# William R. Bennett Bridge
# Intelligent Transportation Systems


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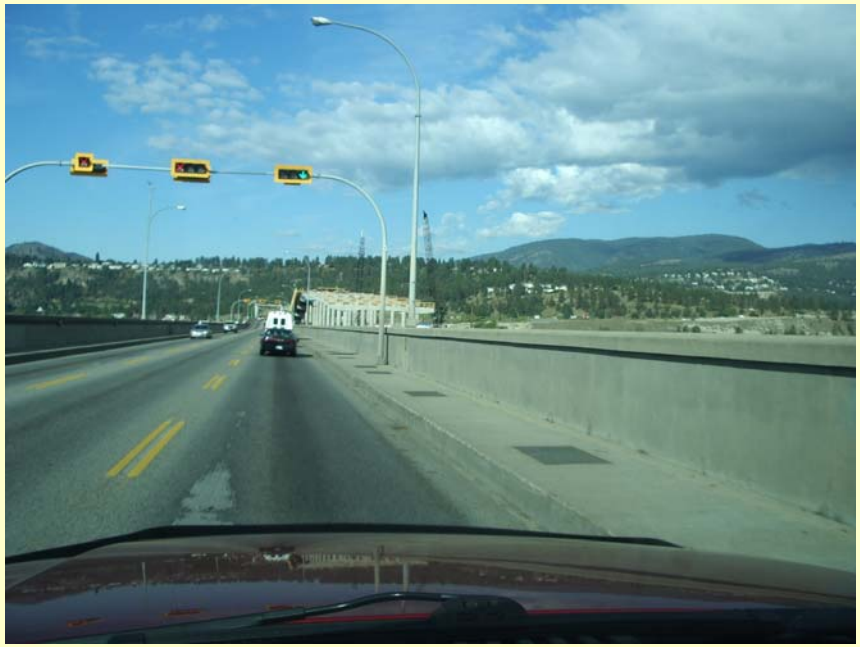
# Existing Kelowna Bridge

- Existing 3 lane bridge now 50 years old
- Traffic volumes now exceed bridge capacity
- Repairs are no longer on option
- Province of BC determines new bridge required (2003)

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# New Bridge Proposed

- Province of BC issues Request for Expressions of Interest in October 2003 to initiate selection process for public/private partnership.
- Contractor to design, build, finance and operate new 5 lane bridge

# New Bridge - Project Time Line

October 2003 - Request for Expressions

December 2003 – Request for Qualifications

May 2004 – Request for Proposal Issued to 3 Teams

November 2004 – 2 Proposals Submitted

June 2005 – SNC-Lavalin Inc. Selected

November 2005 – 30% Electrical/ITS Design

May 2006 – 90% Electrical/ITS Design

November 06 – 100% Electrical Design

December 2007 - ITS Equipment Delivered

April 2008 – ITS Equipment to Job Site

May 25, 2008– Bridge Opening

# Bridge Construction - Pictorial Time Line

August 2006

February 2007

August 2007

February 2008

# Electrical / ITS
# Design Requirements Overview

- Power Distribution
- Emergency Power
  - UPS for key components
  - Provision for connection of generator
- Lighting
  - Roadway lighting
  - Navigation, Pontoon and Pier Lighting
- Communications
- Closed Circuit Television (CCTV)
- Traffic Detection & Monitoring
- Instrumentation


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# Bridge Photos – Electrical & Utilities



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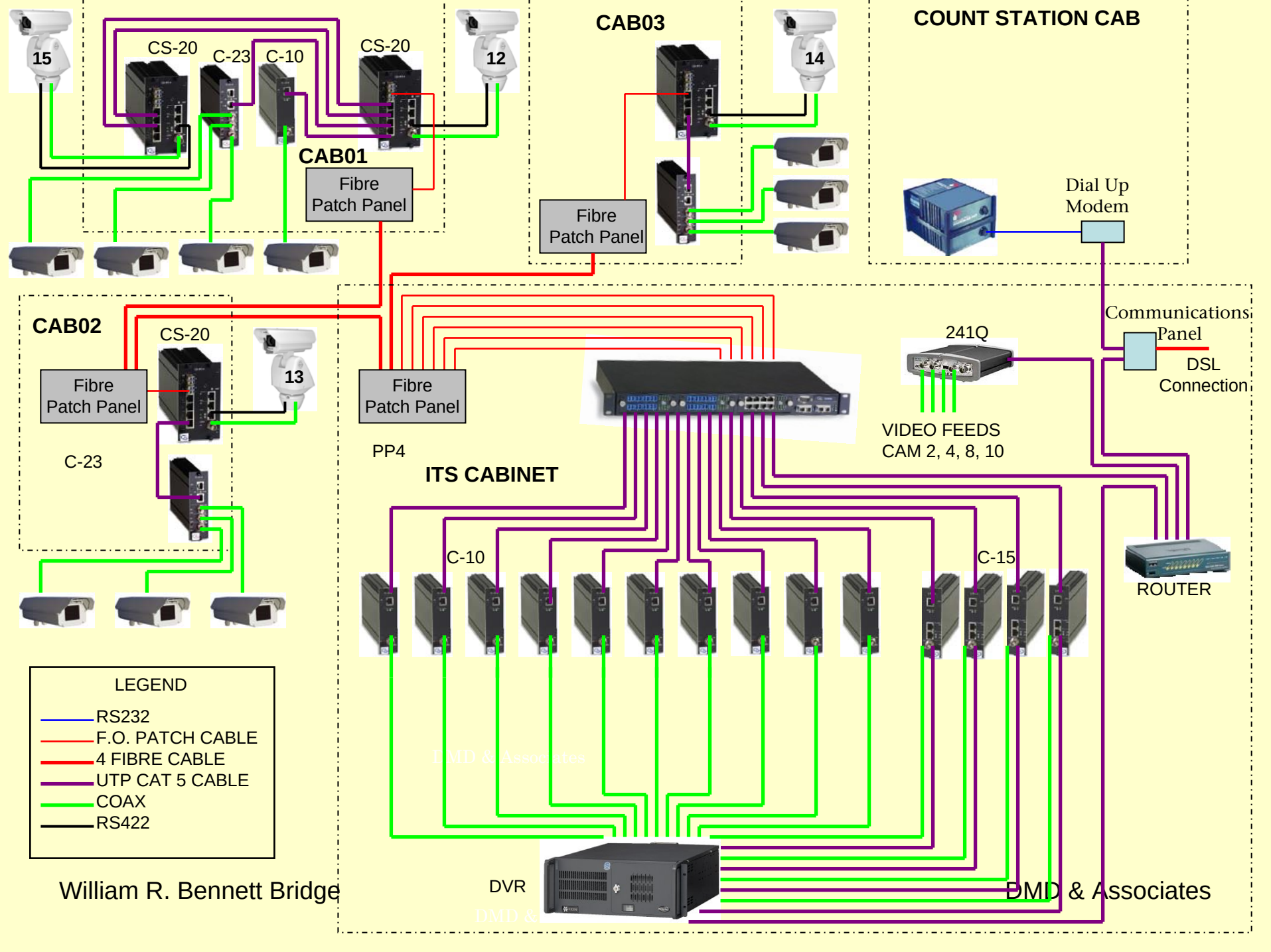
# Bridge ITS Components Overview

- Closed Circuit Television (CCTV)
  - 10 Fixed Cameras
  - 4 Pan, Tilt, Zoom (PTZ) Cameras
  - Digital Video Recorder
- Vehicle Detection Traffic Counter/Classifier
- Instrumentation
  - Anemometer and Data Logger
  - Road Weather Information System (RWIS)
  - Seismograph recorder and sensors
- Intelligent Roadway Lighting
- Communications System


15
CS-20
C-23
C-10
CS-20
12
CAB01
Fibre Patch Panel
CAB03
14
Fibre Patch Panel
COUNT STATION CAB
Dial Up Modem
CAB02
CS-20
13
Fibre Patch Panel
C-23
Fibre Patch Panel
PP4
ITS CABINET
241Q
VIDEO FEEDS
CAM 2, 4, 8, 10
Communications Panel
DSL Connection
C-10
C-15
ROUTER
DVR
LEGEND
RS232
F.O. PATCH CABLE
4 FIBRE CABLE
UTP CAT 5 CABLE
COAX
RS422
William R. Bennett Bridge
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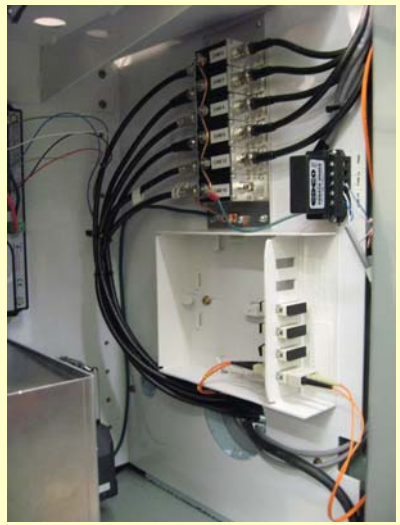
# ITS Components – Cabinet 1


Optelecom Ethernet Switches & Encoders



Video & Data Surge Protection
Fibre Patch Panel



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# ITS Components – Cabinet 1



Campbell Scientific Data Logger

Thermostat & Surge Protection



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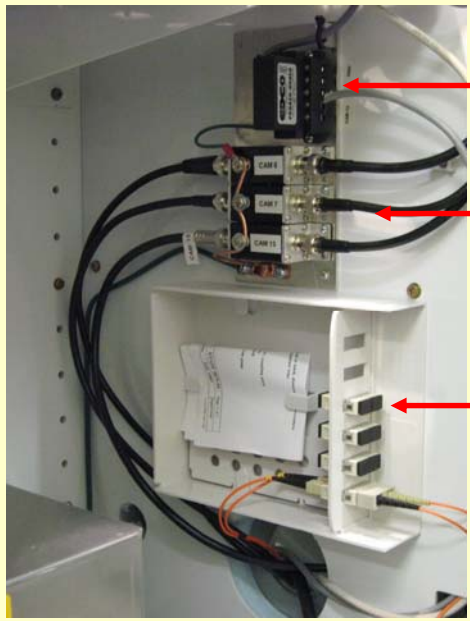
# ITS Components – Cabinet 2

Transformer – 347/600 to 120/240





PTZ Data Surge Protection

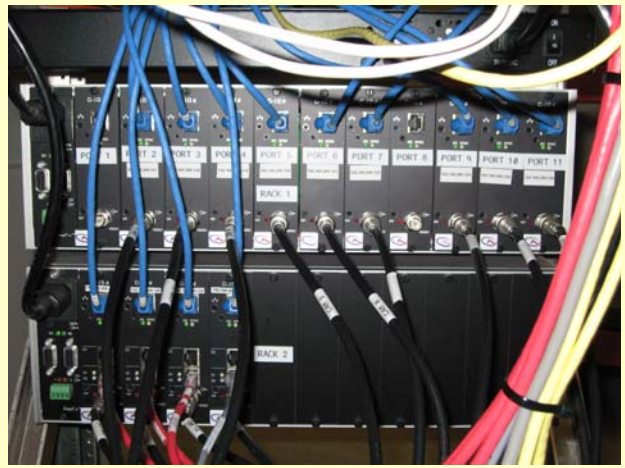
Video Surge Protection

Fibre Patch Panel

# ITS Components – ITS Cabinet

Video images on monitor


Router & Video Distribution Amplifiers



Optelecom Decoders – Rear View



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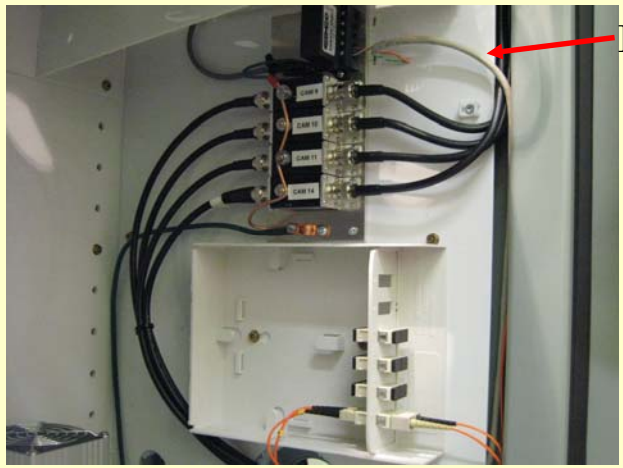
# ITS Components – Cabinet 3





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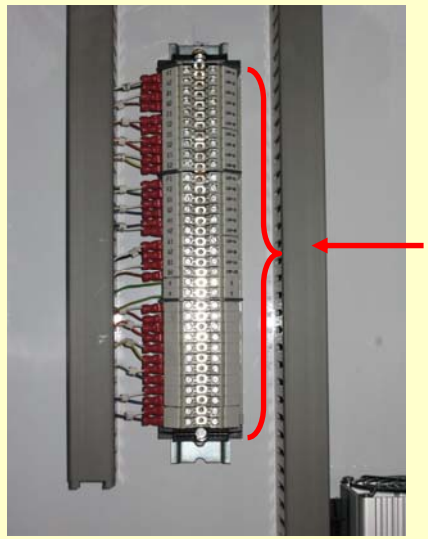
# ITS Components – Traffic Count Cabinet



Traffic Counter Classifier



Inductive Loop Connections



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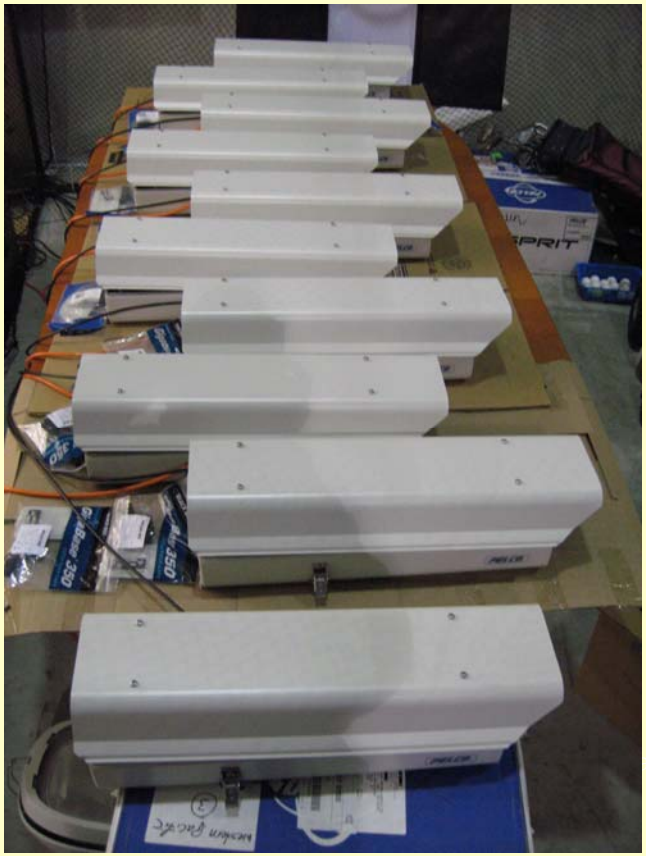
# ITS Components – Fixed Cameras



Testing Fixed Cameras at DMD

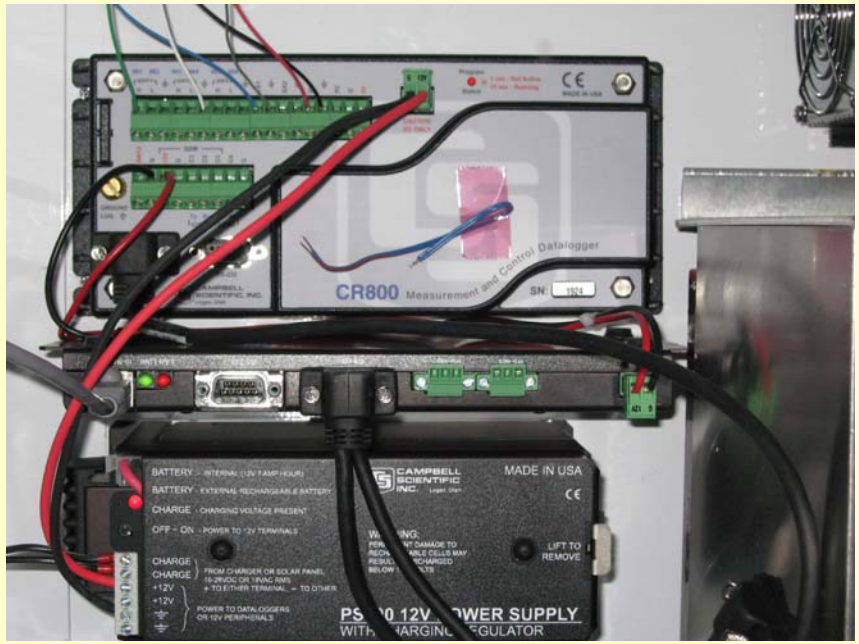
# ITS Components – Pan, Tilt, Zoom Cameras

- Pelco Esprit PTZ cameras used
- 3 PTZ cameras dispersed across bridge
- 1 PTZ camera under bridge
- Cameras controlled by Vicon Digital Video Recorder software



PTZ Camera Testing at DMD

# ITS Components
# Anemometer & Data Logger


Anemometer & Data Logger being Tested at DMD



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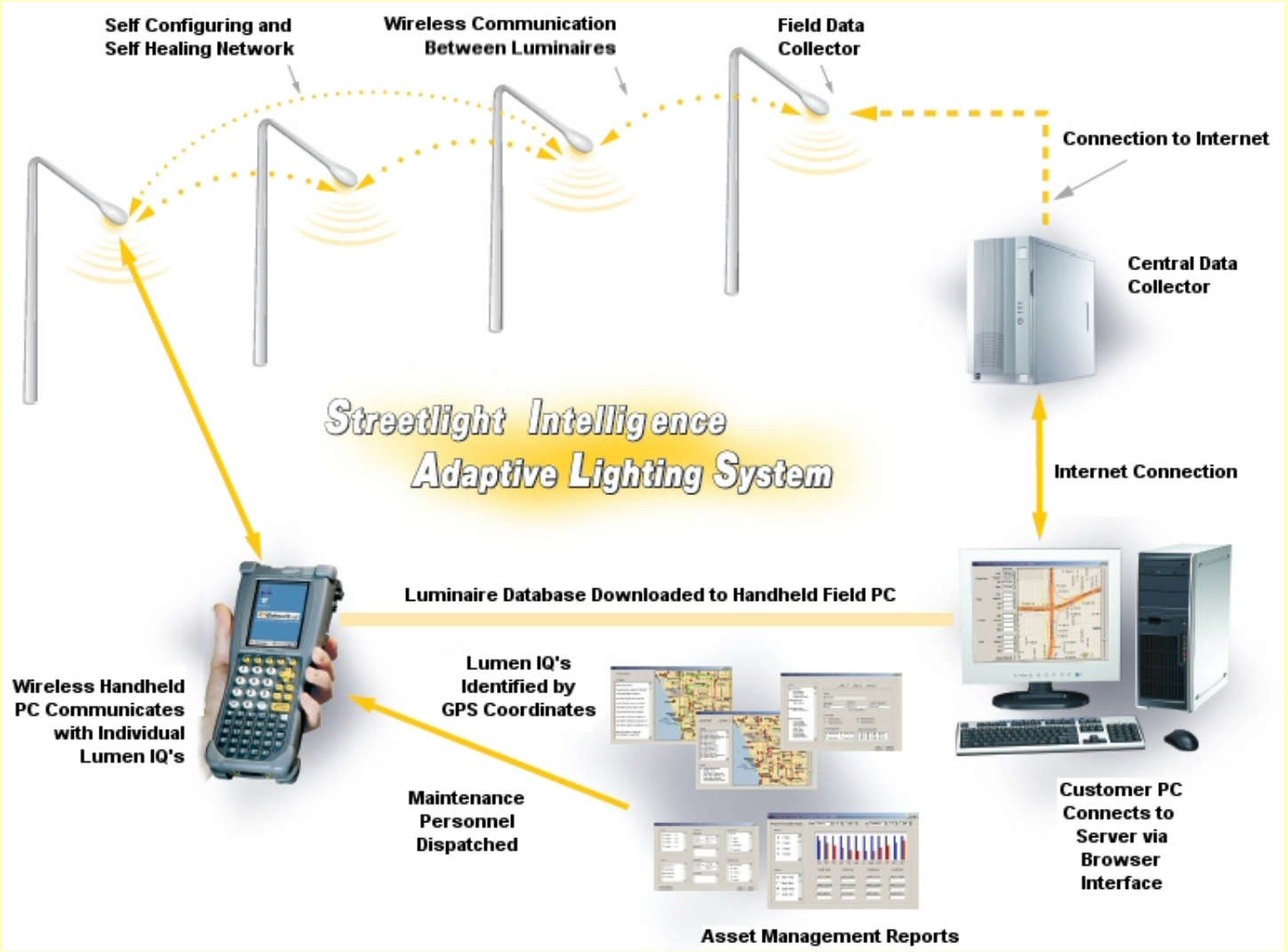
# ITS Components
# Seismic Monitoring System

- GeoSig model CR5 data recorder used
- Sensors
  - 2 Tri-axial force balance accelerometer
  - 1 Tri-axial force balance down hole accelerometer
  - 3 Horizontal Uniaxial force balance accelerometer

# ITS Components
# Road Weather Information System (RWIS)

- RWIS system cabinet will be mounted on the Kelowna side of the bridge
- RWIS system includes the following components
  - 2 pavement sensors
  - Subsurface temperature probe
  - Independent anemometer
  - Temperature / humidity sensor

# Adaptive Street Lighting System



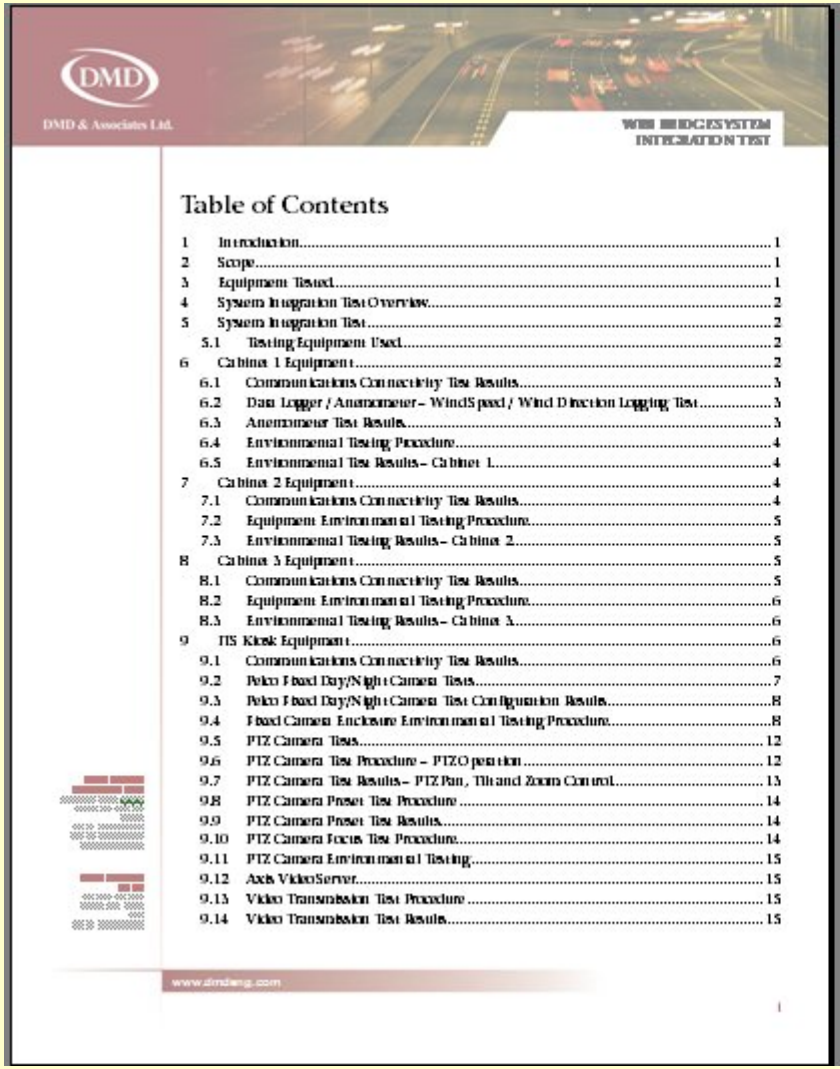
# ITS Components
# System Integration Testing

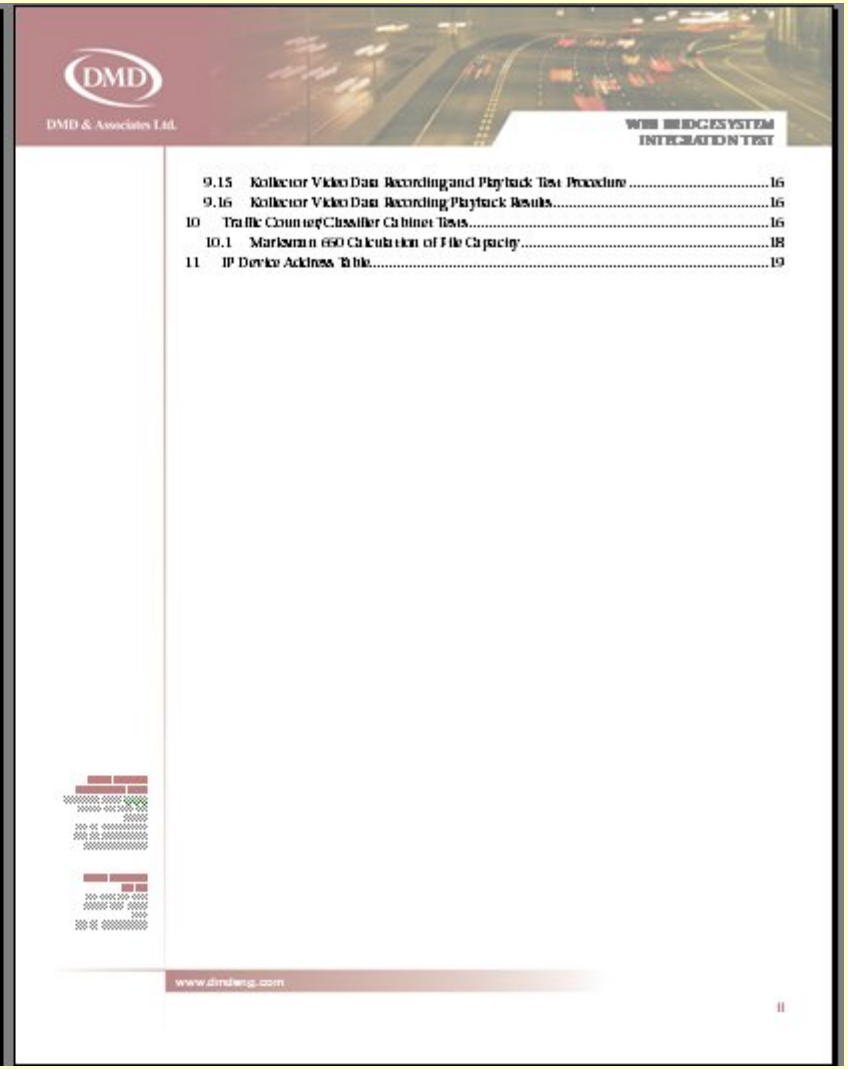
- Equipment Tested
  - Setup Camera and ITS cabinets, fixed and PTZ cameras, data logger etc. at DMD
  - Configured all ITS equipment as required
  - Debug system
  - Performed System Integration Test
- Tests Performed
  - Communications
  - Video
  - Equipment Functionality
  - Environmental Testing

# ITS Components
# System Configuration, Operation and Testing

- Digital Video Recorder (DVR)
  - On site functionality
    - Viewing video
    - Recording Video
  - Remote workstation functionality
    - Viewing Video
    - Recording Video
- Testing of Pan, Tilt, Zoom cameras
- Data Logger and Anemometer
  - Set up sample program and tested wind speed

# ITS Components- System Integration Test



# Conclusion

- When ever possible, equipment set up, configuration, troubleshooting and testing should be performed in a controlled environment
- Why?
  - Verifies integrity of system design
  - Provides a check that nothing has been missed and that all equipment will function as required
  - Easier and more efficient than performing on site
  - Less confusion and delays when on site for every one that is involved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