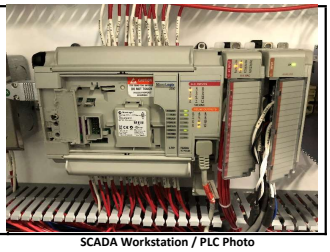
Photograph Checklist		
Site Photo 1	North	☑
Site Photo 2	East	☑
Site Photo 3	South	☑
Site Photo 4	West	☑
Site Photo 5	Towards WTP	☑
Electrical Service 1	Pole / TFRM	☑
Electrical Service 2	Meter Base	☑
Electrical Service 3	Transfer SW	☐
Electrical Service 4	Generator	☐
Electrical Service 5	Panelboard	☑
Electrical Service 6	PB Legend	☑
MCC 1	MCC Lineup	☑
MCC 2	MCC Nameplate	☑
MCC 3	Buckets	☑
Control Cabinet 1	Wall 1	☑
Control Cabinet 2	Wall 2	☑
Control Cabinet 3	Wall 3	☑
Control Cabinet 4	Wall 4	☑
Control Cabinet 5	Panel Door Ext	☑
Control Cabinet 6	Panel Door Int	☑
Control Cabinet 7	Mounted Equip	☑
Control Cabinet 8	Cable Entries	☑
Control Cabinet 9	Backpanel	☑
Control Cabinet 10	PLC Rack	☑
Control Cabinet 11	PLC Processor	☑
Control Cabinet 12	IO Cards	☑
Control Cabinet 13	Field Terminals	☑
SCADA 1	Computer Desk	☐
SCADA 2	PC Front	☐
SCADA 3	PC Back	☐
SCADA 4	PC Model	☐
SCADA 5	Serial Conn.	☐
SCADA 6	Ethernet Conn.	☐
SCADA 7	Switch / Router	☐
General 1	Inst. Mounting	☑
General 2	Inst. Nameplate	☑
General 3	Process Piping	☑
General 4	Ext Wall 1	☑
General 5	Ext Wall 2	☑
General 6	Ext Wall 3	☑
General 7	Ext Wall 4	☑

Site Description :	Site - W108 - Sentinel Pump House

Site Photo - Overall

Process Photo

Control Cabinet Photo



SCADA Workstation / PLC Photo

Internet Service (If Applicable)			Radio Network (If Applicable		
ISP			Network Type		
Router Model			Radio Model		
WAN Ports			Ethernet		
LAN Ports			Serial		
VLANS			Antenna/Azm		
Backups Taken	☐		Backups Taken	☐	

Instrumentation Information				
Tag	Make	Model	SN	Description
FT1	Fischer & Porter	10D1435A	8203B2050/1/B1	Flow Meter

Field Notes :

SCADA Phase III - Phase 3: Site Assessment

Site - W109 - Willow Drive Pump House

Client: Municipality of Crowsnest Pass

Checked By: Nick Sawatzky

Project: SCADA Phase III

Date: Nov. 1, 2017

MPE Job #: 1776-001-00

Site Information	
Longitude from GPS	-114.5428643
Latitude from GPS	49.63226
Elevation from GPS	4380.3 feet

Site Description : Site - W109 - Willow Drive Pump House

Site Photo - Overall

Process Photo

Electrical Service Info		
Type (OH / UG)	Overhead	
Voltage / Current	480 V	
Generator Info	N/A	
Transfer Switch	N/A	
Lighting Panel		

PLC Information		
Make / Model	ELPRO	905U-4
Program Backup ?	☐	
AI Cards / Points		
AO Cards / Points		
DI Cards / Points	On Board	4 - DI 12 - DIO
DO Cards / Points	On Board	4 - DO 12 - DIO
Ethenet Card		

Control Cabinet Photo

SCADA Workstation / PLC Photo

Control Cabinet Information		
Width	16	in
Height	18	in
Depth	10	in
Make / Model	Hoffman	A181610CHQRFG
HMI cutout size	N/A	mm
HMI Make / Model		

SCADA Computer Information (If Applicable)		
Operating System		
SW Make / Vers		
Additional SW		
Backups Taken	☐	

Internet Service (If Applicable)		
ISP		
Router Model		
WAN Ports		
LAN Ports		
VLANS		
Backups Taken	☐	

Radio Network (If Applicable		
Network Type		
Radio Model		
Ethernet		
Serial		
Antenna/Azm		
Backups Taken	☐	

Photograph Checklist		
Site Photo 1	North	☑
Site Photo 2	East	☑
Site Photo 3	South	☑
Site Photo 4	West	☑
Site Photo 5	Towards WTP	☑
Electrical Service 1	Pole / TFRM	☑
Electrical Service 2	Meter Base	☑
Electrical Service 3	Transfer SW	☐
Electrical Service 4	Generator	☐
Electrical Service 5	Panelboard	☑
Electrical Service 6	PB Legend	☑
MCC 1	MCC Lineup	☐
MCC 2	MCC Nameplate	☐
MCC 3	Buckets	☐
Control Cabinet 1	Wall 1	☑
Control Cabinet 2	Wall 2	☑
Control Cabinet 3	Wall 3	☑
Control Cabinet 4	Wall 4	☑
Control Cabinet 5	Panel Door Ext	☑
Control Cabinet 6	Panel Door Int	☑
Control Cabinet 7	Mounted Equip	☑
Control Cabinet 8	Cable Entries	☑
Control Cabinet 9	Backpanel	☑
Control Cabinet 10	PLC Rack	☑
Control Cabinet 11	PLC Processor	☑
Control Cabinet 12	IO Cards	☑
Control Cabinet 13	Field Terminals	☑
SCADA 1	Computer Desk	☐
SCADA 2	PC Front	☐
SCADA 3	PC Back	☐
SCADA 4	PC Model	☐
SCADA 5	Serial Conn.	☐
SCADA 6	Ethernet Conn.	☐
SCADA 7	Switch / Router	☐
General 1	Inst. Mounting	☑
General 2	Inst. Nameplate	☑
General 3	Process Piping	☑
General 4	Ext Wall 1	☑
General 5	Ext Wall 2	☑
General 6	Ext Wall 3	☑
General 7	Ext Wall 4	☑

Instrumentation Information				
Tag	Make	Model	SN	Description

Field Notes :

SCADA Phase III - Phase 3: Site Additions
Site - W110 - Kananaskis Wilds

Client: Municipality of Crowsnest Pass
Checked By: Nick Sawatzky
Project: SCADA Phase III
Date: Nov. 1, 2017
MPE Job #: 1776-001-00

Site Information	
Longitude from GPS	-114.4981478
Latitude from GPS	49.6420462
Elevation from GPS	4589 feet

Site Description :	Site - W110 - Kananaskis Wilds

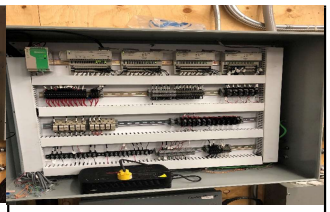

Site Photo - Overall


Process Photo

Electrical Service Info	
Type (OH / UG)	Underground
Voltage / Current	600V / 400A
Generator Info	Caterpillar - LC5
Transfer Switch	Thomson Technology Inc - TSC 800
Lighting Panel	120 / 208 V / 100A

PLC Information		
Make / Model	Schneider	TSX Momentum 171CCC96030
Program Backup ?	☐	
AI Cards / Points	170 AMM 090 00 - Qty. 3 170 ADM 350 10 - Qty. 1 170 INT 110 00 - Qty. 3	AMM - 4
AO Cards / Points		AMM - 2
DI Cards / Points		AMM - 4 ADM - 16
DO Cards / Points		AMM - 2 ADM - 16
Ethernet Card		


Control Cabinet Photo


SCADA Workstation / PLC Photo

Control Cabinet Information		
Width	36	in
Height	36	in
Depth	10	in
Make / Model	Homman	CSD363610
HMI cutout size	5 H x 7 W	in
HMI Make / Model	Eaton	HMI06CE

SCADA Computer Information (If Applicable)		
Operating System		
SW Make / Vers		
Additional SW		
Backups Taken	☐	

Internet Service (If Applicable)		
ISP		
Router Model		
WAN Ports		
LAN Ports		
VLANS		
Backups Taken	☐	

Radio Network (If Applicable		
Network Type		
Radio Model		
Ethernet		
Serial		
Antenna/Azm		
Backups Taken	☐	

Photograph Checklist		
Site Photo 1	North	☑
Site Photo 2	East	☑
Site Photo 3	South	☑
Site Photo 4	West	☑
Site Photo 5	Towards WTP	☐
Electrical Service 1	Pole / TFRM	☑
Electrical Service 2	Meter Base	☑
Electrical Service 3	Transfer SW	☑
Electrical Service 4	Generator	☑
Electrical Service 5	Panelboard	☑
Electrical Service 6	PB Legend	☑
MCC 1	MCC Lineup	☑
MCC 2	MCC Nameplate	☑
MCC 3	Buckets	☑
Control Cabinet 1	Wall 1	☑
Control Cabinet 2	Wall 2	☑
Control Cabinet 3	Wall 3	☑
Control Cabinet 4	Wall 4	☑
Control Cabinet 5	Panel Door Ext	☑
Control Cabinet 6	Panel Door Int	☑
Control Cabinet 7	Mounted Equip	☑
Control Cabinet 8	Cable Entries	☑
Control Cabinet 9	Backpanel	☑
Control Cabinet 10	PLC Rack	☑
Control Cabinet 11	PLC Processor	☑
Control Cabinet 12	IO Cards	☑
Control Cabinet 13	Field Terminals	☑
SCADA 1	Computer Desk	☐
SCADA 2	PC Front	☐
SCADA 3	PC Back	☐
SCADA 4	PC Model	☐
SCADA 5	Serial Conn.	☐
SCADA 6	Ethernet Conn.	☐
SCADA 7	Switch / Router	☐
General 1	Inst. Mounting	☑
General 2	Inst. Nameplate	☑
General 3	Process Piping	☑
General 4	Ext Wall 1	☑
General 5	Ext Wall 2	☑
General 6	Ext Wall 3	☑
General 7	Ext Wall 4	☑

Instrumentation Information				
Tag	Make	Model	SN	Description
PT1	Rosemount	2088G3S22A1M5B4C6	0366890	Suction Pressure
PT2	Rosemount	2088G3S22A1M5B4C6	0366887	Distribution Pressure
FT1	SeaMetrics	EX115B	11071889	Distribution Flow

Field Notes :

SCADA Phase III - Phase 3: Site Assessment
Site - W113 - Blairmore Reservoir

Client: Municipality of Crowsnest Pass
Project: SCADA Phase III
MPE Job #: 1776-001-00

Checked By: Nick Sawatzky
Date: Nov. 2, 2017

Site Information	
Longitude from GPS	-114.4427924
Latitude from GPS	49.601968
Elevation from GPS	4432.3 feet

Electrical Service Info		
Type (OH / UG)	Overhead	
Voltage / Current	480	200
Generator Info	N/A	
Transfer Switch	N/A	
Lighting Panel	70A	

PLC Information		
Make / Model	ELPRO	905U-2
Program Backup ?	☐	
AI Cards / Points	On Board	4
AO Cards / Points	N/A	
DI Cards / Points	On Board	4 DI 4 PI
DO Cards / Points	On Board	1
Ethenet Card		

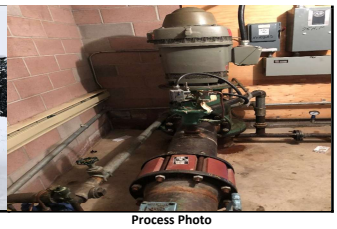
Control Cabinet Information		
Width	14	in
Height	16	in
Depth	6	in
Make / Model		
HMI cutout size	N/A	mm
HMI Make / Model		

SCADA Computer Information (If Applicable)		
Operating System		
SW Make / Vers		
Additional SW		
Backups Taken	☐	

Photograph Checklist		
Site Photo 1	North	☑
Site Photo 2	East	☑
Site Photo 3	South	☑
Site Photo 4	West	☑
Site Photo 5	Towards WTP	☑
Electrical Service 1	Pole / TFRM	☑
Electrical Service 2	Meter Base	☑
Electrical Service 3	Transfer SW	☐
Electrical Service 4	Generator	☐
Electrical Service 5	Panelboard	☑
Electrical Service 6	PB Legend	☑
MCC 1	MCC Lineup	☑
MCC 2	MCC Nameplate	☑
MCC 3	Buckets	☑
Control Cabinet 1	Wall 1	☑
Control Cabinet 2	Wall 2	☑
Control Cabinet 3	Wall 3	☑
Control Cabinet 4	Wall 4	☑
Control Cabinet 5	Panel Door Ext	☑
Control Cabinet 6	Panel Door Int	☑
Control Cabinet 7	Mounted Equip	☑
Control Cabinet 8	Cable Entries	☑
Control Cabinet 9	Backpanel	☑
Control Cabinet 10	PLC Rack	☑
Control Cabinet 11	PLC Processor	☑
Control Cabinet 12	IO Cards	☑
Control Cabinet 13	Field Terminals	☑
SCADA 1	Computer Desk	☐
SCADA 2	PC Front	☐
SCADA 3	PC Back	☐
SCADA 4	PC Model	☐
SCADA 5	Serial Conn.	☐
SCADA 6	Ethernet Conn.	☐
SCADA 7	Switch / Router	☐
General 1	Inst. Mounting	☑
General 2	Inst. Nameplate	☑
General 3	Process Piping	☑
General 4	Ext Wall 1	☑
General 5	Ext Wall 2	☑
General 6	Ext Wall 3	☑
General 7	Ext Wall 4	☑

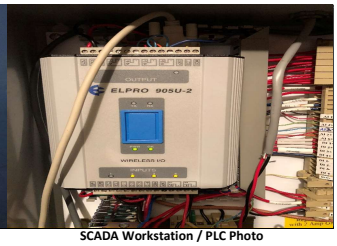
Site Description : Site - W113 - Blairmore Reservoir

Site Photo - Overall



Process Photo

Control Cabinet Photo



SCADA Workstation / PLC Photo

Internet Service (If Applicable)		
ISP		
Router Model		
WAN Ports		
LAN Ports		
VLANS		
Backups Taken	☐	

Radio Network (If Applicable		
Network Type		
Radio Model		
Ethernet		
Serial		
Antenna/Azm		
Backups Taken	☐	

Instrumentation Information				
Tag	Make	Model	SN	Description
				Blairmore Reservoir Level
				Ski Hill Flow

Field Notes :