

## Case Study

CS 04/2010

### The City of Naperville Electrical Substations

In order to achieve maximum uptime and tight security, Illinois' City of Naperville implemented an Ethernet substation network featuring Belden's Hirschmann™ MACH1000 Gigabit Ethernet switches, Industrial HiVision Network Management Software and Belden DataTuff® Category 6 cables.



### Hirschmann Substation Hardened Switches and Network Management Software Enable a Highly Reliable, Easy-to-Manage Substation Network

The City of Naperville achieved the following benefits with their Belden-Hirschmann Ethernet upgrade:

- From a single interface, the entire network can be monitored and managed on a 24/7 basis
- VoIP phones at each site are now powered by the Ethernet switches for greatly reduced local phone provider bills
- Communications are secure with computers and phones operating on their own, exclusive bandwidth
- Video cameras provide tight security with 24/7 surveillance

To enable these benefits, The City established the following requirements:

- Switch compliance with IEC 61850-3 and IEEE 1613; UL listed cables
- Switch must be rack mountable
- Switch with single-mode, multimode and copper ports
- Switch temperature range performance of -40°C to +85°C; high RFI/EMI immunity
- Extremely high reliability networking components
- Single source supplier with network design and on-site training capabilities
- Local representation/expert support

### Why Belden-Hirschmann Was Chosen

First of all, Belden met all of The City's requirements. They were also influenced by Belden's sole ability to provide an end-to-end Ethernet solution consisting of substation hardened Gigabit Ethernet switches, PoE capabilities, network management software and connectivity:

- Hirschmann MACH1000 Gigabit Ethernet fan-less switch with up to 28 ports
- Hirschmann HiVision Network Management Software to map, commission, manage and maintain the network
- Belden DataTuff Category 6 cables with Bonded-Pair technology

The networking system also included some key user-friendly benefits such as a common user interface for all system components and an ACA-21 USB option that allows the user to easily back up and restore settings with no networking knowledge necessary.

To meet The City's service requirements, Belden provided:

- Network design assistance
- On-site training (two days, including basic and advanced Ethernet instruction)
- Experienced support

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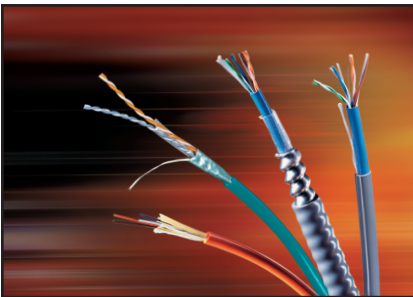
"Hirschmann's sales and support staff have been excellent to work with."

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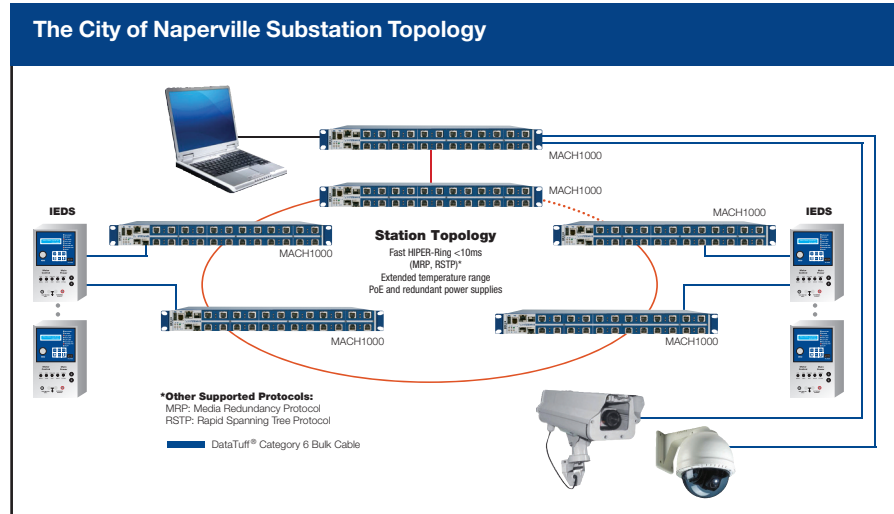
– Kevin O'Grady  
Senior A&C Electrical Engineer  
The City of Naperville



Hirschmann MACH1000 switch



Belden DataTuff Ethernet Category 6 unshielded twisted pair (UTP) Cables



## Installation Description

An Ethernet network transports all data to and from The City's 16 substations via MACH1000 switches. The topology used is Fast HIPER-Ring; all network components are protected by redundant power supplies (UPSs). The Hirschmann Gigabit Ethernet switches provide the bandwidth necessary for VoIP communications, which greatly reduces the monthly, re-occurring costs from the local phone provider. The substation network interfaces with the corporate LAN for easy access by management personnel. Video cameras at each substation help secure each site.

## Installation Details

- 16 electrical substations
- Majority of substations are 138kV to 12kV; others 34kV to 12kV
- Supply area of 36 square miles
- Switches use 130VDC as input power
- Network management with Industrial HiVision
- High availability via proven Hirschmann Ethernet technologies (MTBF: 40+ years)
- High performance Belden Ethernet cables for harsh environments
- IEC 61850-3 compliance
- IEEE 1613 compliance

"The Industrial HiVision software provides readily available and easy-to-read 24x7 monitoring of the substation network."

– Brian Groth  
A&C Electrical Engineer  
The City of Naperville