

cityofnovi.org

CITY of NOVI CITY COUNCIL

Agenda Item 2
April 21, 2008

SUBJECT: Approval to award a construction contract for the sanitary sewer Supervisory Control and Data Acquisition (SCADA) Implementation project to Windemuller Electric Inc., the lowest qualified bidder, in the amount of \$398,400.

SUBMITTING DEPARTMENT: Engineering *RH*

CITY MANAGER APPROVAL: *[Signature]*

EXPENDITURE REQUIRED	\$398,400 (From Water & Sewer Fund)
AMOUNT INCLUDED IN CIP	\$500,000 (Includes \$44,269 previously awarded for Engineering)
ADDITIONAL AMOUNT REQUIRED	\$0
LINE ITEM NUMBER	592-592.00-158.050

BACKGROUND INFORMATION:

This project is a recommendation from the *Capacity, Management, Operations and Maintenance (CMOM)* Program initiated by the City in 2004. Supervisory Control and Data Acquisition (SCADA) will allow the Water and Sewer Department to monitor the operation of the City's sanitary sewer lift stations, rain gauge (to be located at the Field Services Complex) and flow meter (located in the vicinity of Eight Mile Road and Novi Road). The system will provide real time data about how the sanitary sewer system is operating, and will allow staff to monitor and control the stations remotely rather than requiring staff to visit a site when problems occur. Obtaining and evaluating data will allow staff to continuously monitor the performance of the City's sanitary system and identify areas that may be in need of maintenance.

The SCADA system project scope will include:

- Upgrade of the existing Multitrode pump controllers at five sanitary sewage lift stations.
- Installation of new computerized pump controllers at 10 sanitary sewage lift stations.
- Installation of equipment and controllers to serve the new Field Services Complex rain gauge and the City's Eight Mile Road sewage flow meter.
- Installation/integration of a communications backbone based on a cellular data system consisting of cellular modems at each station.
- Provision of two mobile SCADA control units, two workstations at the Field Services Complex dedicated to SCADA, and two redundant servers (one to be installed at DPW; one at City Hall).
- Training of City staff.

Stantec, the consulting engineer selected for this project, worked with Engineering and Water and Sewer staff to develop a final specification for the project. In order to obtain bids from the contractors most familiar with this type of work, a two phase bid process was used. The first phase was a qualification review that was advertised publicly and yielded qualification packages from eight contractors. The qualification packages were reviewed and the five contractors with the highest review scores were selected to provide bids to the City for construction. The second phase was priced based on the final specifications prepared by Stantec. A total of four bids were

received from the selected group of qualified contractors on April 3, 2008. The results of the bid opening are shown below:

Contractor	Option A Bid	Option B Bid
Windemuller Electric	\$398,400	\$513,700 ←
Post Electric	\$482,400	\$494,400
Motor City Electric	\$498,335	\$642,000
Commerce Controls	\$565,780	\$496,025

As part of the design process, two specifications were developed for the controllers to be used at each site: Option A (controllers manufactured by Multitrode) and Option B (controllers manufactured by Allen Bradley). The attached memo from Stantec dated February 7, 2008 explains the differences between the two options.

While both options will serve the needs of the City, the recommendation from Engineering and Water and Sewer is to award Option A (see Tim Sikma memo dated April 14, 2008 attached). The recommendation is based not only on the lower cost of implementation (\$96,000 less expensive than the lowest bid for Option B), but also on the lower cost of maintaining a system based on Multitrode controllers. The Multitrode controllers (Option A) can be programmed and maintained by existing staff with limited training, while the Allen Bradley (Option B) system would require either a full-time internal technician be added to staff or the use of a consultant to update and manage the controllers.

Windemuller Electric met the qualification requirements to bid the project (as reviewed by staff) and provided the lowest bid for Option A, the recommended option by staff. Windemueller has been in business since 1963 and has recently completed SCADA systems for the City of Coldwater, Pittsfield Township (near Ann Arbor) and City of Allendale (near Grand Rapids). Stantec has reviewed their references on our behalf and received favorable recommendations. (See Stantec recommendation letter dated April 14, 2008 attached).

The budget for the project is \$500,000, of which \$44,269 has already been awarded to Stantec for engineering. The project is scheduled for completion this calendar year.

RECOMMENDED ACTION: Approval to award a construction contract for the sanitary sewer Supervisory Control and Data Acquisition (SCADA) Implementation project to Windemuller Electric Inc., the lowest qualified bidder, in the amount of \$398,400.

	1	2	Y	N
Mayor Landry				
Mayor Pro Tem Capello				
Council Member Crawford				
Council Member Gatt				

	1	2	Y	N
Council Member Margolis				
Council Member Mutch				
Council Member Staudt				

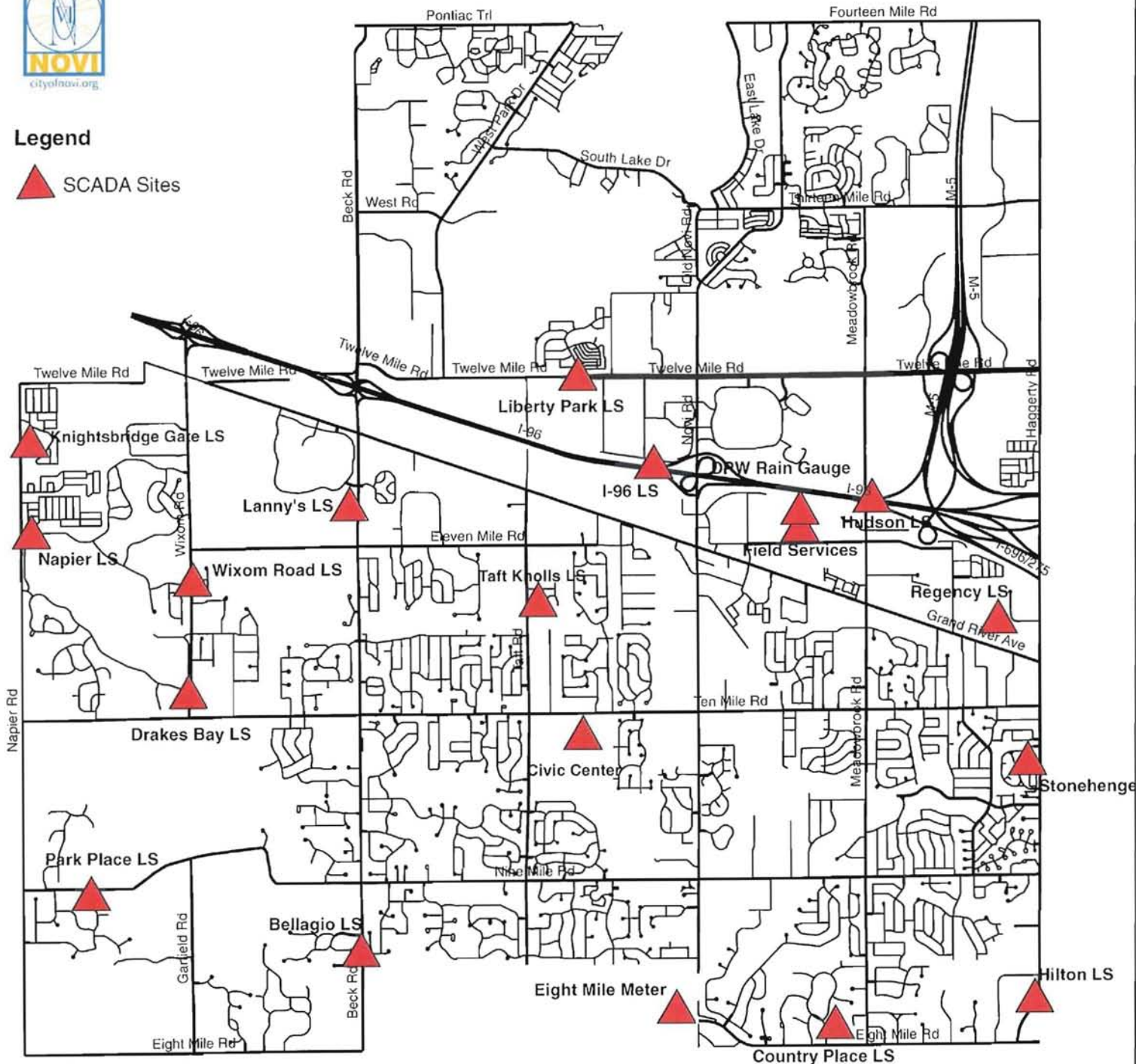
LOCATION MAP

Sanitary Sewer SCADA Installation Sites



Legend

SCADA Sites



CITY OF NOVI

ENGINEERING DIVISION

45175 W. TEN MILE ROAD
NOVI, MI 48375-3084
(248) 347-0454

MAP AUTHOR: BRIAN COBURN, PE



FEET

1 INCH EQUALS 4,531 FEET

MAP PRINT DATE: 4/15/08

MAP INTERPRETATION NOTICE

Map information depicted is not intended to replace or substitute for any official or primary source. This map was intended to meet National Map Accuracy Standards and use the most recent accurate sources available to the people of the City of Novi. Boundary measurements and area calculations are approximations and should not be construed as survey measurements performed by a licensed Michigan Surveyor as defined in Michigan Public Act 132 of 1970 as amended. Please contact the City GIS Manager to confirm source and accuracy information related to this map.



Stantec Consulting Michigan Inc.
3959 Research Park Drive
Ann Arbor MI 48108-2216
Tel: (734) 761-1010
Fax: (734) 761-1200

Stantec

April 14, 2008
File: 2075108500

City of Novi
Engineering Department
45175 West Ten Mile Road
Novi, Michigan 48375-5683

Attention: Mr. Brian Coburn, PE

Dear Mr. Coburn:

**Reference: Recommendation of Award
Sanitary Lift Stations SCADA Improvements
City of Novi, Michigan**

Pursuant to your direction, bids for the above-referenced project were received at the City of Novi, Clerk's Office on Thursday, April 10, 2008, where they were opened and read aloud at 3:00 PM. A total of four (4) bids were received, ranging from a low in the amount of \$398,400 for the base bid for Option "A" submitted by Windemuller Electric, Inc. of Wayland, Michigan to a high in the amount of \$642,000 for the base bid for Option "B" by Motor City Electric Technologies, Inc. of Detroit, Michigan. Our engineer's estimate for this project was in the amount of \$389,000 for Option "A" and \$525,000 for Option "B".

Windemuller Electric, Inc. was involved with the system integration on a water system project involving extensive SCADA system work for one of our clients, Pittsfield Township; Windemuller's performance on this project was satisfactory. In addition, we have contacted the references provided by Windemuller Electric, Inc., and verified their experience with other engineers for whom they have worked with on similar projects. We received favorable recommendations regarding their experience, timeliness, and ability to perform the required work from these references. Based on these references and the bids received, we recommend awarding this contract to Windemuller Electric, Inc.

If you concur with our recommendation and the City Council awards a contract to Windemuller Electric, Inc., we would be pleased to prepare the contracts, obtain the required bonds and insurance coverages and schedule a preconstruction meeting to initiate this project.

We would like to thank you for this opportunity to provide services for the City of Novi and we look forward to continuing this relationship in the future.

Sincerely,

STANTEC CONSULTING MICHIGAN INC.


Greg S. Schofer
Associate
Tel: 734-214-1852
Fax: 734-761-1200
greg.schofer@stantec.com

Attachment: Bid Tab

Bid Tabulation
for the
Sanitary Lift Stations SCADA Improvements
for the
City of Novi, Michigan

Bid Date: Thursday, April 10, 2008
3:00 PM, local time

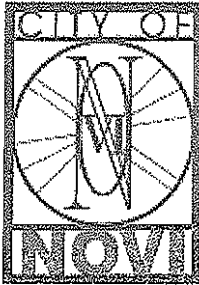
Project No.: 2075108500

Contractor	Windemuller Electric, Inc. 1176 Electric Avenue Wayland, Michigan 49348 616-877-8770	Post Electric, Inc. P.O. Box 21058 Detroit, Michigan 48221 313-369-1616	Commerce Controls 41096 Vencent Court Novi, Michigan 48375 248-476-1442
Item	Total Price	Total Price	Total Price
Option A - SCADA System Using Multi-Smart Controllers	\$ 398,400.00	\$ 482,400.00	\$ 565,780.00
Option B - SCADA System Using Allen-Bradley Controllers	\$ 513,700.00	\$ 494,400.00	\$ 496,025.00

Other Bidders:

Contractor	Motor City Elec. Tech. Inc. 9440 Grinnell Detroit, Michigan 48213 313-921-5300
Item	Total Price
Option A - SCADA System Using Multi-Smart Controllers	\$ 498,335.00
Option B - SCADA System Using Allen-Bradley Controllers	\$ 642,000.00

MEMORANDUM



cityofnovi.org

TO: BRIAN COBURN, ENGINEERING
FROM: TIM SIKMA, WATER AND SEWER MANAGER
SUBJECT: MULTISMART CONTROLLERS VERSUS TRADITIONAL PROGRAMMABLE LOGIC CONTROLLERS
DATE: APRIL 14, 2008

A handwritten signature in black ink, appearing to be "T. Sikma", is written to the right of the "FROM:" line.

We are responding to your request for input regarding the consideration of the installation of the Multismart controllers over the more traditional Program Logic Controllers (PLC). As you know, we are currently using the Multismart controllers at four of our active lift stations. We have found that they are easy to use and to program. Most of our staff are now comfortable with the controllers and are capable of operating the station efficiently with these units. Operationally and mechanically we have found them useful in all our sewer applications and we would like to use these controllers in the remaining lift stations that are planned to be upgraded as part of our Supervisory Control and Data Acquisition (SCADA) program.

Our staff can easily repair or replace most problems associated with the Multismart controller unit in the field without outside support which would be necessary with other controller products. In addition, if further support is needed, we have a local supplier of the Multismart controllers who are available on a 24 hour response basis. If you have any questions regarding the use of Multismart controllers operation and maintenance please contact us.

Technical Memo



Stantec

To: Brian Coburn, P.E.
City of Novi Engineering
Department

From: Greg Schofer
Stantec Ann Arbor Michigan

File: 2075108500

Date: February 26, 2008

Reference: Traditional Programmable Logic Controller Radio Versus “Out of the Box” Pump Station Controller/RTU

Following the third progress meeting between Stantec Consulting Michigan Inc. (Stantec) and the City of Novi (City), the City requested that Stantec review both traditional programmable logic controllers (PLC) and “out of the box” pump station controllers/RTU on the local controller for the proposed SCADA systems.

After further discussions with the City it was decided for compatibility, dependability and the ability for multiple contractors to provide SCADA related services, two options are to be reviewed.

Option “A” – “Out of the Box” Controllers

This system will be based on MultiTrode Multismart controllers.

Option “B” – Traditional PLC

This system will be based on Allen-Bradley Programmable Logic Controllers with Panelview plus 600 monochrome screens.

Option “A” – “Out of the Box” Controllers

In the last five (5) years, a new type of controller has emerged. These controllers have been pre-packed to meet the needs of lift and booster stations. Stantec has been involved using the MultiTrode MultiSmart controllers for various projects in the last two (2) years. The City presently uses this controller as its standard controller for the sanitary lift stations.

The cost for an “Out of the Box” Controller is typically half of the cost a traditional PLC and will be around \$6,500.00 including a new enclosure, screen, wiring, programming and intrinsically barrier. Please note that this cost is a direct comparison of the MultiSmart vs. a similar programmable PLC. The MultiSmart could increase in cost to \$9,000.00 with the advance operations like flow calculation, motor protection, efficiency operations and VFD operations. These advanced functions are typically not cost effective to install on a traditional PLC system.

Stantec

April 14, 2008
Brian Coburn, P.E.
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Reference: Traditional Programmable Logic Controller Radio Versus "Out of the Box" Pump Station Controller/RTU

Based on the design intent by the City, the proposed MultiSmart controller will meet the needs of the proposed control systems.

Benefits of "Out of the Box" Controllers

1. Costs:

Based on economy of scale, manufacturers have rolled the development costs of advanced controllers over the large number of production units. Typically these units have a lot of functionality with minimal cost. The City already has started down the path of MultiSmart units with four (4) sites already, nine (9) sites that could have the MT2P controllers directly upgraded, and two (2) other sites that would need complete replacement.

2. Ease of Installation/Maintenance/Repairs:

Typically the MultiSmart controller can easily be repaired with basic electrical knowledge. The settings of the lift station can be stored on a memory card and restored in a matter of minutes after the hardware has been repaired. Each controller comes with guided setup systems and can be easily setup in a matter of minutes.

3. Reliability:

MultiSmart controllers are developed to provide a hardened level of reliability. The end user does not have access to the raw logic and can only make changes to the setup points. Since each unit is programmed to a specific lift or booster station, they are closed controllers for a specific purpose. The program is very specific for the application and is fully tested to prevent failures.

Drawbacks of "Out of the Box" Controllers

1. Defined Purpose:

"Out of Box" controllers are specific to function. If a controller is meant to control a lift station it would be difficult for it to control a chemical feed system based on flow. Although the manufacturers have attempted to add the ability for custom programming, they are best suited for their intended role.

2. Limited Vendors:

The manufacturers and distributors of "Out of the Box" controllers are basically sole sourced. In Michigan, there are only resellers of MultiSmart units and the manufacturer is based in Australia. If the manufacturer goes out of business or pulls out of the United States, one could be left without support or the ability to purchase new units. This is very unlikely with the install base in the United States and Michigan. The manufacturer of the MultiSmart has also promised direct pricing and support if the local distributor abandons the product line.

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Reference: **Traditional Programmable Logic Controller Radio Versus "Out of the Box" Pump Station Controller/RTU**

Option "B" – Traditional PLC

In southeast Michigan, the majority of controllers related to water and wastewater systems that Stantec has been involved with are based on Allen-Bradley controllers.

The cost for a traditional PLC will be around \$13,000.00 including a new enclosure, screen, wiring, programming and intrinsically safe barriers. This cost does not include revisions and updates that will be needed over the years.

Benefits of Traditional PLC's

1. Fully Customizable:

Since the PLC is intended for various applications including water, wastewater, automotive, manufacturing, and assembly, PLC's are suited to perform any conceived operation that could be required in proposed applications. PLC's of this type can operate a single pump application and can expand all the way up to complete automotive assembly.

2. Fully Expandable:

Each PLC can be expanded to handle any number of input or output points that the City could evolve into including the possibility of complete water and/or wastewater plants.

3. History:

PLC's are not new to the water/wastewater market. They have been actively used since the middle of the 1990's with a lot of changes and misstep's along the way. In the last five (5) years, most Instrumentation and Controls (I&C) have worked out the "bugs" and have refined the programmability of these stations into very reliable systems.

4. Open Source/Open Venders:

Since PLC's are used in many markets, there are many venders, suppliers and servicing companies that will bid on jobs. This typically controls costs and delivers high value projects.

Drawbacks of Traditional PLC's

1. Development Costs:

Since PLC's are fully customizable, depending on the level of information that is required, costs can significantly increase due to programming and screen development. It is not unheard of for 50% of I&C costs to be in programming. Typically each point that is required will cost \$225.00 per point for programming and screen development.

Reference: Traditional Programmable Logic Controller Radio Versus “Out of the Box” Pump Station Controller/RTU

2. Ability to Perform Internal Repairs/Updates:

PLC’s are very technical in nature and can take many years for an organization to become proficient in diagnosing and repairing failure that will occur. With the total number of locations the City is planning to expand into, it would require a full time position to update and manage the controller. Most communities do not want to hire a PLC technician and end up outsourcing the required work. This becomes a concern with the ability to repair on weekends and at night. Also, if an emergency arises, there is typically a significant premium for same day service from I&C service providers.

3. Technical Failure of the Project:

The success of lift station controllers is based on the talents of the programmer. Even within the same I&C service providers there are good programmers and bad programmers. We have seen projects within and outside of Stantec fail because of a programmer leaving for another company, improper vender selection, even updates to the ladder logic that control PLC has caused a project to be abandoned. A PLC lift station controller is only as good as the programmer.

<u>SUMMARY</u>	
<u>“Out of the Box” Controllers / MultiSmart</u>	<u>Traditional PLC Controllers</u>
Defined Purposed / Limited Expandability	Unlimited Expandability / Customization
Total Cost of Installation: \$71,500.00 Note: Some units will be direct upgrades	Total Cost of Installation: \$195,000.00
Self Reliant Repairs and Updates	Dependant on outside Integrators
One manufacturer/local supply of controllers	Open Source / Multiple Service Providers
Engineered to be very successful regardless of the installer for the water/wastewater markets	Dependant on the talents of the programmer/I&C supplier
New technology in the last five (5) years	Used for Over 30 Years

Stantec

April 14, 2008
Brian Coburn, P.E.
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Reference: Traditional Programmable Logic Controller Radio Versus "Out of the Box" Pump Station Controller/RTU

It is our opinion that both systems should go out to bid. Both systems do have individual merits and offer both long and short term reliable solutions.

Please feel free to contact me if you have any questions or require further clarification.

STANTEC CONSULTING MICHIGAN INC.

Gregory S. Schofer
Project Manager
greg.schofer@stantec.com

c. Ish Naik, Stantec
George Tsakoff, Stantec



WINDEMULLER

Partners in Your Success

Current Projects

City of Grand Rapids

Grand Rapids Lake Michigan Filtration Plant

Contact: Terry Francik / Bill Chapman

17350 Lake Michigan Drive West Olive, MI 49460

(616) 456-3700

Arch/Engineer: FTC&H

Scheduled Completion: March 2008

Amount: \$1.9 million

Percent Complete to date: 95%

Project Description: Upgrade SCADA system using Allen Bradley ControlLogix, SLC PLC's and RSView software.

Change Orders: Ten (10) change orders (two non-monetary) totaling \$169,000.00; all requested by customer as extra scope.

City of Zeeland

Contact: Lloyd Van Slooten

350 E. Washington Avenue Zeeland, MI 49464

(616) 772-6212

Scheduled Completion: Multiple on-going service work & project installs using Opto 22 and Opto Display.

Amount: varies

City of Big Rapids

Contact: Carmen Johnson

730 Osceola Big Rapids, MI 49307

(231) 796-6231

Scheduled Completion: Multiple on-going service work & project installs using A-B and Wonderware.

Amount: varies



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Past Projects

City of Coldwater WWTP

Contact: Dave Woodman

28 W Chicago Street Coldwater, MI 49036

Arch/Engineer: Williams & Works, Inc.

Completion: Still Active

Amount: Automation only - \$60,000.00

Percent Complete with Windemuller forces: Automation only – 100%

Project Description: New controls and PLC's for plant expansion, Opto 22 with Opto Display software were used.

Change Orders: Zero (0) change orders.

Pittsfield Township

Contact: Greg Schofer, Stantek

4467 Concourse Drive Ann Arbor, MI 48108

Arch/Engineer: Stantek

Completion: Fall 2006

Amount: Automation only - \$165,000.00

Percent Complete with Windemuller forces: Automation only – 100%

Project Description: New booster stations and head end upgrades using Allen Bradley SLC PLC's and Wonderware software.

Change Orders: One (1) change order for \$1,200.00.

City of Allendale

Contact: Mike Barricklow

11624 – 40th Street Allendale, MI 49401

Arch/Engineer: Fleis & Vanden Brink

Completion: Winter 2008

Amount: Automation only – \$49,000.00

Percent Complete with Windemuller forces: Automation only – 100%

Project Description: New booster station and SCADA upgrades. Opto 22 PLC and Wonderware were used.

Change Orders: Zero (0) change orders.

Leaders in Pump Station Management Technology



GET A LOC-IN User-name: Password: LOG IN

- HOME
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- OFFICES & DISTRIBUTORS
- SYSTEM INTEGRATORS
- TRAINING & SUPPORT
- CASE STUDIES
- WHITE PAPERS
- CONTACT US
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- CAREERS AT MULTITRODE
- DESPATCH TRACKING

PRODUCTS

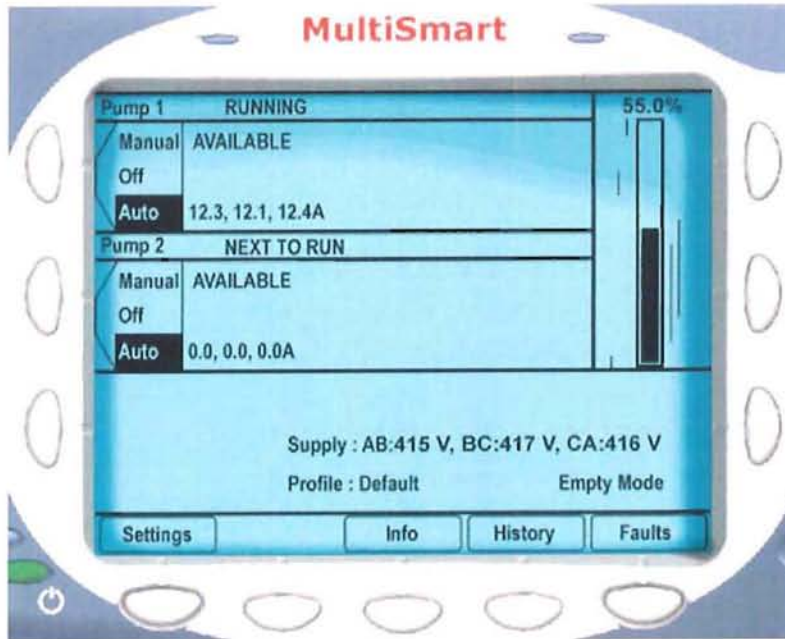
Overview | Datasheets & Application Notes | IO and Electrical | Testimonials | **Screen Shots** | Product Manuals | Troubleshooting | Specifying | Communications | Flow | CO2 friendly | Power, energy and motor protection | Logic Engine | VFD | Wiring Diagrams | Upgrading | Convert from MT2PC | Return To Products

MULTISMART PUMP STATION MANAGER

This innovative product provides "out of the box" pump control for water and sewer pump stations. It integrates many control panel components with an intuitive user interface while providing the simplest connection to remote monitoring and control.



Search

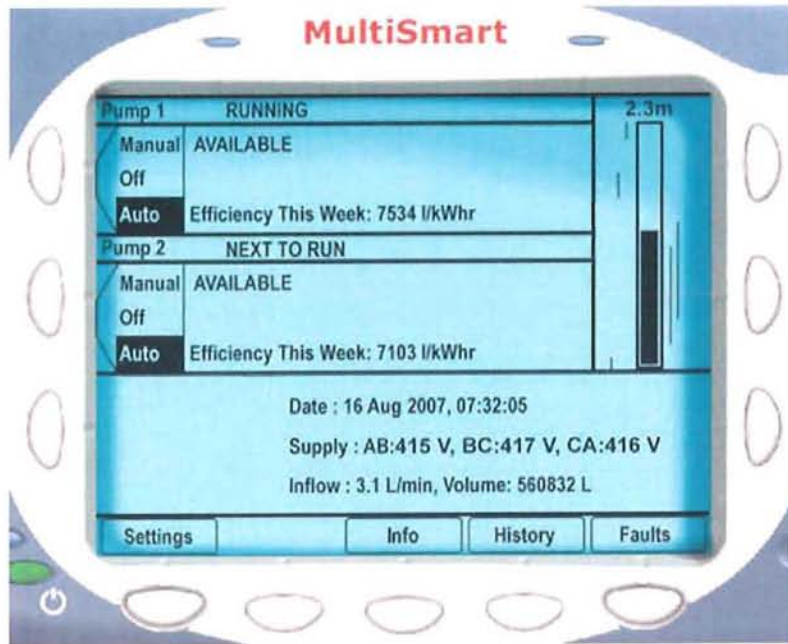


The main screen shows the operator the status of each pump.

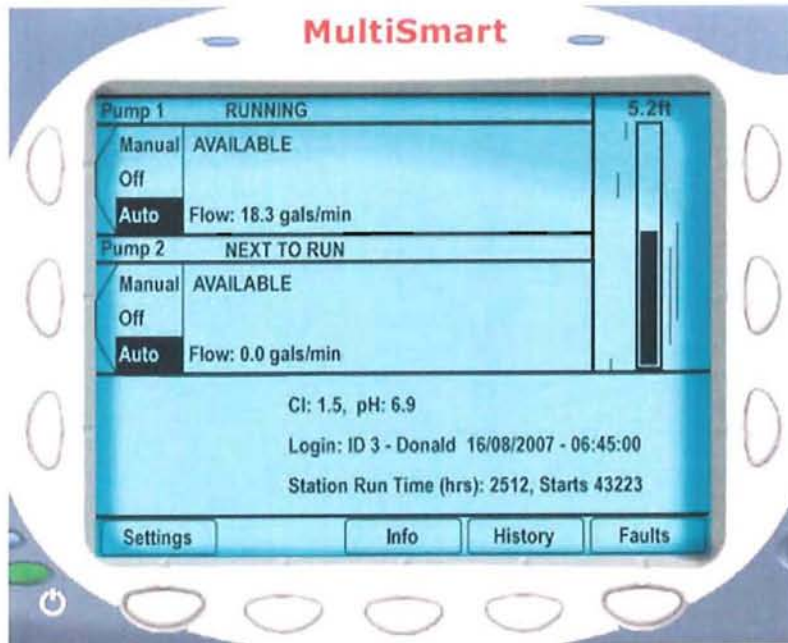
Changing the mode of the pump through manual (hand), off and auto is one button press away. Note that when the well reaches the deactivation point any pumps in manual (hand) automatically revert to auto mode. This eliminates a common problem of pumps being left in manual mode.

The level display provides a big benefit as operators no longer need to lift the well cover. This increases their safety at work.

The setpoints for pumps and alarms are also visible.

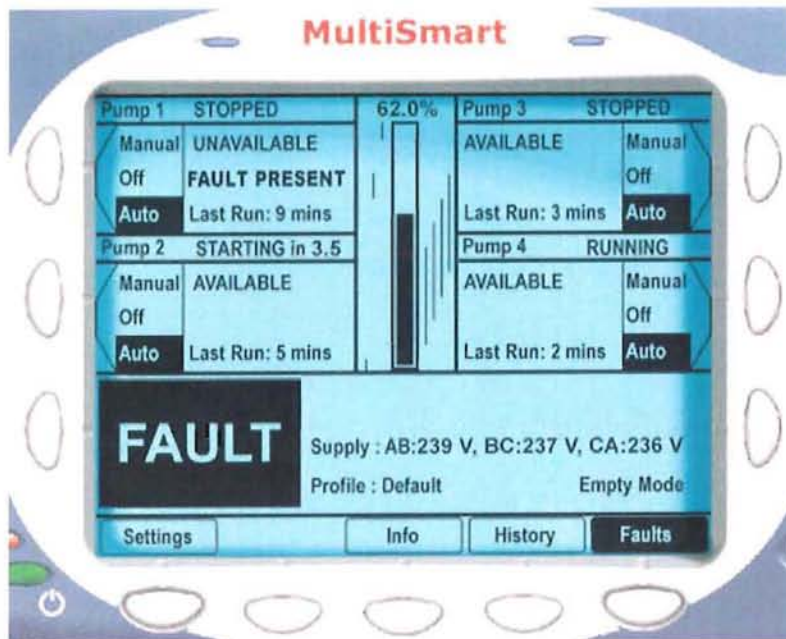


MultiSmart with pump efficiency in litres per kWhr, level in metres and a customized bottom section to the display.

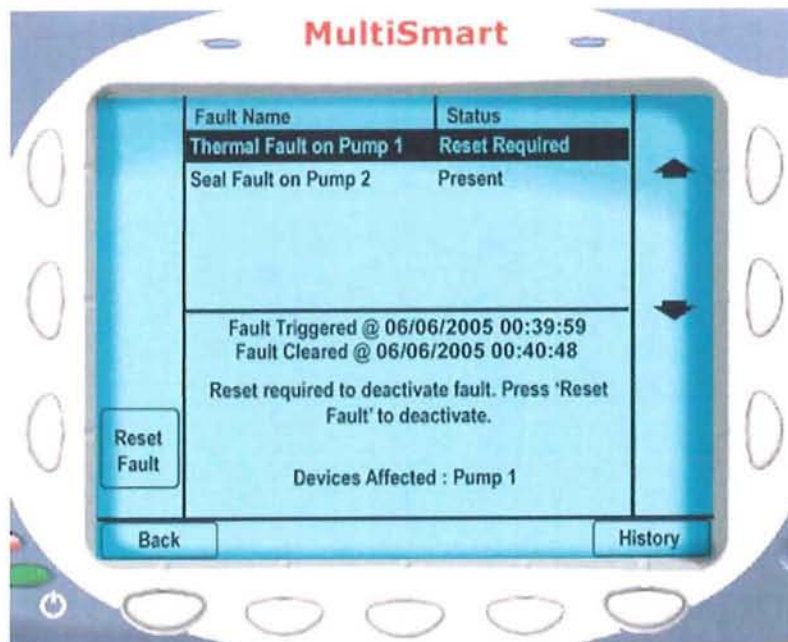


MultiSmart with the display customized to show flow per pump in gals/min and level in ft. The bottom section is also set to display analog inputs with their descriptions, the last login to the unit, and station accumulators.

[View User Interface Demo](#)



The operator will easily see that a fault condition is present, and which button to press to view the fault information in more detail.

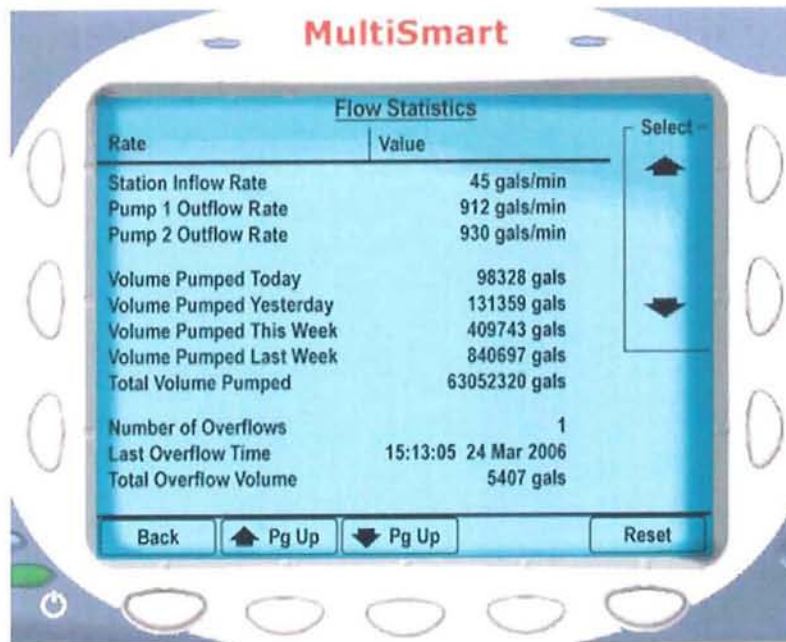


The fault screen shows exactly which faults have occurred, when they occurred and when they cleared.

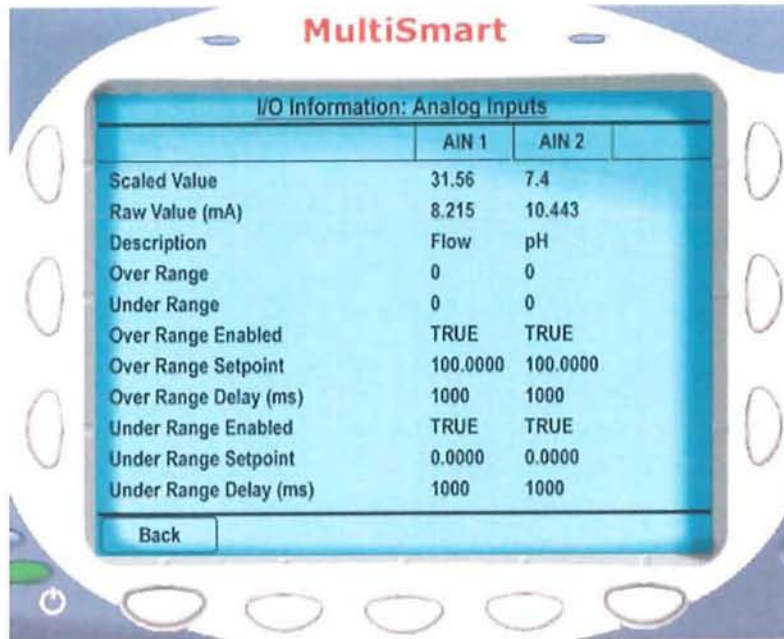
The Reset option only appears if the fault condition has cleared.



The history page comes with many easy to apply filters.



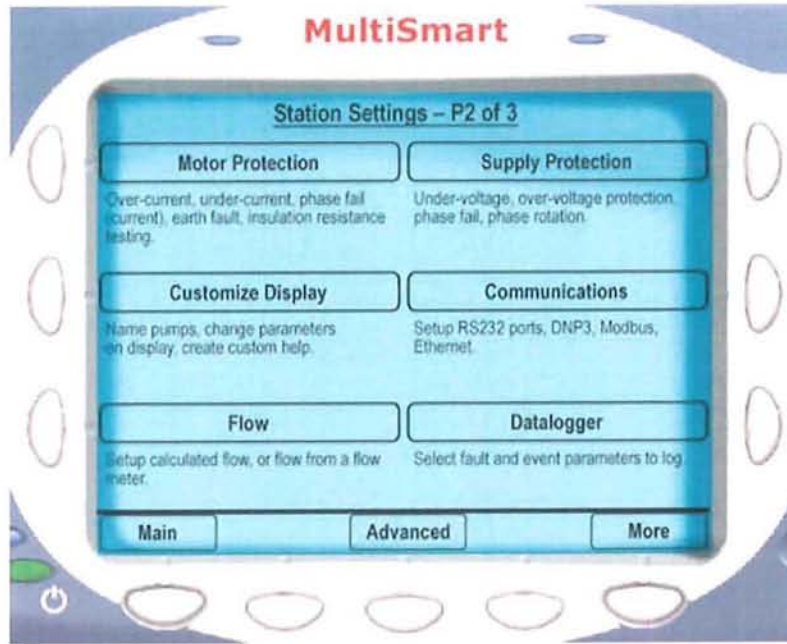
Flow data from volumetric calculations when flow module installed



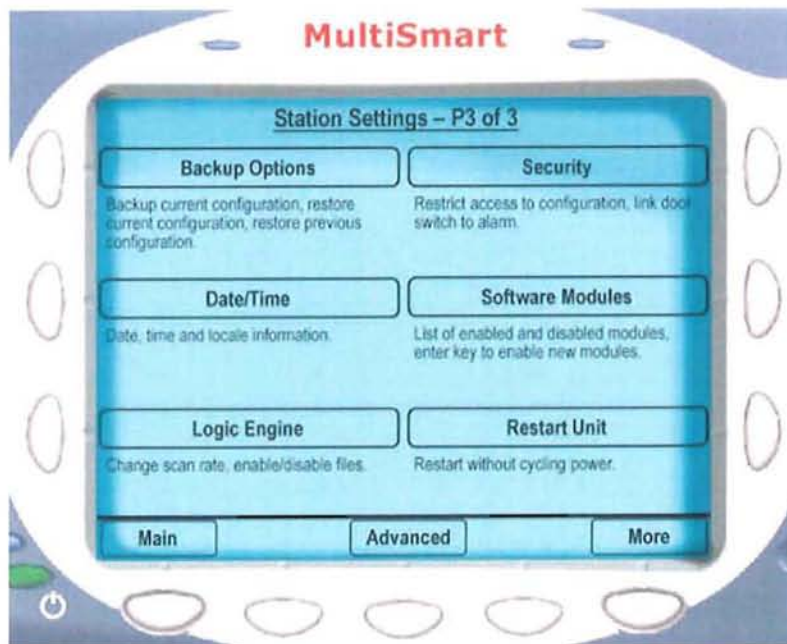
All I/O status is displayed. Analogs are shown with the raw 4-20mA, the scaled value and a custom name where chosen.

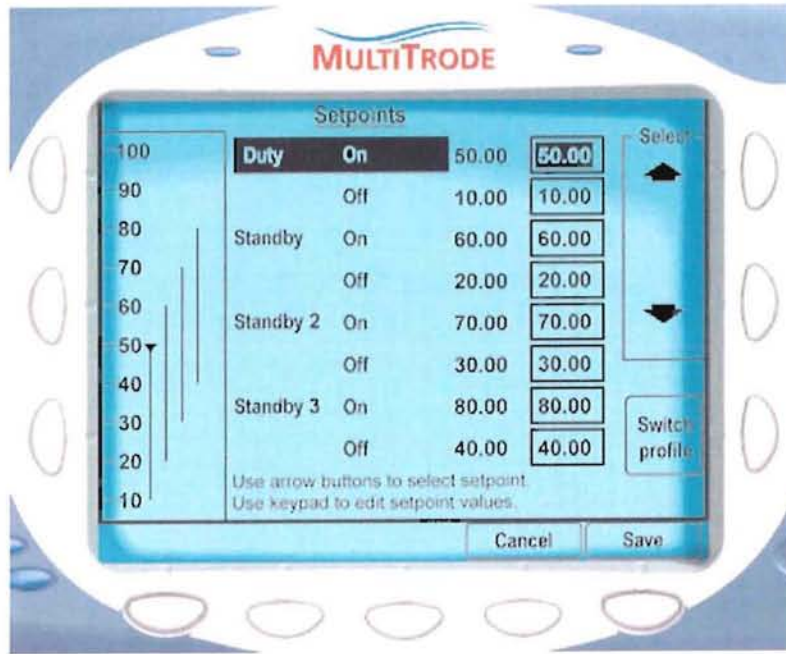


Operations and engineering staff can easily find the settings screen they need.

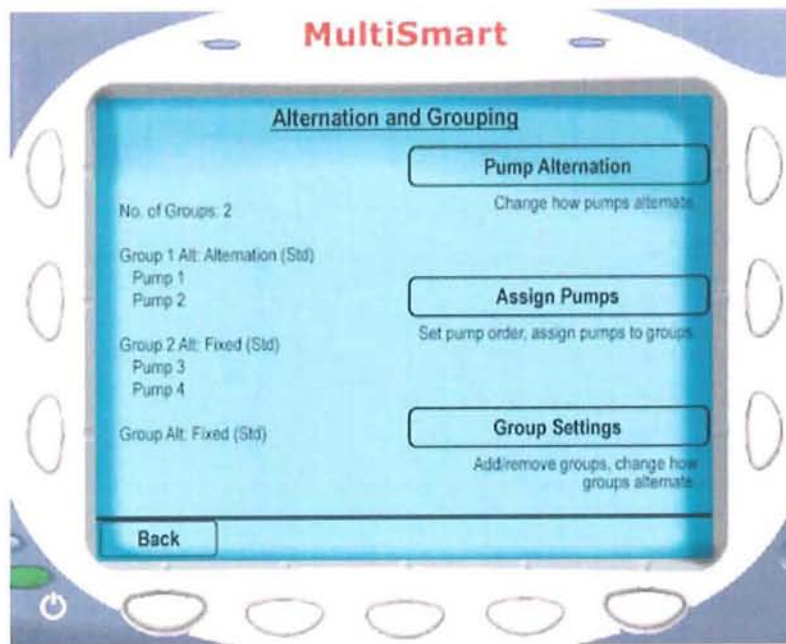


Little or no training is required to use this interface.





The pump and alarm setpoints for each profile can be graphically viewed, and new values entered.



Complex grouping and alternation of pumps can be easily configured.