Welcome to

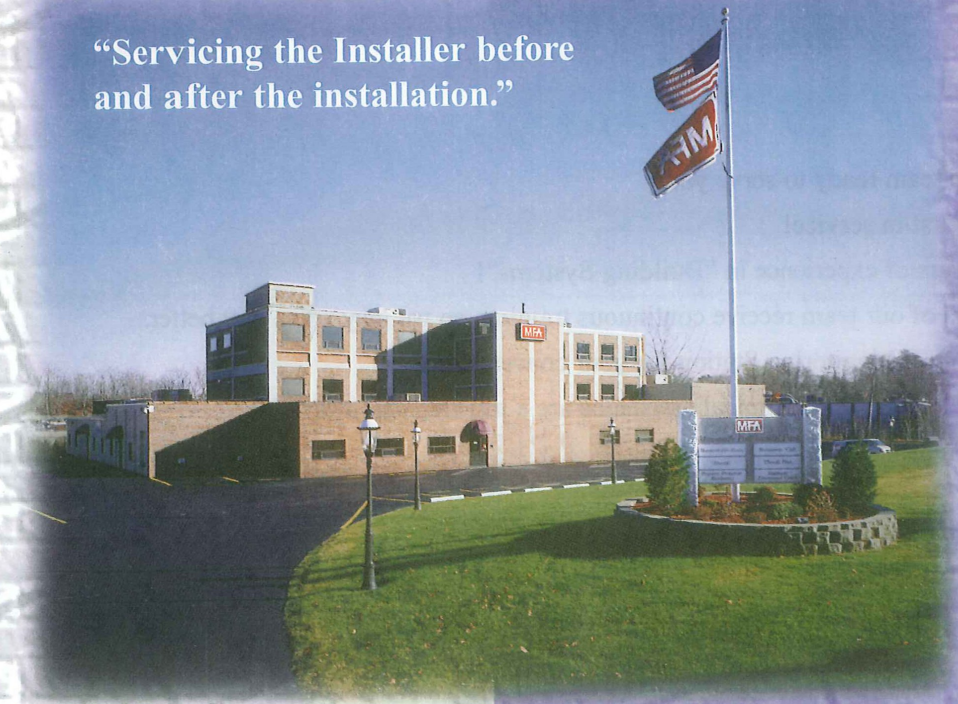
MFA

Mammoth FireAlarms
Incorporated

PPM

Property Protection Monitoring
Incorporated

"Servicing the Installer before and after the installation."



Corporate Headquarters

176 Walker Street **1-800-995-9808** Lowell, MA 01854

Welcome to:

Mammoth Fire Alarms

Incorporated

Your local representative is:

Meet the team ready to serve you!
Always first in service!
Many years of experience in "Building Systems"!
Members of our team receive continuous training, so we may serve you better.
Our own UL Monitoring Station for your convenience!
Troubleshooting and technical assistance are a toll free call away!
Hands on product training!

Finest *quality control*.
Inspection and testing.
Real point to point drawings with all submittal packages.
Everything you want in a systems distributor.

AND MORE!

Mammoth Fire consists of a team of dedicated professionals with the single goal of serving you, the systems installer.

Form #MFA6785

obstructions, air movement, or the authority having jurisdiction. When Protectowire is used to activate sprinkler systems, special Factory Mutual (FM) spacing guidelines may also be applicable to the specific hazard protected. It is mandatory that engineering judgment be applied in determining final detector location and spacing.

In general, the use of Protectowire in any initiating device circuit, is limited to coverage of a specific hazard or area. Copper wire, of an approved type, with a minimum conductor size of 18 AWG, shall be installed from the control panel out to the hazard area where it is then connected to the beginning of the Protectowire portion of the circuit. The Protectowire portion of each initiating circuit shall begin and terminate at each end in an approved zone box or end-of-line zone box. Strain relief connectors, Model SR-502, shall be installed in all zone boxes where Protectowire enters or exits the enclosure, in order to hold the cable securely.

Installation Accessories

A comprehensive range of mounting and installation accessories are available for the installation of Protectowire Linear Heat Detector. These include several types of clips, straps, drive rings, beam clamps, cable standoffs, connectors and zone boxes. Their proper use assures a neat and reliable installation. Only installation hardware supplied or approved by The Protectowire Company should be used.

Messenger wire is also available for any model Detector on special order. It consists of high tensile strength stainless steel wire, which is wound around the Detector at the rate of approximately one turn per foot. It is a carrier or support wire which is designed to simplify the installation of the Detector in areas where mounting is difficult due to the lack of appropriate support structures or mounting surfaces. When using messenger wire to support the Detector, turnbuckles and eyebolts must be employed at each end of a run to place tension on the support wire. The maximum Detector run length between turnbuckles should not exceed 250 feet (76m) and the wire must also be supported with approved intermediate fasteners at intervals ranging from 15 feet (4.5m) to 50 feet (15m) depending upon the application. Outdoor messenger wire installations present additional challenges due to environmental factors such as snow loads, ice build-up or wind. Increased detector support must be provided by using additional intermediate fasteners with closer spacing in all outdoor installations. When ordering messenger wire configurations, add suffix "-M" to the Protectowire model number.

All models of Protectowire Linear Heat Detector have the same size conductors and are readily spliced together with common tools, by means of PWS Splicing Sleeves or PWSC Splicing Connectors. These devices are designed for this specific purpose and are the only approved methods of splicing the Detector.

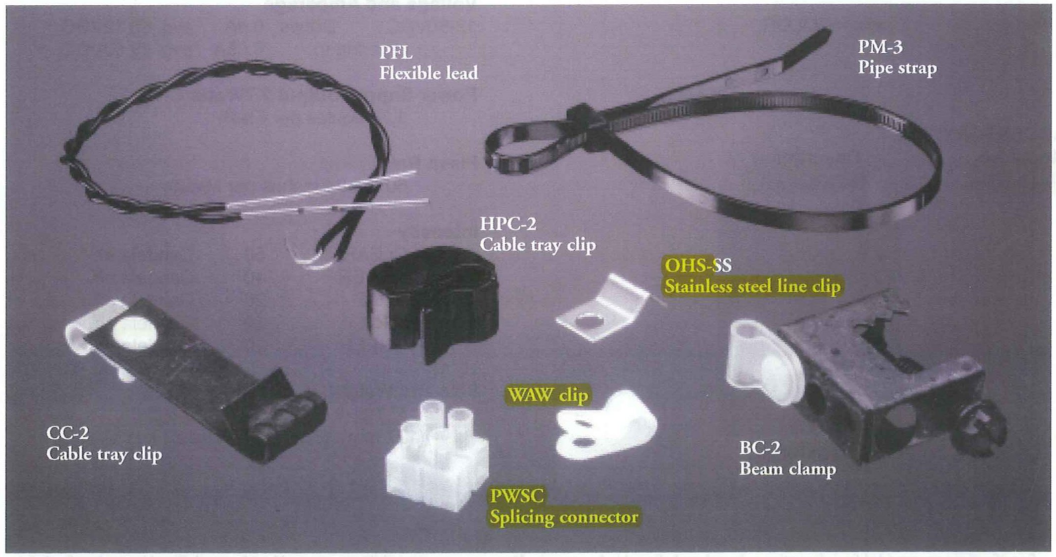
System Capabilities

Protectowire Linear Heat Detector is a component of a complete family of systems manufactured by The Protectowire Company — a leader in fire detection for over sixty-five years.

Protectowire fire detection systems provide a complete single source solution for meeting any fire defense need, from hazardous area detection to auxiliary equipment shutdown, and automatic extinguishing release.

Accessories

The Protectowire Company offers an assortment of fasteners and splicing devices to facilitate installation for both standard and special applications. Full details are available upon request.

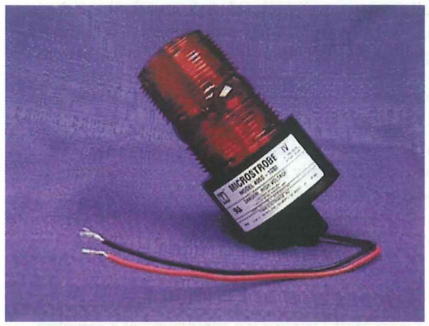


The Protectowire Company, Inc. ■ 40 Grissom Road, Plymouth, MA 02360-7205, U.S.A. ■ p:781-826-3878 ■ f:781-826-2045
web: www.protectowire.com ■ email: pwire@protectowire.com

DS 6592T-1006 (2M)

Mammoth Fire Alarms
Incorporated

490S-1280 MICRO IV™



The MICRO IV™ strobe family is an enhanced version of the MICROSTROBE featuring a power supply which can operate from a very wide input voltage range of 12 thru 80 VDC or 16 thru 24 VAC. The supply has a regulated output so that the lamp brightness and flash remain constant when operated over the rated input voltage range. The power supply is potted in polyurethane for the ultimate in protection from moisture and vibration. The enclosure is all LEXAN®, and the plug-in lamp is field replaceable. All units are polarity protected and have built-in filters to protect against radio interference and spike voltages.

ORDERING INFORMATION

Please specify lens color and model number desired.
Colors available: AMBER, BLUE, CLEAR, GREEN, or RED

Model No.	Description	Voltage
490S/1280-xxx	1/2" Female Pipe Thread Mount	12 thru 80 VDC

xxx = COLOR

ACCESSORY

Model No.	Description
FMSL/4RA	Mounting Kit

FMSL/4RA

SPECIFICATION

Lamp Type
5001 Xenon Strobe Lamp

Lens Type
470S-L-xxx (Please Specify Color)

Voltage and Amperage
12-80VDC Draws 0.4A avg. @ 12VDC
tapering to 0.05A avg. @ 80VDC

Power Supply Output 2.7Watts
1.75 Joules per Flash

Flash Rate
60 to 80 Flashes per Minute

Intensity

CLEAR	50	Candela eff.
AMBER	40	Candela eff.
BLUE	20	Candela eff.
RED	10	Candela eff.
GREEN	20	Candela eff.

Size and Weight

5" Tall x 3" Dia.	0.6 lbs.
(127 mm) (76 mm)	(0.27 kg)

176 Walker Street, Lowell, MA 01854-3126
Sales (978) 934-9130 Fax (978) 934-9131 Service (800) 499-9394

Mammoth Fire Alarms
Incorporated
176 Walker Street *Lowell, MA 01854*

POLICIES

WARRANTY:

Mammoth Fire Alarms, Inc. warranties all equipment supplied by it to be free from defects for one year from the date of shipment. Mammoth Fire Alarms, Inc. will repair or replace, at its option, any equipment which it determines to be defective. Said equipment will be returned to the purchaser. Mammoth Fire Alarms, Inc. shall not be obligated to repair or replace equipment which has been repaired by others, abused, improperly installed, altered or otherwise misused or damaged in any way, including damage caused by any Acts of God. Mammoth Fire Alarms, Inc. will not be responsible for any on-site dismantling, reassembling or reinstallation charges or costs.

TROUBLESHOOTING/SERVICE:

All field troubleshooting/service performed by Mammoth Fire Alarms, Inc. personnel will be billed per hour portal to portal, plus all costs for parts. All defective equipment that is under warranty will be replaced or repaired, at the option of Mammoth Fire Alarms, Inc., provided the equipment was not damaged during installation, damaged because of poor or improper installation, or damaged by any Acts of God. No troubleshooting will be performed, either over the telephone or in the field, if the customer's account is not current.

RETURNS FOR CREDIT:

Authorizations for merchandise to be returned for credit must be previously authorized and cannot exceed 60 days from the date of original MFA invoice. Merchandise authorized for return must be sent PREPAID and insured, within 30 days of the date of the authorization (date on this fax). When merchandise is returned for credit and is returned for other than Mammoth Fire Alarms, Inc. shipping error, a 20% charge will be made to cover handling, inspection and testing. Non-stocking items will be assessed a 50% restocking charge. For credit to be issued, the item(s) must be in the original factory packaging. Custom and special ordered items will not be accepted for credit. Items damaged in transit will be deducted from the credit. Acceptance of goods returned for credit shall be at the sole discretion of Mammoth Fire Alarms, Inc. Supplying an RA number is not a guarantee of issuance of credit.

RETURN FOR REPAIR OR REPLACEMENT:

Mammoth Fire Alarms, Inc requires prior approval of return of equipment for repair. The information required for equipment to be returned for repair is the product model # and the problem that exists with the unit. Confirmation will be faxed to you and then the return may be made. If the item(s) is under warranty, (One year from the date of shipment) it will be repaired or replaced at our option. All items shipped to Mammoth Fire Alarms, Inc. must be shipped PREPAID. If the item(s) is out of warranty, but repairable, it will be repaired at a cost not to exceed 50% of the cost of a new unit.

MATERIALS DAMAGED UPON RECEIPT:

Any materials physically damaged upon receipt must remain at the original place of delivery and in the original packaging. If the packaging is visibly damaged, the delivery driver should be instructed to make note of it prior to signing for the delivery. Mammoth Fire Alarms, Inc. shipping manager must then be contacted to arrange a replacement and an on-site evaluation of the damaged equipment. Mammoth Fire Alarms, Inc. cannot warranty any damaged equipment that has been removed from its original delivery location or does not contain the original packaging.

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www.mammothfire.com

SYSTEM SEQUENCE OF OPERATION

JOB NAME
Worral Covered Bridge
Rockingham, VT

Operation of Events

[X] General Alarm [ ] Lights to Remain Flashing after Audible Silenced

Masterbox to be Resettable Tamper Switches to be

[ ] Yes [ ] No [ ] Alarm [ ] Supervisory

Duct Detectors to be Elevator Recall

[ ] Alarm [ ] Supervisory [ ] Special Actuation [ ] Mass Code

Activation of any portion of the linear type heat detector shall cause:

- The exterior horn strobe to activate
- Indicate zone in alarm at FACP
- Send alarm to a central monitoring station

Until

- FACP is silenced
- device in alarm is returned to a normal condition
- FACP is reset

Digital Communicator Yes__x__ Monitored by PPM____ OTHER _____

OUR COMPANY

Mammoth Fire Alarms, founded in 1991, is a wholesale distributor of state-of-the-art communication equipment.

OUR TEAM

Our staff members have diverse backgrounds enabling us to solve the wide variety of problems presented. What unifies this diverse group is a team spirit dedicated to addressing customer's needs. Years of professional experience have qualified us to analyze the needs of our customers within the requirements of local as well as national codes. Our engineering and technical staff is trained to provide solutions in all areas of life safety systems management. Those solutions meet the constraints of both time and money that so often characterize the construction of life safety-code-related projects.

Our staff members care about the needs of the customer.

SYSTEM LAYOUT/CODE COMPLIANCE

Through the use of our CAD drafting equipment, our field system consultants and in-house personnel enable *Mammoth Fire Alarms* to provide complete layout and specifications assistance.

ANALOG SYSTEMS

For systems requiring the rapid identification of a device in alarm or pre-alarm condition, we are distributors for leading manufacturers of addressable and analog multiplex systems. For systems with fewer than one hundred points to those with thousands and including video display units and printers, *Mammoth Fire Alarms* is your headquarters for the most advanced life safety systems available.

CONVENTIONAL/MULTIPLEX SYSTEMS

We stock an extensive supply of conventional and analog commercial, industrial, and residential systems, as well as replacement parts to support these systems long after the installation is complete.

We have a variety of conventional systems available to match the customer's needs. They vary from a small one-zone system suitable for a convenience store, to a multi-zone system for a convention center or high-rise office building. In addition, these systems can be customized, through programming of its controls, to accommodate the many individual needs a user may have.

QUALITY CONTROL

"Quality control" takes on a new meaning for our customers. All our control panels must pass a rigid computerized checkout at the factory. The manufactures' quality control procedures include testing the individual circuit boards as well as the assembled control panel. After the control equipment reaches us, and before we ship it to our customer, our technicians perform additional in-house bench testing and verify that the assembled control panel conforms to the project drawings for which it was built. Second, we conduct our own complete test of the assembled control panel.

DELIVERY

Mammoth Fire Alarms has **off-the-shelf** delivery of most system control panels and peripheral devices. As a result, *Mammoth Fire Alarms* has developed a reputation for supplying complete systems **on time**.

On-time delivery of systems is essential; its importance cannot be over-emphasized. The occupancy permit for a new building will ordinarily not be granted unless the alarm system is installed and operational.

TEST AND INSTRUCTION

The sales of equipment would be incomplete without: (1) accompanying drawings and instructions for installing the system and (2) in-place testing once the installation has been completed. *Mammoth Fire Alarms* provides both. Complete point-to-point as well as riser diagrams, developed from the customer's specific project, are provided with submittal to allow the contractor to properly plan the installation. Then, once the system is in place, our technical field service personnel test the system to complete its start-up and commissioning.

PPM

Property Protection Monitoring

176 Walker Street
Lowell, MA 01854

MIRCOM®
Advanced Life Safety Solutions

KFCi *King Fisher Company, inc.*

Fike

KELTRON
Network solutions by radio

TECHNICAL ASSISTANCE

Mammoth Fire Alarms provides our customers with convenient technical assistance. By calling 800-995-9808, our customers can reach our technicians from the job-site.

- On-site service is available, for those situations where problems can not be resolved over the phone.
- Full parts inventory and state-of-the-art test equipment are carried in the service vehicles by all of our field technicians.
- Service technicians are provided with continuing technical training on all of our products. In addition, we have considerable electrical field experience.
- We also offer numerous seminars on technical topics, on-site, to train customers. At our state of the art education center.

The entire *Mammoth Fire Alarms* team is committed to providing and maintaining the most dependable life safety systems.

Partial Installation List

CONNECTICUT
- GE Capital
- Groton Submarine Base
- Shaws Supermarkets
- SVG Lithography

MAINE
- Bangor International Airport
- Biddeford Middle School
- Husson College
- Marshfield High School
- Shaws Supermarket
- Seal Rock Healthcare
- TD Banknorth
- United Rentals

MASSACHUSETTS
- Boston University
- Brandeis University
- Cotuit Center For The Arts

MASSACHUSETTS (cont.)
- Federal Express
- Hanscom Air Force Base
- Harvard University
- Heritage Assisted Living
- Hess Gas Station
- John Smith Soccer Centers
- NFPA Headquarters
- Putnam Investment
- R.K. Plaza
- South Shore Hospital
- Tufts University
- United Parcel Service
- World Trade Center

NEW HAMPSHIRE
- Boston University
- Colby Sawyer College
- Dartmouth College
- Haverwood Retirement Community

NEW HAMPSHIRE (cont.)
- Jac Pac Foods
- J. Jill Group
- LRG Healthcare
- Pease International Trade Port
- Quail Hollow Retirement Community
- State House

RHODE ISLAND
- Amtrol
- Brown University
- Hess Gas Stations
- Narragansett Electric
- Rhode Island School of Design
- Roger Williams College
- Stanley Bostich
- U.S. Naval Station

VERMONT
- Ben & Jerry's

VERMONT (cont.)
- Bombardier Capital
- Brattleboro Retreat
- Burlington International Airport
- Immigration & NATL Service Center
- Jay Peak Resort
- Killington Ski Resort
- Killington-Grand Summit Hotel
- Middlebury College
- Motel 6
- Mt. Snow-Grand Summit Hotel
- University of Vermont
- VT Law School
- Veterans Admin Hospital
- VT State House
- Wake Robin CCRC
- Wyndham Hotels

Partial Manufacturers List

Aiphone
Air Products Controls
Altronix
Bosch CCTV
Cooper Notification
Evax Systems
Gamewell/FCI
Gentex
Keltron
King Fisher
Mircom
Napco
Panasonic
Protectowire
Safety Technologies
Sapling Clock Systems
Securitron
Space Age Electronics
Vision Systems (Vesda)
"WAVES" Systems
Fike

MFA

Mammoth Fire Alarms

Incorporated

Corporate headquarters:

176 Walker Street, Lowell, MA 01854-3126
Tel. (978) 934-9130 Sales • 1-800-995-9808 • Fax (978) 934-9131
www.mammothfire.com

Flexibility

The basic 2000 Series Control Panel is designed for easy expansion of system capability by adding additional modules and functions to the standard system. The 2000 will accommodate a combination of the following options:

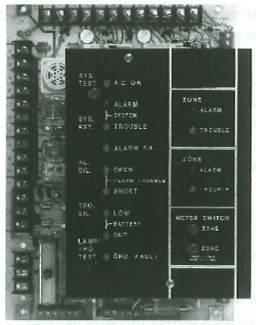
- Protectowire alarm point location meter
- Extinguishing system release and supervision
- Water flow detection
- Fire and non-fire supervisory monitoring
- Intrinsically safe detection zones
- Municipal tie
- Supplementary relays

A complete list of available options is included in the "System Configuration Guide" section of this catalog sheet.

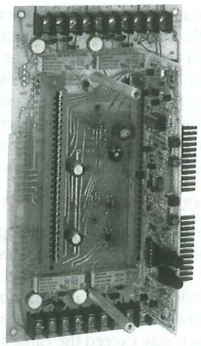
System Expansion

The basic 2-wire control unit consists of two (2) detection zones, and requires one module space in the system enclosure. The zone capacity of the basic system can be expanded up to a maximum of forty-six (46) zones in one EN12 enclosure, by utilizing the required number of plug-in zone modules and their associated EB-91 zone expander boards. Each standard 2-wire zone module requires a half module space in the system enclosure and contains two (2) individual detection circuits. To monitor the two detection circuits, a red LED zone alarm indicator and a yellow zone trouble indicator are supplied for each zone. Supervisory zone cards utilize two yellow LED indicators per zone to indicate supervisory alarm and supervisory trouble.

The modular system design enables the system to be modified at any time. The required number of input and output circuits and system options are custom assembled and tested at the factory to ensure exact conformance with the customer's application requirements.



FS2000 Basic control module



Zone expander board (EB-91) with one plug-in zone module

System Features

Nine system status indicators are mounted on the main control board. A green POWER ON LED, a red SYSTEM ALARM LED, a yellow SYSTEM TROUBLE/SUPERVISORY signal LED, and a yellow GROUND FAULT indicator. Additional yellow indicating LED's are provided for ALARM SILENCED, AUDIBLE SIGNAL CIRCUITS OPEN/SHORTED, BATTERY LOW and BATTERY OUT.

System controls consist of five push button switches which provide the following functions: System Test, System Reset, Alarm Silence, Trouble Silence, and Lamp and Trouble Test.

Protectowire Alarm Point Location Meter (Option A) and Scanner (Options B, C & C2)

Protectowire introduces "smart" detector technology to Linear Heat Detectors. The PDM-1000-1 Meter (Option A) may be built into the 2000 Series Control Panel to locate a heat actuated point on the Protectowire Linear Heat Detector. The meter will display the distance in feet or meters from the start of the Detector portion of the zone to the overheated or actuated point on the Protectowire Linear Heat Detector.

A Zone Alarm Scanner option for the PDM-1000-1 is available which allows for automatic identification and display of the Protectowire zone in alarm, as well as the alarm point distance location, while still monitoring the remaining Protectowire zones for an alarm condition. The Scanner is available in the following configurations: 8 zones (Option B), 16 zones (Option C), and 32 zones (Option C2).

PDM-1000–1 Protectowire alarm point location meter with 16 zone alarm scanner. (Options A & C)

Solenoid Monitor and Release Module (Options G & GG)

The RS-91 Series Solenoid Monitor and Release Modules are designed to operate and supervise solenoid valves used for the actuation of extinguishing systems.

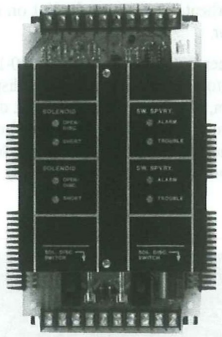
Release logic and subsequent activation of the module is governed by the appropriate detection zone module(s) in the 2000 Series Control Panel. When the alarm signal is transferred to the release module(s), a 24VDC output is initiated to operate the normally de-energized solenoid, which activates the extinguishing agent release sequence.

The release circuits are supervised for open and shorted conditions. In the case of an open or short, the system trouble buzzer will sound and the appropriate yellow indicating LED will illuminate. A circuit disconnect switch is also provided to deactivate the module during servicing of the system.

The release module is available in two versions. Option G (RS-91) contains two (2) independent 24VDC release circuits plus two (2) Class B switch supervisory circuits. The RS-91 release module requires one (1) module space in the system enclosure and has

been approved by Factory Mutual Research Corporation for actuation of FM Solenoid Groups A, B,D, E, F and G.

Option GG (RS-91D), is available for those applications which require operation of the Star Model D deluge valve. This model contains two (2) release circuits and two (2) Class B supervisory circuits, and requires one (1) module space in the system enclosure. Option GG (RS-91D) is the only model which has been FM Approved for operation of the Star Model D deluge valve, FM Solenoid Group C.



Solenoid monitor and release module with Class B supervisory circuits. (Options G & GG)

Intrinsically Safe Detection Circuits (Options H, J, & K)

The 2000 Series can be provided with intrinsically safe Class B detection circuits for those areas that are classified as hazardous. The voltage and current in the detection circuits will be limited to values which are incapable of causing an explosion in a Division 1 area. Protectowire Linear Heat Detector and/or other non-energy storing initiating devices may be used in these areas. Three FM Approved options are currently offered for the 2000 Series Control Panels:

Option H utilizes a shunt diode barrier and has been FM Approved for NEC Classes I, II, and III, Division 1, Groups A, B, C, D, E, F, and G. This option permits the use of the Protectowire alarm point location meter (Option A) but requires that the system ground fault detection circuit be disabled.

Option J is used exclusively with TRI-Wire detection zones and provides two shunt diode barriers per zone. This option is FM Approved for NEC Classes I, II, and III, Division 1, Groups C, D, E, F and G. Option J is compatible with the Protectowire Alarm Point Location Meter (Option A), but requires that the system ground fault detection circuit be disabled.

Option K incorporates a DC isolator as part of the detection circuit. This method is FM Approved for NEC Classes I, II, and III, Division 1, Groups A, B, C, D, E, F, and G. The use of Option K permits the utilization of the system ground fault detection circuit for all other non-isolated system circuits, but is not compatible with the Protectowire Alarm Point Location Meter (Option A).

Note: Option K is not FM Approved for use with TRI-Wire detection zones (Option X).

Battery Charging Meters (Option P)

Battery Charging Meters (Option P) consist of a DC volt meter and DC amp meter which provide a numerical indication of the system's battery condition. These meters provide an accurate display of both the charging current draw and the battery standby voltage level. Option P is side wall mounted inside the enclosure, and may be viewed only when the enclosure door is opened.

Audible Alarm Circuits (Options T & U)

Each 2000 Series Control Panel contains two standard Class B (Styles W & Y) general alarm circuits which are contained on the main control board. These audible circuits may be wired in a Class A (Styles X & Z) configuration when Option T is ordered.

Additional audible alarm circuits may be added to the system by utilizing AE-91 Audible Expander Modules (Option U). Each module provides one (1) audible alarm signaling circuit which may be wired in either a Class A (Styles X & Z) or Class B (Styles W & Y) configuration. These plug-in modules may be provided in a latching or non-latching mode and will also accept up to four (4) inputs for selective activation by zone or groups of zones. Option U requires half a module space in the system enclosure, and the total circuit load may not exceed 1.0 amp.

Zone Voting Module (Option V)

The ZV-91 Zone Voting Module (Option V) is designed to offer selective/multiple circuit activation from a variety of initiating circuits, depending on the operational logic to be achieved upon system operation.

The ZV-91 contains a programmable resistor network which will accept up to 16 input signals. The 16 inputs are arranged into four (4) groups of four (4) with each group capable of providing a designated output signal (total 4). When used in a voting zone format, the module inputs can be selectively programmed to provide an output signal upon activation of any two or three of the 16 inputs. When a cross-zoned configuration is required, the module will accept a maximum of eight (8) inputs or zones, and can provide up to a maximum of four (4) separate outputs.

The module provides excellent system versatility in control function logic. Typical application examples are: actuation of selected relays from the operation of two or more independent initiating circuits; activating an AE-91 Audible Expander Module from a number of select initiating device circuits; and cross-zoning of initiating device circuits and/or supervisory circuits. The ZV-91 is designed for mounting on the sidewall of the enclosure, and does not require a designated module space when sizing the system enclosure.

Auxiliary Power Supply (Option W)

The PS-91 Auxiliary Power Supply (Option W) is a step-down transformer and bridge rectifier designed to increase the system power of any 2000 Series Control Panel. The PS-91 supplies additional full wave rectified power for detection zones, solenoid release circuits, auxiliary audible circuits, alarm relays, or other high power demand devices which may exceed the capacity of the system's main power supply.

The unit is completely supervised. Should the PS-91 fail, a trouble signal illuminates the on-board trouble LED, and allows the battery back-up source to supply the panel with the necessary power. The PS-91 operates on primary AC power of 120VAC, 50-60Hz at 1.75 amps maximum, and provides 5.0 amps of DC power under alarm conditions.

Dual Temperature Detection Zones for use with Protectowire TRI-Wire™ Linear Heat Detector (Options X & XX)

Option X, Class B (Style B)

Option X consists of a ZC-95 plug-in zone module, which provides two (2) independent Class B (Style B) dual input detection zones

along with signal processing circuitry. Each detection zone will accommodate up to 5,000 feet (1,524m) of Protectowire Type TRI, 3-wire Dual Temperature Linear Heat Detector (TRI-Wire™). This module senses two alarm trip levels. The first level operates on a low temperature pre-alarm input signal, and the second level is activated by a high temperature alarm signal. In addition to a common alarm output signal, the module provides an auxiliary pre-alarm (low temperature) output signal and an auxiliary confirmed temperature output signal which is initiated only after both the low temperature pre-alarm and high temperature alarm signals have been activated.

Option XX, Class A (Style D)

When using Protectowire Type TRI, 3-wire Dual Temperature Linear Heat Detector (TRI-Wire™), Class A (Style D) detection circuits are configured by utilizing a version of the system's ZC-91 series plug-in zone module. Designated Option XX, each module provides one (1) 3-wire Class A (Style D) detection zone which will operate up to 3,500 feet (1,067m) of Dual Temperature TRI-Wire™. In this configuration, the module provides a separate trouble and alarm indication for both low temperature pre-alarm and high temperature alarm, as well as separate alarm outputs for both activations. Unlike Option X, a confirmed temperature output signal is not available directly from the zone module. With this option, a confirmed temperature alarm signal is only available by using zone operated relays or a Zone Voting Module (Option V) as part of the system configuration.

When either Option X or XX is ordered with the Protectowire Alarm Point Location Meter (Option A), each zone will cause the meter to display in feet or meters, the location of the heat actuated low temperature pre-alarm point on the TRI-Wire™ Linear Heat Detector.

Power Conditioning Module (Option Y)

The PS-95 Power Conditioning Module (Option Y) is designed to provide filtered, regulated DC power from unfiltered, unregulated DC power sources. When 24VDC input power for the PS-95 is taken from the proper point on the control panel, battery backup is provided automatically to devices powered by the module. When operating on battery backup, the PS-95's unique design prevents any voltage drop from occurring across the module.

The PS-95 features an AC-ON green LED indicator and a BACK-UP ON yellow LED indicator. Reset can be accomplished by utilizing the main panel system reset switch or the push button switch located on the module. Provision has also been made to accept a N/O switch connection for remote reset capability.

The module has a current output of 1.5 A @ 26VDC at idle, and 2.0 A @ 26VDC during alarm. Output voltage is factory calibrated at 25.5 to 26VDC.

System Enclosures

EN Series – Type 1

The EN Series System Enclosures are designed to accommodate all input and output modules, power supplies, and batteries (up to 18AH) utilized in the FireSystem 2000.

Each enclosure consists of a back box and door, fabricated of heavy gauge steel and finished in a fine textured beige epoxy enamel finish. The enclosure door, which is mounted on heavy duty sag-resistant hinges, is fitted with a key lock, and may be removed from the back box to permit easy installation and service. Red enclosures are optionally available and may be ordered by adding the suffix "R" to the enclosure model number.

Each enclosure is vented, which allows for internal placement of the emergency standby batteries. The largest battery supplied by the factory, which may be installed in each model enclosure is indicated in the chart below. When the system's battery size requirements exceed the sizes shown, a separately ordered battery cabinet is required. Consult factory for information.

Encl.	Module spaces	Max. battery size	Width Inches (cm)	Height Inches (cm)	Depth Inches (cm)
EN2	2	10AH	21" (53.3)	17" (43.2)	5" (12.7)
EN4	4	18AH	21" (53.3)	31" (78.7)	5" (12.7)
EN6	6	18AH	26" (66.0)	31" (78.7)	5" (12.7)
EN9	9	18AH	26" (66.0)	42" (106.7)	5" (12.7)
EN12	12	18AH	26" (66.0)	53" (134.6)	5" (12.7)

LTi Industrial Series — NEMA Type 4/12 & 4X

The LTi Series Enclosures are intended for use indoors or outdoors and are designed primarily to provide a degree of protection against windblown dust and rain, splashing water, hose-directed water, and damage from external condensation. To prevent the build-up of dangerous battery gases within the sealed enclosure, a separately ordered battery cabinet is required. For additional information on LTi Enclosures, refer to Data Sheet 9130.

Encl. Model	Module Spaces	Width Inches (cm)	Height Inches (cm)	Depth Inches (cm)	Encl. Color
LTi2X	2	19.5" (49.5)	17.5" (44.5)	9.0" (22.9)	Red
LTi4	4	24.0" (70.0)	34.0" (86.4)	6.9" (17.4)	Red
LTi6	6	29.0" (73.7)	34.0" (86.4)	6.9" (17.4)	Red
LTi9	9	29.0" (73.7)	45.0" (114.3)	6.9" (17.4)	Red

FireSystem 2000 Specifications

AC Supply
120 or 240VAC, 50-60Hz, 1.75 amp max.

Battery Supply
24VDC 4.5-55 ampere hour.
Gel cell (standard)
Nickel cadmium (special order)

Environmental Operation Conditions
Ambient temperature: 32°-120°F (0°-49°C).
Humidity: Max. 95% non-condensing.

Primary System Power
24V FWR by TI, 175VA typical.

System Regulated Power
Each board (MB, EB, RS) has full voltage regulation, 12VDC and 24VDC.

Audible Signaling Device Circuits
24V - FWR with battery standby.
Maximum current: 2 amp/circuit, 3 amp combined.
Requires polarized audible devices.

Relay Contact Ratings
Common alarm: 3 amp @ 30VDC.
Common trouble: 2 amp @ 30VDC.

Approvals*
• UL listed • City of New York #MEA-374-91E
• Factory Mutual • Calif. State Fire Marshal #7165-0854:103

How To Order

Determine the type of system configuration required from the descriptions below and follow the appropriate ordering instructions:

Configuration 1 **System will contain all Dual Temperature 3-wire Detection Zones.**

Step 1 **Order Basic Control Unit, Model #FS2000.** The Model FS2000 Control Unit contains no detection zones and will require the addition of either Option X or Option XX. The FS2000 Control Unit requires a half module space in the system enclosure.

Next, proceed directly to Step 2 and follow the ordering instructions. As part of Step 2, be sure to include Option X or Option XX and specify the quantity of modules necessary to provide the appropriate number of 3-wire Dual Temperature TRI-Wire™ zones required for the entire system.

Configuration 2 **System will contain all Standard 2-wire Detection Zones or a Combination of 2-wire and Dual Temperature 3-wire Zones.**

Begin the ordering process at Step 1A. Select the Basic Control Unit which contains the required number of standard 2-wire detection zones.

Proceed to Step 2 and continue the ordering process as instructed. As part of Step 2, be sure to include Option X or Option XX and specify the quantity of modules necessary to provide the appropriate number of 3-wire Dual Temperature TRI-Wire™ zones.

Step 1A Determine the number of 2-wire detection zones required, and select the appropriate system control unit from the models shown in the table below.

Basic 2–Wire System Control Units

Model #	Enclosure Module Spaces	Description
FS2002	1	2 zones
FS2004	1½	4 zones
FS2006	2	6 zones
FS2008	2½	8 zones
FS2010	3	10 zones
FS2012	3½	12 zones
FS2014	4	14 zones
FS2016	4½	16 zones
FS2018	5	18 zones
FS2020	5½	20 zones
FS2022	6	22 zones
FS2024	6½	24 zones
FS2026	7	26 zones
FS2028	7½	28 zones
FS2030	8	30 zones
FS2032	8½	32 zones
FS2034	9	34 zones

Add ½ module space for each additional 2 zones.

Step 2 Select option code letter(s) from the "System Configuration Guide" section of this catalog sheet and show quantity when necessary. Note options which require enclosure module space(s).

Step 3 To determine the proper size system enclosure, add the module spaces required for the basic control unit (Step 1 or 1A) plus the module spaces required for the quantity of each option selected (Step 2). If the total module spaces required for the system exceed the size of the largest enclosure, a second extender enclosure will be required. Select two enclosures whose total module capacity equals or exceeds that required for the complete system.

Step 4 Finalize complete system model number as shown in the System Configuration Guide, Section D.

Step 5 Each 2000 Series Control Panel is custom assembled and tested at the factory as a complete system. In order to ensure conformance with each customer's operational requirements, every order should be accompanied by a brief description of the panel's operating logic and zone functions.

* Not all options are both UL Listed and FM Approved. Consult factory for details.

System Configuration Guide

A. Model number of basic system control unit selected in Step 1 or 1A.

Specify AC input voltage: **120** or **240VAC**

Specify battery charger adjustment code: **GC** - Gel Cell (Std.)
NC - Nickel Cadmium

B.

Options	Encl. mod. space	
A	-	Protectowire alarm point location meter PDM-1000-1
B	1	8 zone alarm scanner ┐
C	1	16 zone alarm scanner ├ Requires Option A
C2	1	32 zone alarm scanner ┘
D	½	Water flow detection zones (2/card)
E	½	Switch supervisory circuits Class A/B (2 circuits/module)
G	1	Solenoid monitor and release module w/ Class B switch supervisory (2 release and 2 supervisory circuits/module)
GG	1	Solenoid monitor and release module for Star Model D w/ Class B switch supervisory (2 release and 2 supervisory circuits/module)
H	-	Intrinsic safety barrier for Class B, 2-wire
(1-2)	0	detection circuits
(3-16)	1	(Option not available with system
(17-32)	2	ground fault detection)
		Determine module space based upon zone qty. shown in brackets.
J	-	Intrinsic safety barriers for Class B,
(1-2)	0	TRI-Wire detection circuits (2/zone)
(3-8)	1	(Option not available with system
(9-16)	2	ground fault detection)
(17-24)	3	Determine module space based upon zone qty. shown in brackets.
K	-	DC isolator for Class B, 2-wire detection circuits
(1-2)	0	(Not compatible with Option A)
(3-8)	1	Determine module space based upon zone
(9-16)	2	qty. shown in brackets. **Note: Not FM Approved**
(17-24)	3	**for use with Option X.**
(25-32)	4	
L	-	Auxiliary zone alarm relay - SPDT
LL	-	Auxiliary zone alarm relay - DPDT
M	-	Municipal tie unit (series type - requires Option E)
N	-	Municipal tie unit (shunt type)
P	-	Battery charging meters
Q	-	Time delay relay
R	-	Auxiliary common alarm relay - DPDT
RR	-	Auxiliary relay module - 8-SPDT relays (1 amp @ 24 VDC)
S	-	Auxiliary common trouble relay - DPDT
T	-	Class A (NFPA Styles X & Z) audible circuits (main panel, general alarm only)
U	½	Audible expander card (1 circuit, Class A or B)
V	-	Zone voting module
W	-	PS-91 auxiliary power supply
X	½	Dual temperature detection zones Class B (2 zones/module)
XX	½	Dual temperature detection zone Class A (1 zone/module)
Y	-	PS-95 power conditioning module
Z	-	Door mounted, key operated, control switches (reset, alarm silence, trouble/supervisory silence & lamp test)

C. Enclosures

EN2	2 module enclosure
EN4	4 module enclosure
EN6	6 module enclosure
EN9	9 module enclosure
EN12	12 module enclosure

LTi2X	Industrial Type NEMA 4X	2 module enclosure
LTi4	Industrial Type NEMA 4/12	4 module enclosure
LTi6	Industrial Type NEMA 4/12	6 module enclosure
LTi9	Industrial Type NEMA 4/12	9 module enclosure

D. Example of complete system model number. Note that the quantity of each option ordered is shown after its Option Code Letter.

FS2004-120-GC-G2X2-EN6

Control panel with four 2-wire detection zones operating on 120VAC 50-60Hz input & gel cell battery backup; (2) solenoid monitor and release modules w/Class B switch supervisory (2 release & 2 supervisory ckts./module); (2) Dual Temperature 3-wire detection modules (4 Class B zones, 2/module), all in a six (6) module beige enclosure.

The Protectowire Co., Inc.
Post Office Box 200, Hanover, MA 02339-0200 U.S.A.
781-826-3878, Fax 781-826-2045
Web: http://www.protectowire.com
e-mail: pwire@protectowire.com

Special hazard fire detection systems

Mammoth Fire Alarms
Incorporated

BATTERIES

The rechargeable batteries are of sealed lead calcium maintenance-free construction with a fully gelled electrolyte in a polypropylene case. These batteries will not leak or spill even if left upside down for extended periods of time.

PS12120

PS1270

PS12180

PS12350, PS12550

ELECTRICAL SPECIFICATIONS

Nominal voltage	12 volts
Charging voltage	
Float	13.5 - 13.8 VDC
Cycle	14.4 - 14.8 VDC
Operating Temp. Range	
Discharge	-76° F to +122° F (-60° C to +50° C)
Charge	-4° F to +122° F (-20° C to +50° C)

BATTERY FEATURES

- **Long Life**
- **Completely Sealed**
- **Charge and Discharge in any Position**
- **Low Self Discharge**
- **Maintenance Free**

SPECIFICATIONS

Model	Capacity (20 hr. rate)	Terminal Type	Dimensions	Weight
PS1270	7 AH	Faston tab ".187" series	5.11 cm L x 10.03 cm H x 6.6 cm W 5.95" L x 3.95" H x 2.6" W	5.75 lbs. (2.61 kg)
PS12120	12 AH	Faston tab ".250" series	12.48 mm L x 5.97 mm H x 4.72 mm W 5.94" L x 3.70" H x 3.98" W	9.33 lbs. (4.24 kg)
PS12180	18 AH	Terminal posts w/5 mm nut & bolt connectors	18.11 cm L x 16.69 cm H x 7.59 cm W 7.13" L x 6.57" H x 2.99" W	13.2 lbs. (5.99 kg)
PS12350	35 AH	"L" blade w/.6.4 mm hole	19.69 cm L x 18.54 cm H x 12.95 cm W 7.75" L x 7.3" H x 5.1" W	24 lbs. (10.89 kg)
PS12550	55 AH	"L" blade w/6.4 mm hole at negative, 8.9 mm sq. cutout at positive	26.04 cm L x 22.23 cm H x 17.27 cm W 10.25" L x 8.75" H x 6.8" W	39 lbs. (17.69 kg)

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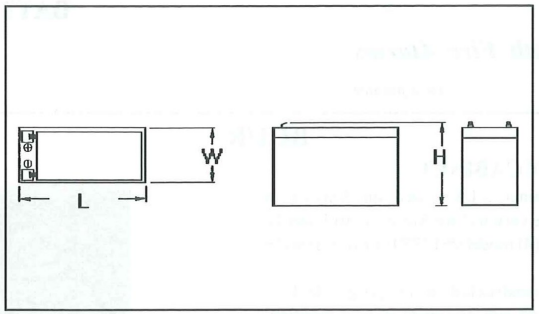
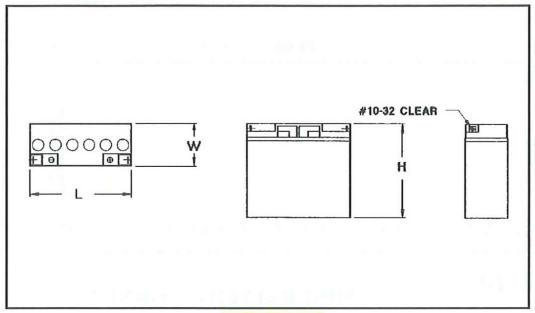
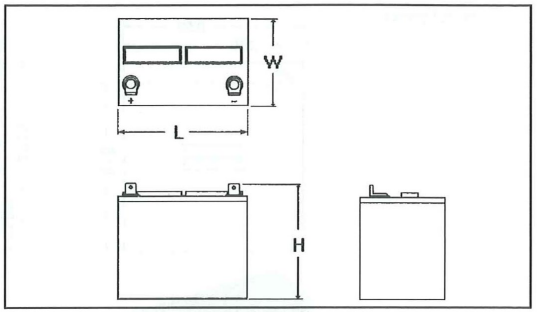


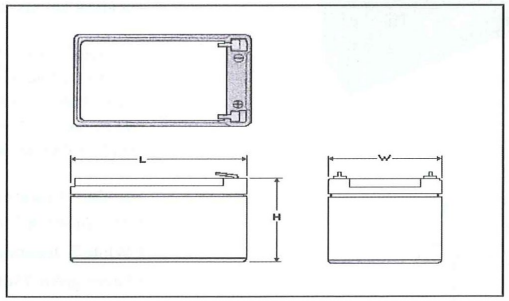
PS1270



PS12180



PS12350, PS12550



PS12120

ORDERING INFORMATION

Model	Description
PS1270	Sealed lead calcium battery, 7 AH
PS12120	Sealed lead calcium battery, 12 AH
PS12180	Sealed lead calcium battery, 18 AH
PS12350	Sealed lead calcium battery, 35 AH
PS12550	Sealed lead calcium battery, 55 AH

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BATTERY CABINET

Mammoth Fire Alarms

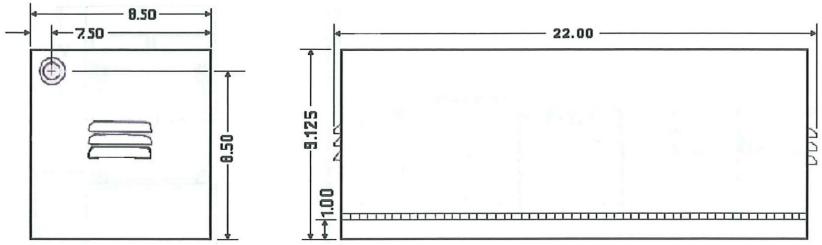
Incorporated

BC1/R

BATTERY CABINET

The Model BC Battery Cabinet is UL Listed and finished in textured red or beige to match the various Fire Alarm control panels. The cabinet will house up to four (4) model PS12350 or two (2) model PS12550 batteries.

The heavy duty cabinet, constructed of 16 gauge steel, is phosphate treated and primed with zinc chromate prior to painting. Knockouts are located at each end of the cabinet. The cabinet features a hinged, locked cover which is keyed alike with Fire Alarm control panels.



MBC

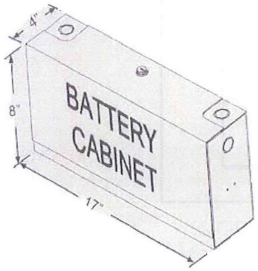
MINI BATTERY CABINET

The MBC "BATTERY CABINET" is designed for the professional installation of systems requiring battery storage and meets the requirement of NFPA 72 (1-5.2.9) stand-by battery storage for battery backup.

The MBC allows for easy access and maintenance of the batteries while also assisting against unecessary power drain, interference or degeneration of the battery. The unit can be mounted securely to a wall, preventing mechanical injury or damage to other equipment.

Standard Features:

- 16 Gauge (.062 thk.) cold rolled steel
- White 2" lettering "BATTERY CABINET"
- Green ground screw with threaded insert
- Formed lift-a-way hinge
- Red textured finish
- CAT 30 keyed door lock / PK625
- Dimensions: 17" wide x 8" high x 4" deep
- Six 1/2" and 3/4" EMT conduit knockouts located on both sides, top and back
- NFPA 72 National Electric



BR/2

BR-2 Battery Rack

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Incorporated
Lowell, MA 01854-3126
Tel. (978) 934-9130 Sales 1-800-995-9808 Fax (978) 934-9131

STANDBY BATTERY CALCULATIONS

SOLD TO:

Created: 3/13/2009
Updated: 8/7/2009

JOB NAME
Worral Covered Bridge
North side RT 103 - 5 mi SE of Chester

Rockingham, VT 05101

QTY	PART #	DESCRIPTION	SUP CURRENT	ALARM CURRENT
1	FS2002	02 ZONE PANEL 1	0.0630	5.2500
1	LTI/4	NEMA 4(WP) 4 MODULE ENCLOSURE RED	-	-
1	HT/1	120VAC CONTROL PANEL HEATER ASSEMBLY	-	-
2	PS12180	18 AMP 12V SEALED BATTERY	-	-
1	DTC-300AR	SLAVE DIGITAL ALARM COMMUNICATOR 6 ZONI	0.0600	0.1100
700	PHSC/155/EPC	REGULAR TYPE EPC RED JACKET	-	-
2	ZB/HD/4/QCF	FIBERGLASS NEMA-4X TYPE JIC ENCLOSURE	-	-
2	SR/502	STRAIN RELIEF CONNECTOR	-	-
2	PWSC	SPLICING CONNECTORS SFTS	-	-
200	OHS/1	CLIP, LINE (USE w/TYPE P, EPC & EPN, TRI	-	-
12	WAW/P	CLIPS, CORNER, POLYPROPYLENE (CLEAR)	-	-
8	SLP/B	SUBMITTAL PACKAGE WITH BINDER	-	-
8	PRINTS	SYSTEM CAD PRINTS	-	-
4	O&M/B	OPERATION & MAINTENANCE MANUAL W/BINDE	-	-
1	UL/TEST/SERVICE	COMPLETE SYSTEM TEST PER UL REQUIREMEI	-	-
1	490S/1280R	RED 12-80VDC STROBE LIGHT	-	0.3200
1	FMSL/4RA	RED FLANGE MOUNT KIT FOR 490/500 STROBE	-	-
	TOTAL		**0.1230**	**5.6800**

15	Ring Time, in Min	(Total Alarm Current / (60 / Ring Time))	1.4200	ALM A/H
90	Standby Time, in Hrs	(Total Supervisory Current * Standby Time)	11.0700	SUP A/H
		Total Amp Hours Required	12.4900	
	VERIFY # OF PWR SUPs	Standby Reserve 20%	14.9880	

MIRCOM®

STAND-ALONE DIGITAL ALARM COMMUNICATOR DTC-300A

Description

The DTC-300A Stand-Alone Digital Alarm Communicator Transmitter/Dialer Module is a six zone fire alarm communicator that can be connected to any 24 VDC fire alarm control panel to provide fire reporting to a monitoring facility.

The DTC-300A utilizes two telephone lines to transmit information for six configurable input zones to a Digital Alarm Communicator Receiver (DACR). The input zones can be configured for Common Alarm, Common Trouble, Common Supervisory, Common Waterflow Alarm, AC Power Fail Trouble and Battery Trouble.

The DTC-300A requires a 24VDC filtered or 24VDC Full Wave Rectified (FWR) power source. The Digital Communicator can be programmed for dual line operation and uses the Security Industry Association (SIA) and Ademco Contact ID reporting protocols.

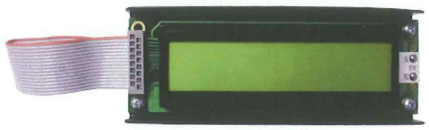
The DTC-300A can be configured locally via the on-board keypad and the CFG-300 Configuration Tool or with a UIMA programming tool and a computer with an available serial or USB port. In addition the DTC-300A can be remotely configured using a personal computer with a modem.

Features

- Connects to any 24VDC fire alarm control panel to provide fire reporting to a monitoring facility
- Transmits information for six configurable input zones on two telephone lines to a Digital Alarm Communicator Receiver (DACR)
- Input zones can be configured for Common Alarm, Common Supervisory, Common Trouble, Common Waterflow Alarm, AC Power Fail Trouble and Battery Trouble
- DTC-300A has the ability of disconnecting the incoming and outgoing calls and capturing the line for transmission to the Digital Alarm Communicator Receiver (DACR)
- Onsite or remote programming
- Onsite configurable with the on-board keypad and the CFG-300 Configuration Tool or using the UIMA Programming Tool and caomputer with an available serial or USB port
- Remotely configurable via a Personal Computer with a modem (Configuration is passcode protected)
- Provides telephone line monitoring and reports status via LED indication on-board
- Provides event logs of 500 entries each to save events from local dialer or remote fire alarm panel
- Logs can be reviewed locally with the CFG-300 Configuration Tool or remotely via modem
- Continuously supervises the status of each of two connected telephone lines at approximately one minute intervals
- Provides LED indication for AC Power, Common Trouble, CPU Fail and Ground Fault
- Requires 24VDC filtered or 24VDC Full Wave Rectified (FWR) power supply

S5434 7300-1477:151

CATALOG NUMBER 5316



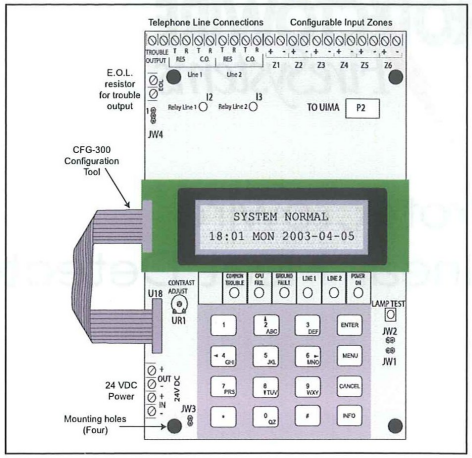
CFG-300 Configuration Tool

The CFG-300 Configuration Tool is required for onsite programming of the DTC-300A. The CFG-300 plugs into the DTC-300A to provide a two line by 20 character LCD display. The CFG-300 tool is used for configuration purposes only and not for normal operation.

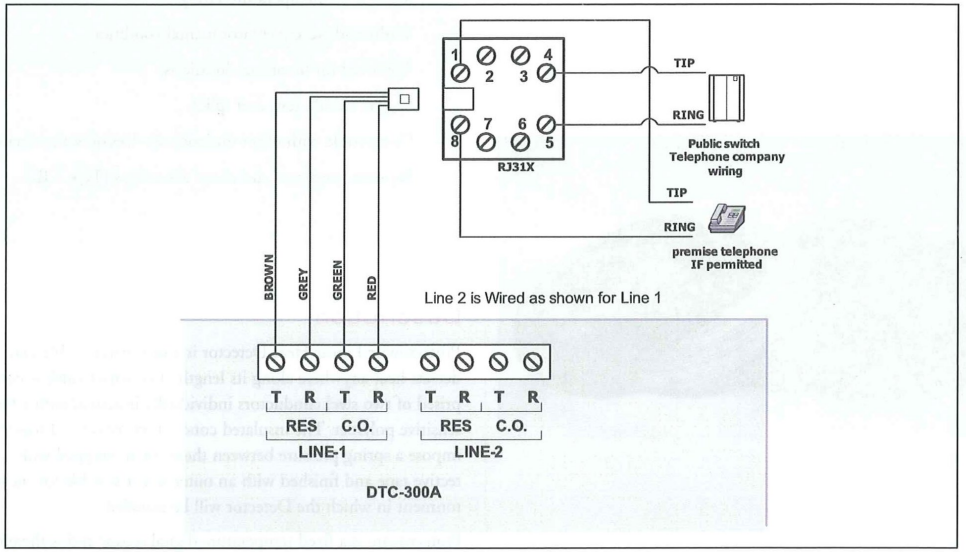
Current Consumption

Standby	60 mA
Alarm	110 mA

DTC-300A Connection Diagram



DTC-300A Wiring Diagram



Ordering Information

Model	Description
DTC-300A*	Standalone Digital Alarm Communicator Transmitter
CFG-300	Configuration Tool
UIMA	Universal Programming Tool

**add suffix "R" for red and "W" for white*

NOT TO BE USED FOR INSTALLATION PURPOSES.

MIRCOM®

Canada
25 Interchange Way
Vaughan, Ontario L4K 5W3
Telephone: (905) 660-4655
Fax: (905) 660-4113

U.S.A.
60 Industrial Parkway
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Fax Toll Free: (888) 660-4113

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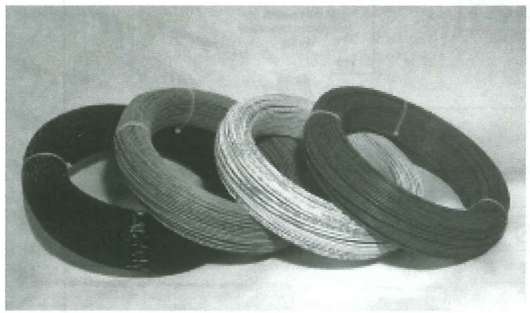
CAT. 5316
Rev. 0

PROTECTOWIRE® FireSystems

Protectowire Linear Heat Detector



Features

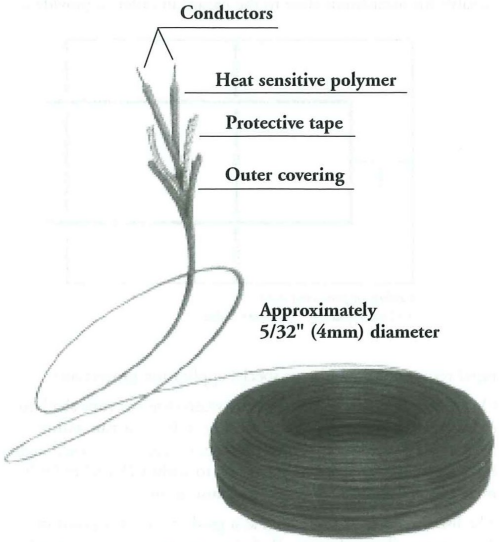
- Line coverage…continuous sensitivity.
- Seven alarm temperature ratings.
- Withstands severe environmental conditions.
- Approved for hazardous locations.
- Easy to install, test, and splice.
- Compatible with other initiation devices on same circuit.
- Separate pre-alarm and alarm actuations (Type TRI).

Description

Protectowire Linear Heat Detector is a proprietary cable that detects heat anywhere along its length. The sensor cable is comprised of two steel conductors individually insulated with a heat sensitive polymer. The insulated conductors are twisted together to impose a spring pressure between them, then wrapped with a protective tape and finished with an outer jacket suitable for the environment in which the Detector will be installed.

Protectowire is a fixed temperature digital sensor and is therefore capable of initiating an alarm once its rated activation temperature is reached. At the rated temperature, the heat sensitive polymer insulation yields to the pressure upon it, permitting the inner conductors to move into contact with each other thereby initiating an alarm signal. This action takes place at the first heated point anywhere along the Detector's length. It does not require that a specific length be heated in order to initiate an alarm nor is system calibration necessary to compensate for changes in the installed ambient temperature. Protectowire Linear Heat Detector provides the advantages of line coverage with point sensitivity.

Protectowire...
the first line of fire defense.



Applications

- Cable trays
- Conveyors
- Power distribution apparatus: switchgear, transformers, motor control centers
- Dust collectors/baghouses
- Cooling towers
- Warehouses/rack storage
- Mines
- Pipelines
- Bridges, piers, marine vessels
- Refrigerated storage
- Tank farms
- Aircraft hangars
- Computer rooms

Ideally suited to industrial high risk hazards as well as many types of commercial applications, Protectowire Linear Heat Detector has unique advantages over other types of detectors, especially when difficult installation factors or severe environmental conditions are present.

When used with a Protectowire FireSystem Control Panel, the Detector will activate a display, showing the location of an over heat or fire condition anywhere along its length. The Detector also meets intrinsically safe standards and is FM Approved for Class I, II, or III, Div. 1, Applicable Groups A, B, C, D, E, F & G hazardous areas, when the appropriate control panel option is ordered.

Protectowire Features & Benefits

- Identifies and displays, at the control panel, the alarm location anywhere along its length when used with the exclusive Protectowire Alarm Point Location Meter.
- Sensitivity not effected by changes in ambient temperature or length of cable used on the detection circuit. Compensating adjustments are not required.
- Steel inner conductors and select outer jackets, provide resistance to mechanical damage.
- Simple to install and splice with common tools. Junctions can be made without effecting the integrity of the system.
- Compatible with other types of alarm initiating devices on the same circuit such as manual pull stations, thermal heat detectors and smoke detectors.
- Can be installed in hazardous areas when used with suitably approved Protectowire FireSystem Control Panels.
- Full range of temperatures and models available to accommodate the most demanding applications.
- Different temperature detectors may be utilized in the same initiating circuit.
- Available on stainless steel messenger wire for installations where mounting is difficult such as large open areas.
- Portable test equipment available for easy field service.
- Ideally suited for activation of extinguishment equipment, such as deluge or pre-action sprinkler systems.

Specifications

The Detector is made in multiple temperature ratings to allow for differences in normal ambient temperature. Guidelines for selecting the proper detector temperature rating are the same as for automatic sprinklers and other heat actuated devices. Refer to the Temperature Rating Chart for proper model selection based upon installation temperature limits.

The Detector's product range consists of five distinct types of cable. Each designation identifies a specific outer jacket material which has unique characteristics that have been selected to accommodate the widest range of installation environments. All specifications are subject to change without notice.

EPC – Type EPC Protectowire consists of a durable flame retardant vinyl outer jacket. This series is best described as multi-purpose and is well suited to a wide range of both commercial and industrial applications. The outer jacket provides good all-around performance for most installations. It features low moisture absorption, resistance to many common chemicals, and excellent flexibility at low temperatures.

EPN – Type EPN utilizes a dual jacket consisting of an inner layer of vinyl with an outer film of black weather resistant 612 nylon. This cable is specifically designed for industrial applications such as conveyors, where abrasion resistance is of major importance. In general, the outer nylon sheath substantially improves the cable's resistance to abrasion, some acids, aggressive salts, oils and petroleum products while maintaining good electrical and mechanical properties.

EPR – The EPR series contains an extruded flame retardant jacket of polypropylene elastomer with a special UV stabilizer added to enhance weathering performance. It is intended for a wide range of industrial applications and is characterized by high resiliency, good abrasion resistance, excellent weathering properties, and good high temperature performance. EPR provides better overall performance at higher ambient temperatures than either EPC or EPN.

TRI – Type TRI Protectowire is a unique dual temperature detector which is capable of initiating separate pre-alarm and alarm signals once each of its rated activation temperatures is reached. The Detector consists of a durable vinyl outer jacket which features low moisture absorption, resistance to many common chemicals, excellent flexibility and flame retardant. For complete information on this product, please refer to Data Sheet 9114.

XLT – Protectowire Type XLT is a unique detector that has been designed for use in cold storage facilities and other applications that require a low alarm activation temperature. The outer jacket consists of a proprietary flame retardant polymer that is specifically formulated to provide low moisture absorption, good chemical resistance, and excellent low temperature environmental performance. This detector has been UL and FM tested to –60°F (–51°C).

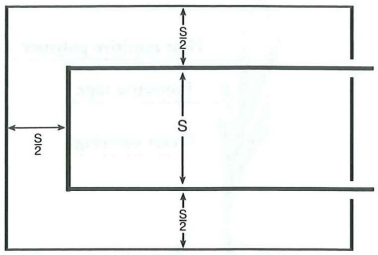
Electrical

All cables are rated for 30 VAC, 42 VDC. Resistance is approximately one ohm per five feet (1.5m) of twisted pair (two conductors).

Installation

Protectowire Linear Heat Detector is approved as a heat actuated automatic fire detector and is intended to be used on a supervised initiating circuit of an approved fire protective signaling control unit. The Detector must be installed in continuous runs without taps or branches in accordance with applicable sections of NFPA 70 National Electrical Code, NFPA 72 National Fire Alarm Code, or as determined by the local "authority having jurisdiction."

Protectowire may be installed at the ceiling level or on the side walls within 20 inches of the ceiling, to protect areas within buildings (area protection). The Detector has the additional benefit of being suitable for installation close to the hazard in order to provide a rapid response (proximity or special application protection).



Ceiling of protected area
S=Listed spacing. See chart below.

On smooth ceilings, the distance between detector runs shall not exceed the listed spacing. There shall be a detector run within a distance of one-half the listed spacing, measured at a right angle, from all walls, or partitions extending to within 18 inches (460 mm) of the ceiling as shown in the illustration.

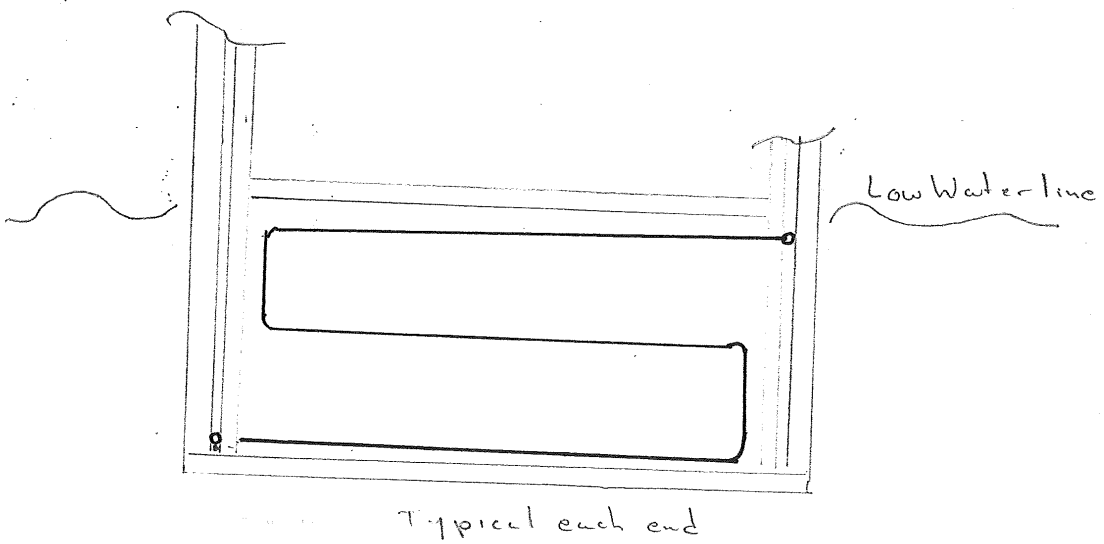
The listed spacing shall be used as a guide or starting point in detector installation layout. Reduced spacing is required based upon factors such as ceiling height and construction, physical

Temperature Ratings and Model Numbers *(Use Linear Detector of Proper Temperature Rating)*

Product Type	Model Number	Alarm Temperature	Max. Ambient Temperature	Approvals/Max. Listed Spacing UL/cUL	FM
EPC					
Multi-Purpose/	PHSC-155-EPC	155° F (68° C)	Up to 100°F (38°C)	50 ft. / 15.2m	30 ft. / 9.1m
Commercial &	PHSC-190-EPC	190° F (88° C)	Up to 150°F (66°C)	50 ft. / 15.2m	30 ft. / 9.1m
Industrial	PHSC-220-EPC	220° F (105° C)	Up to 175°F (79°C)	N/A	25 ft. / 7.6m
Applications	PHSC-280-EPC	280° F (138° C)	Up to 200°F (93°C)	50 ft. / 15.2m	25 ft. / 7.6m
	PHSC-356-EPC	356° F (180° C)	Up to 221°F (105°C)	50 ft. / 15.2m	See Note 1
EPN					
Excellent Abrasion Resistance	PHSC-190-EPN	190° F (88° C)	Up to 150°F (66°C)	50 ft. / 15.2m	30 ft. / 9.1m
EPR					
Good Weathering	PHSC-155-EPR	155° F (68° C)	Up to 100°F (38°C)	50 ft. / 15.2m	30 ft. / 9.1m
Properties & High	PHSC-190-EPR	190° F (88° C)	Up to 150°F (66°C)	50 ft. / 15.2m	30 ft. / 9.1m
Temperature Jacket	PHSC-280-EPR	280° F (138° C)	Up to 200°F (93°C)	50 ft. / 15.2m	25 ft. / 7.6m
Performance	PHSC-356-EPR	356° F (180° C)	Up to 250°F (121°C)	50 ft. / 15.2m	See Note 1
TRI					
Applications Requiring Pre-alarm	PHSC-6893-TRI	Pre-alarm: 155° F (68° C) Alarm: 200° F (93° C)	Up to 100°F (38°C)	N/A	15 ft. / 4.6m
XLT					
Multi-Purpose/ Excellent Low Temp. Properties	PHSC-135-XLT	135° F (57° C)	Up to 100°F (38°C)	50 ft. / 15.2m	30 ft. / 9.1m

Note 1: FM Approved for special application use only.
All Protectowire models can be supplied on Messenger Wire. Add suffix "-M" to above model numbers.

Worrel Covered Bridge
Fire detection lower span



Proposed linear fire protection wire
location for under side of the Worrel covered bridge

Watts Up Electric
Ascutney, VT

Worrrel Covered Bridge
Rockingham VT

We are proposing a deviation from contract drawing 3 of 30. Drawing 3 shows 3 horizontal runs of detection wire on the bottom of the deck.

We are proposing a loop of wire at each abutement end extending out to the low water line of the river. There are two primary reasons for the request 1. If the detection loops are installed on the bottom over the river future maintenance will be extremely difficult and expensive. 2. The chance of a fire being started on the underside of the bridge over the water is almost impossible.

Mammoth Fire Alarms
Incorporated

176 Walker Street Lowell, MA 01854

Fire Alarm System Submittals

LOCATION:

Worral Covered Bridge
North Side Route103
Rockingham, VT

INSTALLER:

Watts Up Electric Company
Ascutney, VT

"Servicing the installer before and after the installation."
www.mammothfire.com
SALES (978) 934-9130 • 1-800-995-9808 • FAX (978) 934-9131

FIRE ALARM SYSTEM
FOR
Worral Covered Bridge
North side RT 103 - 5 mi SE of Chester

Rockingham, VT 05101

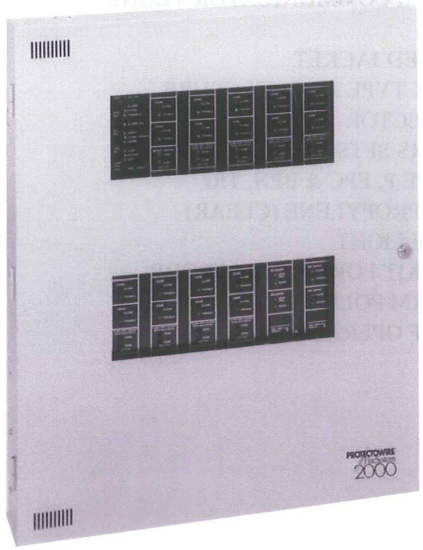
Watts Up Electric

ITEM	QTY	PART #	DESCRIPTION
1	1	FS2002	02 ZONE PANEL 1
2	1	LTI/4	NEMA 4(WP) 4 MODULE ENCLOSURE RED
3	1	HT/1	120VAC CONTROL PANEL HEATER ASSEMBLY
4	2	PS12180	18 AMP 12V SEALED BATTERY
			BATTERY CALCULATION SHEET
5	1	DTC-300AR	SLAVE DIGITAL ALARM COMMUNICATOR 6 ZONE
6	700	PHSC/155/EPC	REGULAR TYPE EPC RED JACKET
7	2	ZB/HD/4/QCF	FIBERGLASS NEMA-4X TYPE JIC ENCLOSURE
8	2	SR/502	STRAIN RELIEF CONNECTOR
9	2	PWSC	SPLICING CONNECTORS SFTS
10	200	OHS/1	CLIP, LINE (USE w/TYPE P, EPC & EPN, TRI
11	12	WAW/P	CLIPS, CORNER, POLYPROPYLENE (CLEAR)
12	1	490S/1280R	RED 12-80VDC STROBE LIGHT
13	1	FMSL/4RA	RED FLANGE MOUNT KIT FOR 490/500 STROBE
14			MAMMOTH FIRE ALARM POLICIES
15			SYSTEM SEQUENCE OF OPERATION

PROTECTOWIRE FireSystems

Features

- Easily expandable
- Two supervised audible circuits
- Lamp and system trouble circuit test
- Ground fault detection
- Initiating device circuit (IDC) alarm test
- Monitors up to 3,500 feet (1,067m) of Protectowire Linear Heat Detector per zone
- Up to 30 smoke detectors per zone
- Compatible with Protectowire TRI-Wire™ Dual Temperature Linear Heat Detector with Pre-Alarm



FireSystem 2000 Commercial and Light Industrial Fire Alarm Control Panel

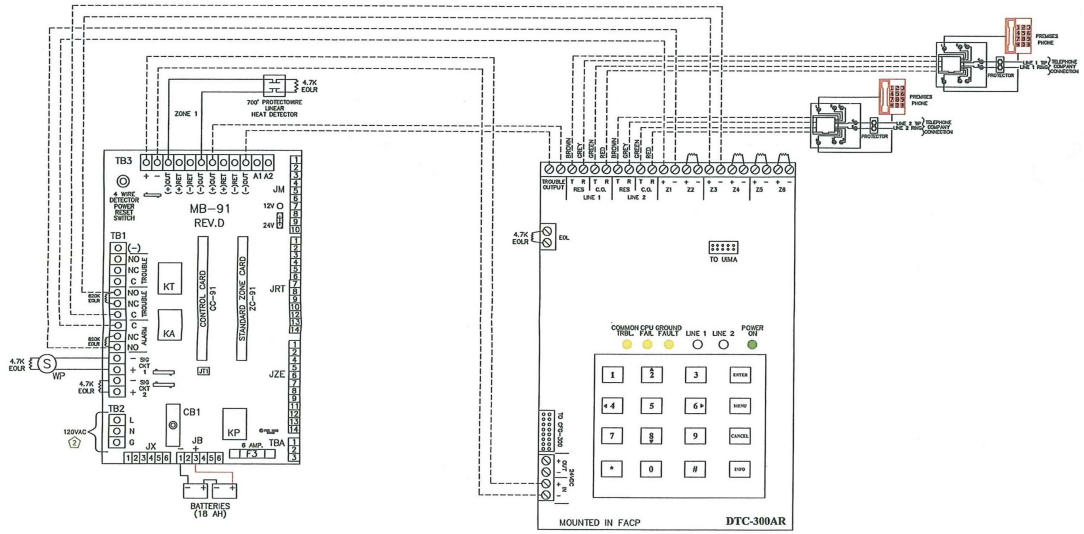
Description

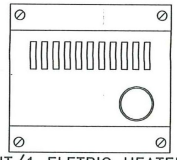
The FireSystem 2000 is a fully supervised, non-coded fire alarm control panel available in multiple zone configurations. The control panels are modular in design and feature individual control modules designed to meet specialized system requirements for commercial, institutional, and light industrial applications. The system is both UL listed and FM approved and conforms to applicable NFPA 72 requirements for local and auxiliary protective signaling systems. It may also be used as part of a proprietary fire alarm system or, when properly configured, is capable of sprinkler supervisory service, water flow alarm, preaction sprinkler or deluge system release.

The basic 2-wire system control panel and its associated power supply provide the following standard features: two supervised detection circuits, which may be field wired for either Class A (Style D) or Class B (Style B); two supervised Class B (Styles W & Y) audible signal circuits; battery charger and monitor; ground fault detection; lamp test; one set of SPDT common alarm contacts, and two sets of SPDT common trouble contacts.

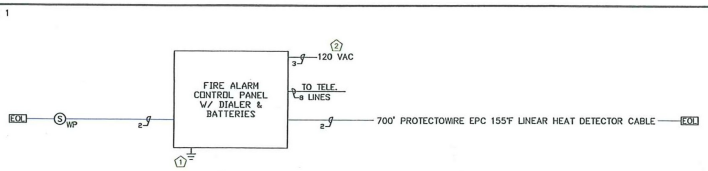
UL LISTED FM APPROVED

AN ISO 9001 REGISTERED COMPANY





HT/1 ELETRIC HEATER
MOUNTED IN FACP (PRE WIRED)



NOTICE

Ground terminal must be connected to Earth Ground per Article 760 of the National Electric Code. Failure to make a proper Earth Ground connection to a metal cold water pipe or a driven Ground Rod to this terminal will result in loss of Lightning protection, reduce the tolerance of the system to transients and will adversely affect its operation. Panel Neutral or Conduit Ground is not acceptable.
Minimum Wire Size: 12 AWG

WARNING

THE INSTALLING CONTRACTOR IS RESPONSIBLE FOR THE WIRING OF ALL DEVICES, THE WIRE TYPE AND THAT ALL WIRE SIZES MEET STATE AND LOCAL CODE REQUIREMENTS. THE INSTALLING CONTRACTOR IS ALSO RESPONSIBLE THAT THE INSTALLATION IS FREE OF ALL DEFECTS.

WIRING SPECIFICATIONS

ZONE/LOOP– 16 AWG MIN 12AWG MAX.
STROBE CKTS– 16AWG MIN 12AWG MAX

POWER LIMITED AND NONPOWER LIMITED CABLE CAN NOT BE RUN THROUGH THE SAME RACEWAY.

NOTES

1. Must be grounded to a driven ground rod or the cold water pipe on the street side of the main shut off valve.
2. No AC voltage on any terminal other than those specified.

GENERAL NOTES

1. ALL Fire Alarm System wiring shall comply with the National Electrical Code, Applicable State and Local Fire and Safety Codes, as well as being coordinated with the Local Authority Having Jurisdiction.
2. CAUTION: DO NOT connect any power to control panel (batteries or 120 vac) until all other field wiring is tested and connected.
3. DO NOT install F.A.C.P. or smoke detectors in any unheated area.
4. DO NOT install any A.C. current carrying conductors close to or in the same raceway with fire alarm system conductors.
5. Dotted lines indicate factory wiring. Solid lines indicate connections to be made by the installer.
6. See Installation Manual for additional wiring instructions.
7. Indicating circuit outputs are 2 amps @ 24 VDC per circuit
8. Cabinet Dimensions LTI/4
   L 34.0000" W 24.0000" D 6.9000"

SPECIAL FUNCTIONS

All Wiring To Be Class B.
Protectowire Linear Heat Detection Cable indicated in Feet. Cable Detects Heat Anywhere Along Its Length.
700FT Total of EPC 155'F Cable.

See Application Manual For Proper Installation of Protectowire Linear Heat Detection Cable.

QTY	LEGEND
1	(S) Strobe
	WP Weatherproof
	⏚ Ground

SIGNAL CIRCUITS

CKT. #	TOTAL LOAD
SIG CKT 1	0.3200
SIG CKT 2	SPARE

WIRE SIZE TO BE DETERMINED BY INSTALLING CONTRACTOR IN IN FIELD. ALL SYSTEM WIRING SHALL BE 16AWG MIN. AND 12AWG MAX.

PPM Properly Protection Monitoring Incorporated
1-877-794-3344
Lowell, MA 01854-3126
24 Hour UL Listed Signal Monitoring

MFA Mammoth Fire Alarms Incorporated
1-800-995-8808
Lowell, MA 01854-3126

Scale: None	Approved By:	Drawn By: MAD
Date: 8/4/09	Dave 8/6/09	Revised:

Worrel Covered Bridge
North Side Rt. 103 Rockingham, Vt. 05101

Volts-Up Electric Service Inc.
47 Firehouse Lane Accutney, Vt. 05030

Drawing No. 168279

WORRALL COVERED BRIDGE

ROCKINGHAM, VT

SHORING, STAGING, AND REHABILITATION PLAN

SEQUENCE OF OPERATIONS

- REMOVAL OF SIDING
- INSTALLATION OF SHORING GIRDERS AND BRIDGE SUPPORT JOISTS
- REMOVAL OF THE NAIL-LAMINATED BRIDGE DECK, FLOOR BEAMS & DISTRIBUTION BEAMS
- INSTALLATION OF THE UNDER-BRIDGE WORK PLATFORM
- INSTALLATION OF THE SHORING COLUMNS AND CAMBERING SHIMS
- INSTALLATION OF THE WIND BLOCKS AND WIND RESTRAINT LINES
- JACK THE BRIDGE APPROXIMATELY 2" OFF PIER AND ABUTMENT. LIMIT END TO END DIFFERENTIAL TO 2" MAX. AND TRANSVERSE DIFFERENTIAL TO ½" MAX.
- REMOVAL OF THE DISTRIBUTION BEAMS
- REMOVAL OF THE ENTIRE LOWER CHORD
  NOTE: RETAIN A MINIMUM OF 1 TRUNNEL AT EACH LATTICE INTERSECTION TO MAINTAIN THE ALIGNMENT OF THE LATTICE MEMBERS.
  NOTE: THE REMOVAL OF THE LOWER CHORD MAY CAUSE LATERAL SWEEP OF THE TRUSS - IF THIS CONDITION OCCURS IT WILL BE REMEDIED BY REALIGNING THE BOTTOM CHORD (SEE BELOW)
- REMOVAL OF ALL INTERMEDIATE LOWER CHORD MEMBERS DESIGNATED FOR REPLACEMENT, ANY INTERMEDIATE LOWER CHORD MEMBERS REQUIRING REMOVAL TO GAIN ACCESS TO THOSE DESIGNATED FOR REPLACEMENT, AND INTERMEDIATE LOWER CHORD MEMBERS AT THE ENDS OF THE BRIDGE TO GAIN ACCESS FOR THE DRILLING OF ANCHORAGES FOR THE SPECIFIED BEARING DEVICES
  NOTE: RETAIN A MINIMUM OF 1 TRUNNEL AT EACH CONNECTION TO MAINTAIN THE ALIGNMENT OF THE MEMBERS.
- JACK THE ENTIRE ROOF OF THE BRIDGE TO GAIN ACCESS TO THE TOP CHORD AND LATTICE MEMBERS. (SEE SHEET 7)
- REMOVAL OF ALL LATTICE MEMBERS DESIGNATED FOR REPLACEMENT.
  NOTE: THE REMOVAL OF LATTICE MEMBERS MAY CAUSE INTERMEDIATE LOWER CHORD MEMBERS OR OTHER LATTICE MEMBERS THAT ARE TO BE RETAINED TO NEED TO BE SUPPORTED BY OTHER MEASURES. IF THIS CONDITION ARISES, TEMPORARILY SUPPORT THE MEMBER BY HANGING IT FROM ABOVE (LATTICE, TOP CHORDS OR BRIDGE SUPPORT JOISTS) UTILIZING RIGGING EQUIPMENT (ROPE/CABLE/CHAIN) RATED FOR 500 POUNDS WITHOUT STRETCHING.
- REMOVAL OF ALL TOP CHORD MEMBERS DESIGNATED FOR REPLACEMENT AND ANY TOP CHORD MEMBERS REQUIRING REMOVAL TO GAIN ACCESS TO THOSE DESIGNATED FOR REPLACEMENT.
  EXCEPTION: A MINIMUM OF ONE PLY (ONE EACH 3" X 11" MEMBER) OF THE TOP CHORD MUST REMAIN IN PLACE AT ALL TIMES AND AT ALL LOCATIONS WITH A MINIMUM OF ONE TRUNNEL AT EACH CONNECTION. THIS MAY REQUIRE THE TOP CHORD TO HAVE TO BE REHABILITATED IN TWO PHASES (EXTERIOR AND INTERIOR).
- INSTALLATION OF NEW TRUSS MEMBERS AS SPECIFIED. TOP CHORD AND LATTICE MEMBERS WILL BE REPLACED PRIOR TO BOTTOM CHORD MEMBERS.
- REALIGNMENT OF THE TOP CHORD. UTILIZE THE SHORING GIRDERS TO PUSH/PULL THE TOP CHORD AS NECESSARY TO STRAIGHTEN.
- LOWER THE ROOF ONTO THE REHABILITATED TRUSSES AND RECONNECT. (SEE SHEET 7))
- REALIGNMENT OF THE BOTTOM CHORD (SEE SHEET 8) AND INSTALLATION OF THE BOTTOM LATERAL BRACING AND FIVE (5) ASSOCIATED FLOOR BEAMS.
- INSTALLATION OF THE NEW DISTRIBUTION BEAMS, LOWER THE BRIDGE AND FASTEN TO BEARING DEVICES. WHILE JACKING DOWN THE BRIDGE, LIMIT END TO END DIFFERENTIAL TO 2" MAX. AND TRANSVERSE DIFFERENTIAL TO ½" MAX
- INSTALLATION OF THE REMAINING FLOOR BEAMS, NAIL-LAMINATED BRIDGE DECK, AND SIDING.
- APPLICATION OF FIRE RETARDANT AND INSECTICIDE/FUNGICIDE
- INSTALLATION OF FIRE DETECTION SYSTEM
- REMOVE THE UNDER-BRIDGE WORK PLATFORM AND ALL SHORING MATERIALS.

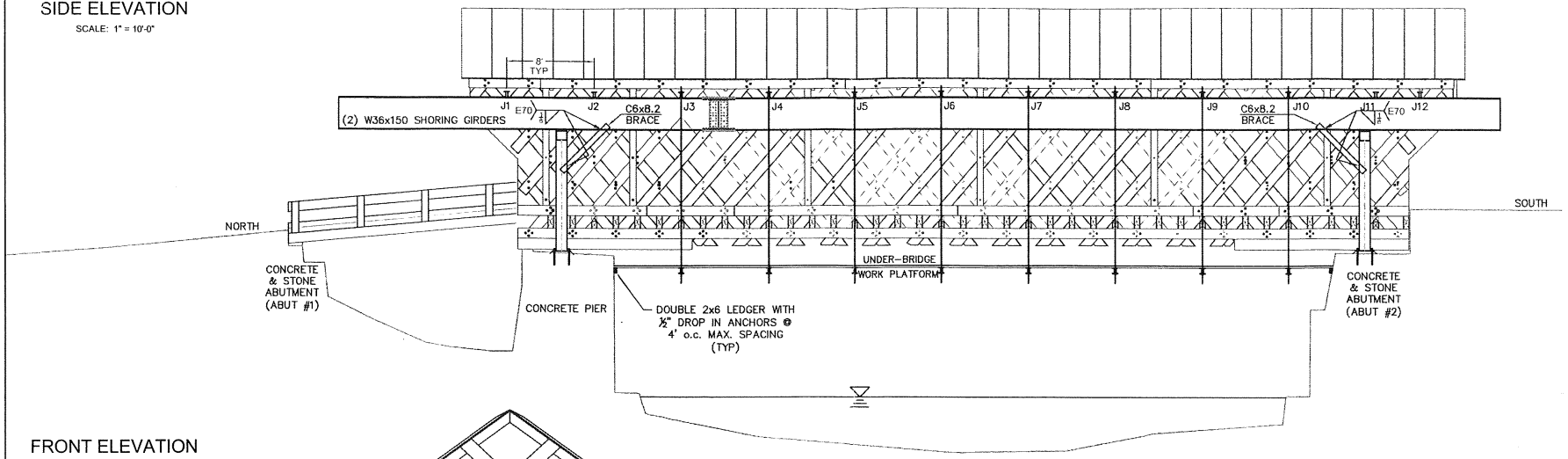
DESIGNED BY _____ CHECKED BY _____ DRAFTED BY _____

WORRALL COVERED BRIDGE (BRIDGE #40) WILLIAMS ROAD	
SHORING, STAGING & REHABILITATION PLAN	
TITLE SHEET	
SCALE	AS NOTED
DATE	DECEMBER 1, 2009
JOB NUMBER	BHO 1442 (34)
FILE	BR40.dwg
SHEET	1 OF 9
DRAWING NUMBER	TS-1

DANIELS CONSTRUCTION
ASCUTNEY, VT 05030

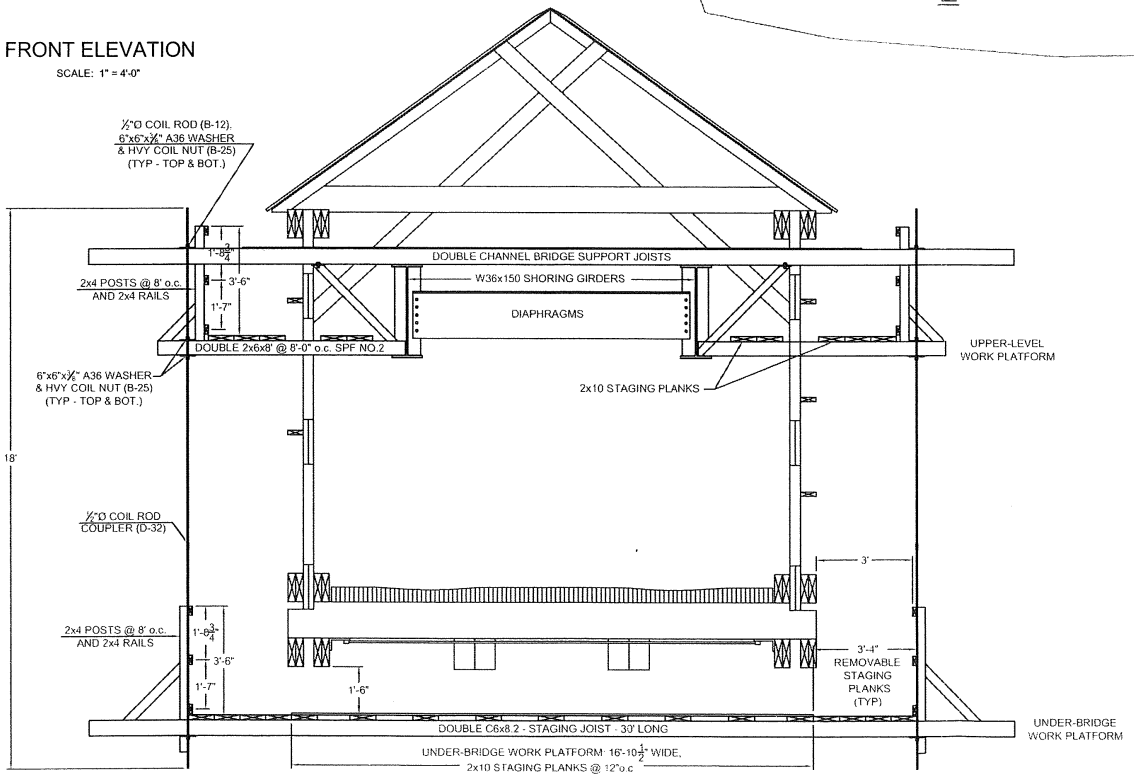
SIDE ELEVATION

SCALE: 1" = 10'-0"



FRONT ELEVATION

SCALE: 1" = 4'-0"



WORK PLATFORM

NOTES

- THE OUTERMOST 3'-4" OF THE UNDER-BRIDGE WORK PLATFORM AND THE EXTERIOR PORTION OF THE UPPER-LEVEL WORK PLATFORM SHALL BE REMOVED DURING ALL WINTER SHUT-DOWNS AND AT THE END OF ALL WORK DAYS WHEN ANY SNOW ACCUMULATION OF 6" OR MORE IS FORECASTED.
- REINFORCED POLY SHEETING MAY BE UTILIZED TO EXTEND THE EXISTING ROOF LINE OUT OVER THE WORK PLATFORMS IN ORDER TO WORK IN RAIN OR SNOW CONDITIONS. THE PITCH OF THE SHEETING SHALL BE 12:12 MINIMUM.
- WORK PLATFORMS ARE DESIGNED WITH THE REQUIRED OSHA SAFETY FACTOR OF 4.0 FOR RIGID WORK PLATFORMS.
- WORK PLATFORMS WERE DESIGNED USING THE OSHA LOADING OF 25.0 PSF.
- THE UNDER-BRIDGE WORK PLATFORM LIVE LOADING SHALL BE LIMITED TO AN 8' WIDE STRIP UNDER EACH TRUSS OF THE BRIDGE.
- LIMIT LOADING OF WORK PLATFORMS (UNDER-BRIDGE & UPPER-LEVEL) TO ONE LEVEL AT A SINGLE TIME AT A GIVEN LOCATION.
- PERSONS ON THE UPPER-LEVEL WORK PLATFORM ON THE INSIDE OF THE COVERED BRIDGE SHALL BE TIED OFF TO THE W36X150 STEEL GIRDER WITH APPROPRIATE FALL PROTECTION.

DRAFTED BY

CHECKED BY

DESIGNED BY

WORRALL COVERED BRIDGE
(BRIDGE #40)
WILLIAMS ROAD

SHORING, STAGING & REHABILITATION PLAN

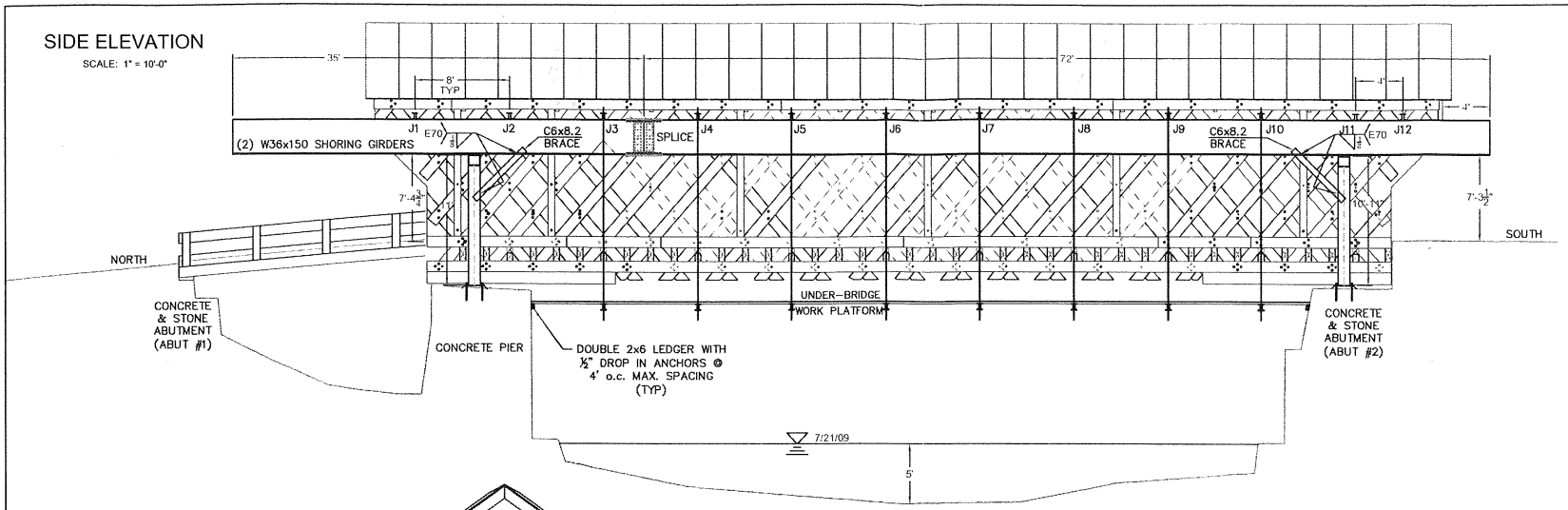
STAGING PLAN

SCALE	AS NOTED
DATE	DECEMBER 1, 2009
JOB NUMBER	BHO 1442 (34)
FILE	BR40.dwg
SHEET	2 OF 9
DRAWING NUMBER	STAGE-1

DANIELS CONSTRUCTION
ASCUTNEY, VT 05030

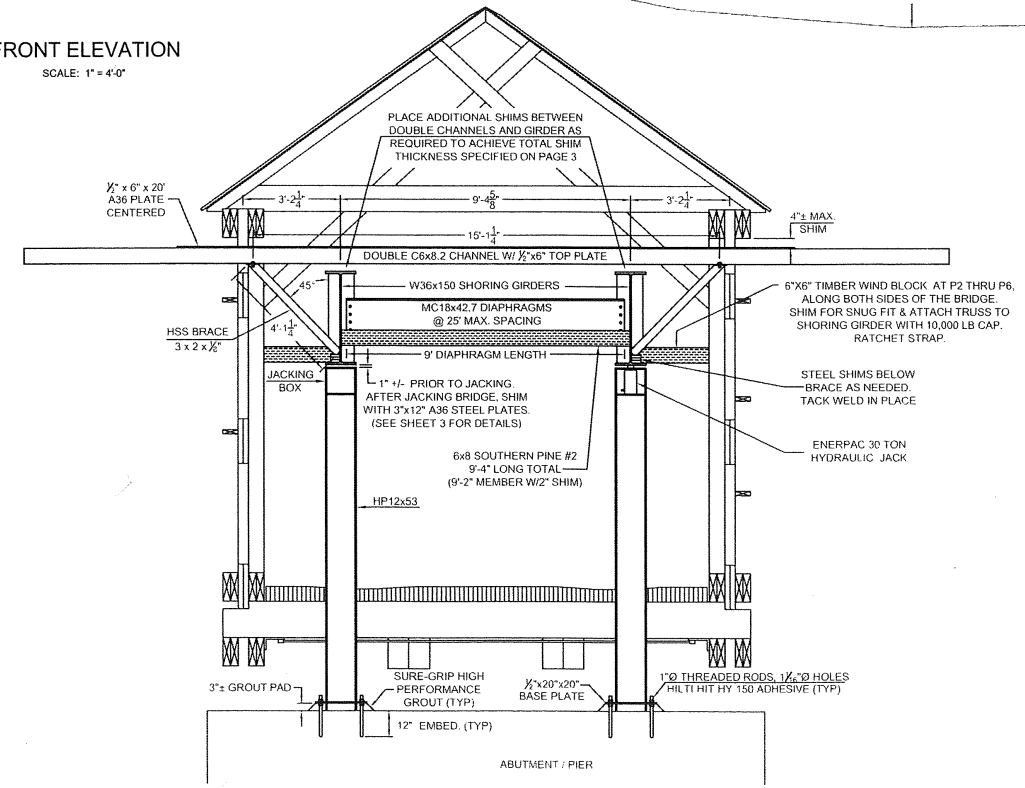
SIDE ELEVATION

SCALE: 1" = 10'-0"



FRONT ELEVATION

SCALE: 1" = 4'-0"



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CHECKED BY

DESIGNED BY

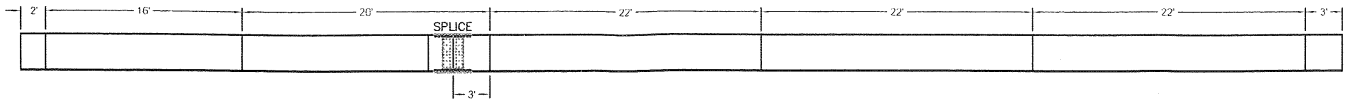
WORRALL COVERED BRIDGE
(BRIDGE #40)
WILLIAMS ROAD

SHORING, STAGING & REHABILITATION PLAN

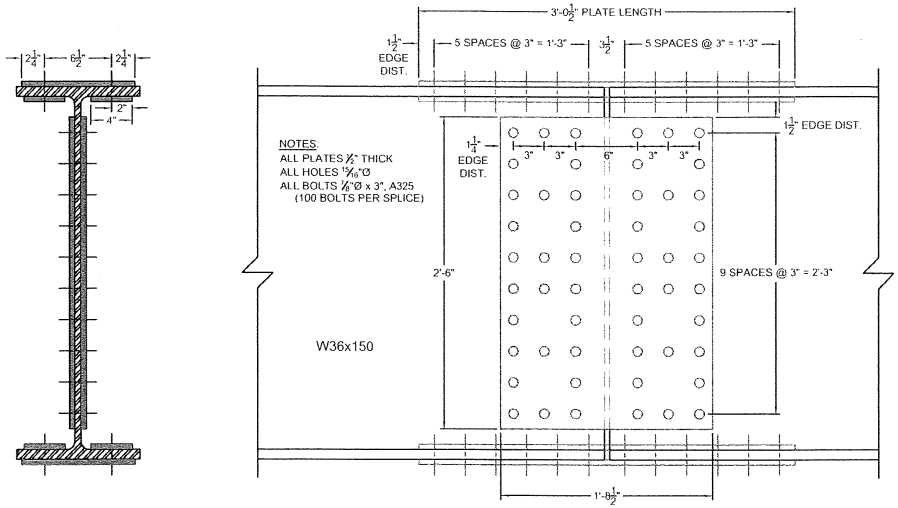
SHORING PLAN

SCALE	AS NOTED
DATE	DECEMBER 1, 2009
JOB NUMBER	BHO 1442 (34)
FILE	BR40.dwg
SHEET	3 OF 9
DRAWING NUMBER	SHORE-1

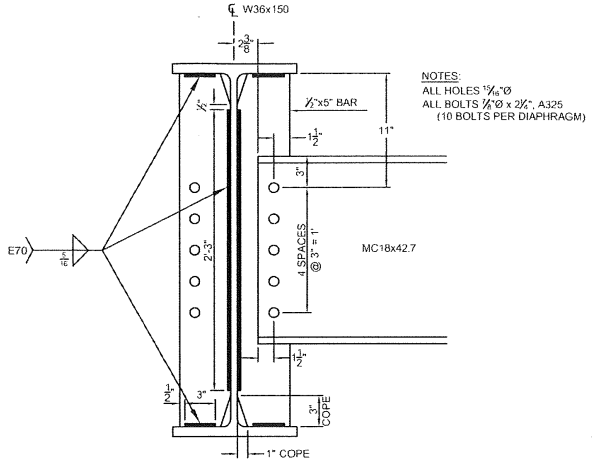
DANIELS CONSTRUCTION
ASCUTNEY, VT 05030



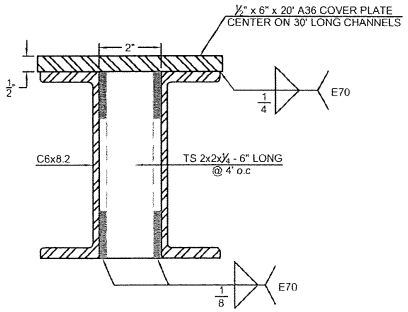
SHORING GIRDER
DIAPHRAGM LOCATIONS
SCALE: 1" = 10'



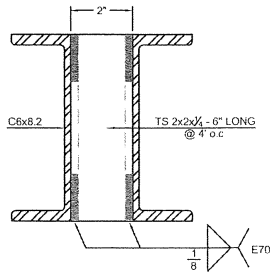
SPLICE PLATE DETAILS
SCALE: 1" = 1'-0"



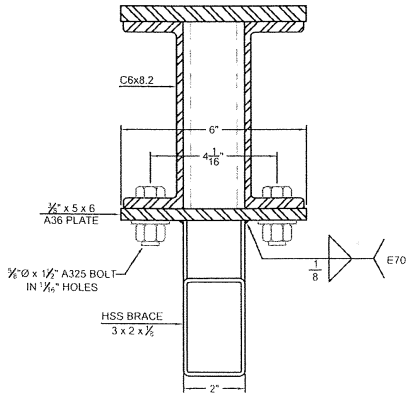
DIAPHRAGM CONNECTION DETAILS
SCALE: 1" = 1'-0"



DOUBLE CHANNEL BRIDGE
SUPPORT JOIST (J1-J12)
SCALE: 1/4" = 1"



DOUBLE CHANNEL
STAGING JOIST
SCALE: 1/4" = 1"



BRACE CONNECTION TO
BRIDGE SUPPORT JOIST
SCALE: 1/4" = 1"

WORRALL COVERED BRIDGE
(BRIDGE #40)
WILLIAMS ROAD

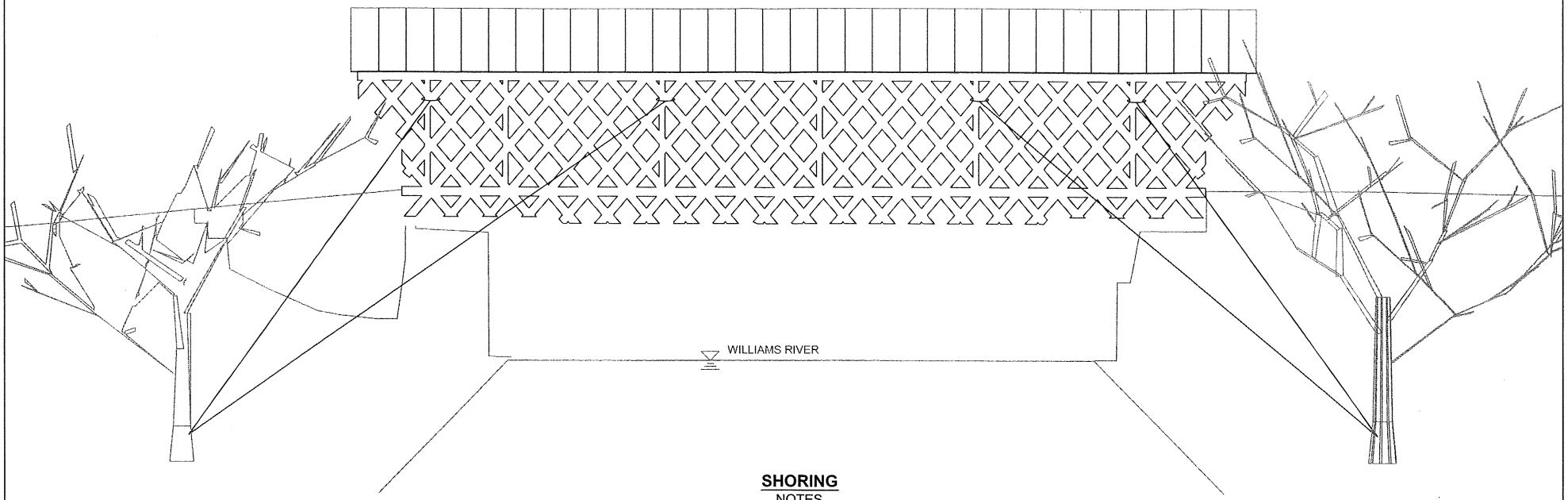
SHORING, STAGING &
REHABILITATION PLAN

SHORING PLAN

SCALE	1" = 1'-0"
DATE	DECEMBER 1, 2009
JOB NUMBER	BHO 1442 (34)
FILE	BR40.dwg
SHEET	4 OF 9
DRAWING NUMBER	SHORE-2

DANIELS CONSTRUCTION
ASCUTNEY, VT 05030

DRAFTED BY
CHECKED BY
DESIGNED BY



SHORING
NOTES

- DURING REHABILITATION OPPERATIONS, THE UPSTREAM AND DOWNSTREAM TRUSSES SHALL BE RESTRAINED AT THIRD POINTS (4 LINES) ALONG THEIR LENGTHS. THIS SHALL BE ACCOMPLISHED BY TIEING THE TRUSSES TO 8"± Ø TREES UPSTREAM AND DOWNSTREAM OF THE STRUCTURE. THE TIE OFF LOCATION ON THE TRUSSES SHALL BE JUST BELOW THE TOP CHORD AND SHALL CAPTURE A LATTICE CONNECTION AND A VERTICAL POST (P_4). THE TIE OFF LOCATION ON THE TREES SHALL BE AS CLOSE TO GROUND LEVEL AS POSSIBLE.
- USE NYLON STRAPS TO CAPTURE THE TRUSSES AND TREES WITH WIRE ROPE CABLES BETWEEN.
- THESE RESTRAINTS MAY BE REMOVED ONCE THE BRIDGE HAS BEEN REHABILITATED, PLUMBED, STRAIGHTENED, AND IS SETTING UPON ITS' BEARINGS.
- ALL RIGGING EQUIPMENT SHALL BE RATED FOR A MINIMUM LOAD CAPACITY OF 4 TONS (8,000 LBS), INCLUDING BUT NOT LIMITED TO; NYLON STAPS, CABLES, CHAINS, AND CLEVIS. COMALONGS, GRIPHOISTS AND LEVER CHAIN HOISTS SHALL BE RIGGED SUCH TO BE CAPABLE OF LIFTING AN 8,000 LB LOAD, BY USING EITHER SINGLE OR MULTIPLE LINES.

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DESIGNED BY

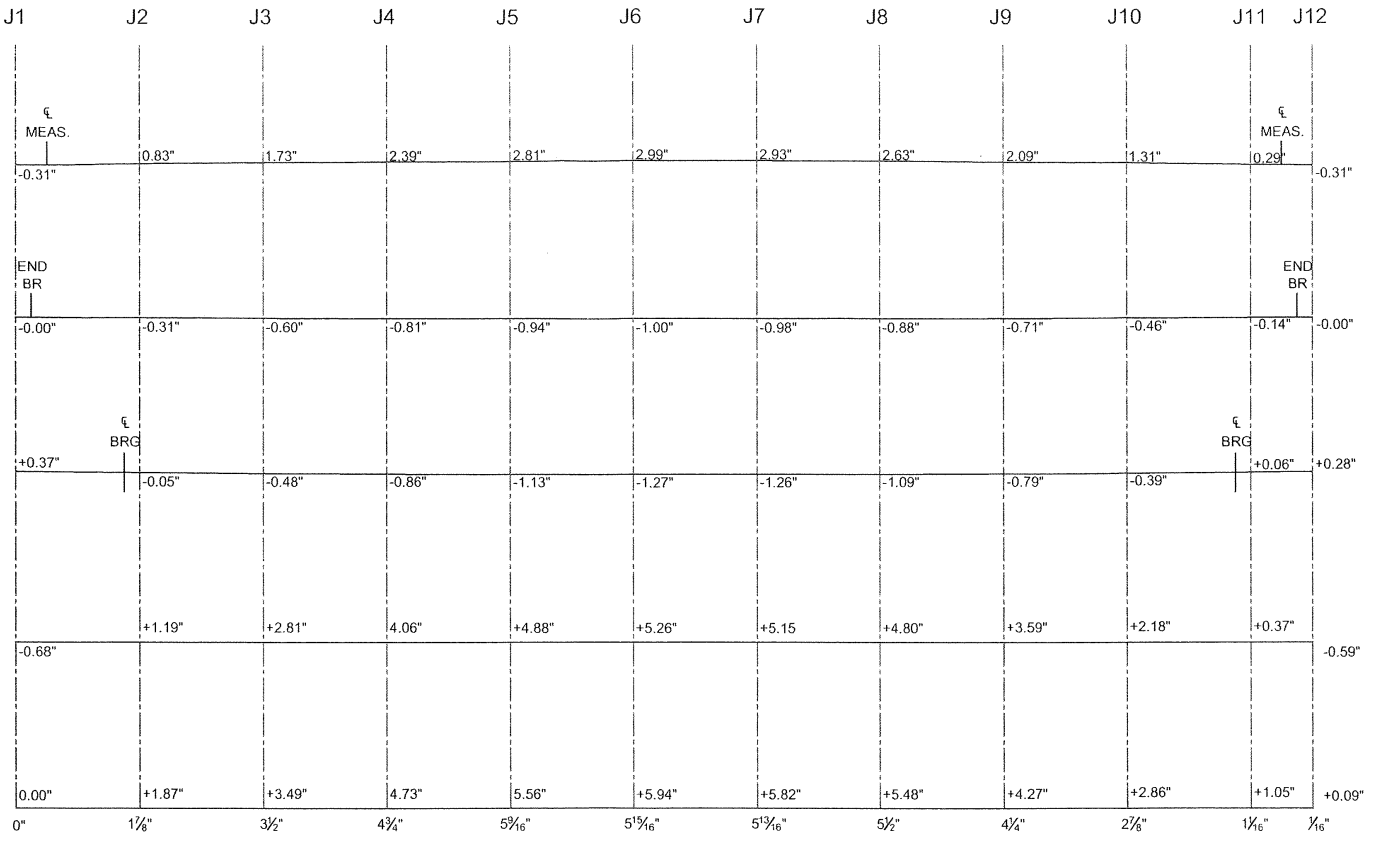
WORRALL COVERED BRIDGE
(BRIDGE #40)
WILLIAMS ROAD

SHORING, STAGING &
REHABILITATION PLAN

SHORING PLAN

SCALE	1" = 10'-0"
DATE	DECEMBER 1, 2009
JOB NUMBER	BHO 1442 (34)
FILE	BR40.dwg
SHEET	5 OF 9
DRAWING NUMBER	SHORE-3

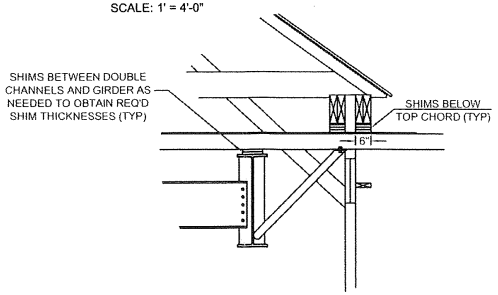
DANIELS CONSTRUCTION
ASCUTNEY, VT 05030



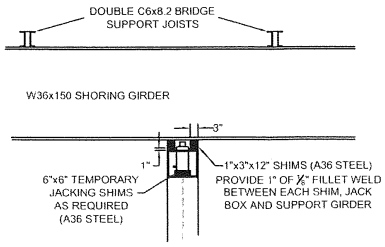
NOTES:

1. CAMBERING OF THE BRIDGE IS TO BE ACHIEVED BY PLACING SUPPORT BEAMS BENEATH THE TOP CHORDS OF THE TRUSSES AT 8 FOOT SPACINGS (SEE SHEET 3) AND PLACING SHIMS BETWEEN THESE SUPPORT BEAMS AND THE TOP CHORD TO ACHIEVE THE DESIRED PROFILE/CAMBER FOR THE BRIDGE.
2. 1 INCH OF DEAD LOAD DEFLECTION IS ANTICIPATED IN THE TIMBER TRUSSES, 1 ⅛ INCHES OF DEFLECTION IS ANTICIPATED IN THE W36x150 SHORING GIRDERS, AND 3 INCHES OF CAMBER CURRENTLY EXISTS.
3. PROVIDE THE SPECIFIED SHIM THICHNESSES AT EACH BRIDGE SUPPORT JOIST BENEATH THE TOP CHORDS OF THE TRUSSES. IF SUFFICIENT SPACE FOR THE SHIMS DOES NOT EXIST BETWEEN BRIDGE SUPPORT JOISTS AND THE TOP CHORDS OF THE TRUSSES, PLACE THE BALANCE OF THE REQUIRED SHIM THICKNESS BETWEEN THE BRIDGE SUPPORT JOIST S AND THE SHORING GIRDERS.
4. PROVIDE 16 SQUARE INCHES OF BEARING (SHIM) AREA BETWEEN THE UNDERSIDE OF TOP CHORD AND BRIDGE SUPPORT JOISTS (PG. 16 OF CALCULATIONS). SHIMS TO BE NO. 2 OAK OR A36 STEEL PLATES.
5. FOR BEARING AREAS BETWEEN THE BRIDGE SUPPORT JOISTS AND THE W36x150 SHORING GIRDERS; PROVIDE 6 SQUARE INCHES OF BEARING AREA FOR A36 STEEL SHIMS, OR 20 SQUARE INCHES OF BEARING AREA FOR NO. 2 OAK SHIMS.
6. ONCE THE SHIMS ARE IN POSSITION, JACK THE BRIDGE, PLACE STEEL BEARING SHIMS BETWEEN THE JACK BOXES AND W36x150 GIRDERS AND TACK-WELD THEM IN PLACE (2 INCHES IF ⅛" FILLET WELD PER SHIM PER LAYER)

CAMBERING SHIM DETAIL
SCALE: 1' = 4'-0"



JACKING SHIM DETAIL
SCALE: 1' = 4'-0"



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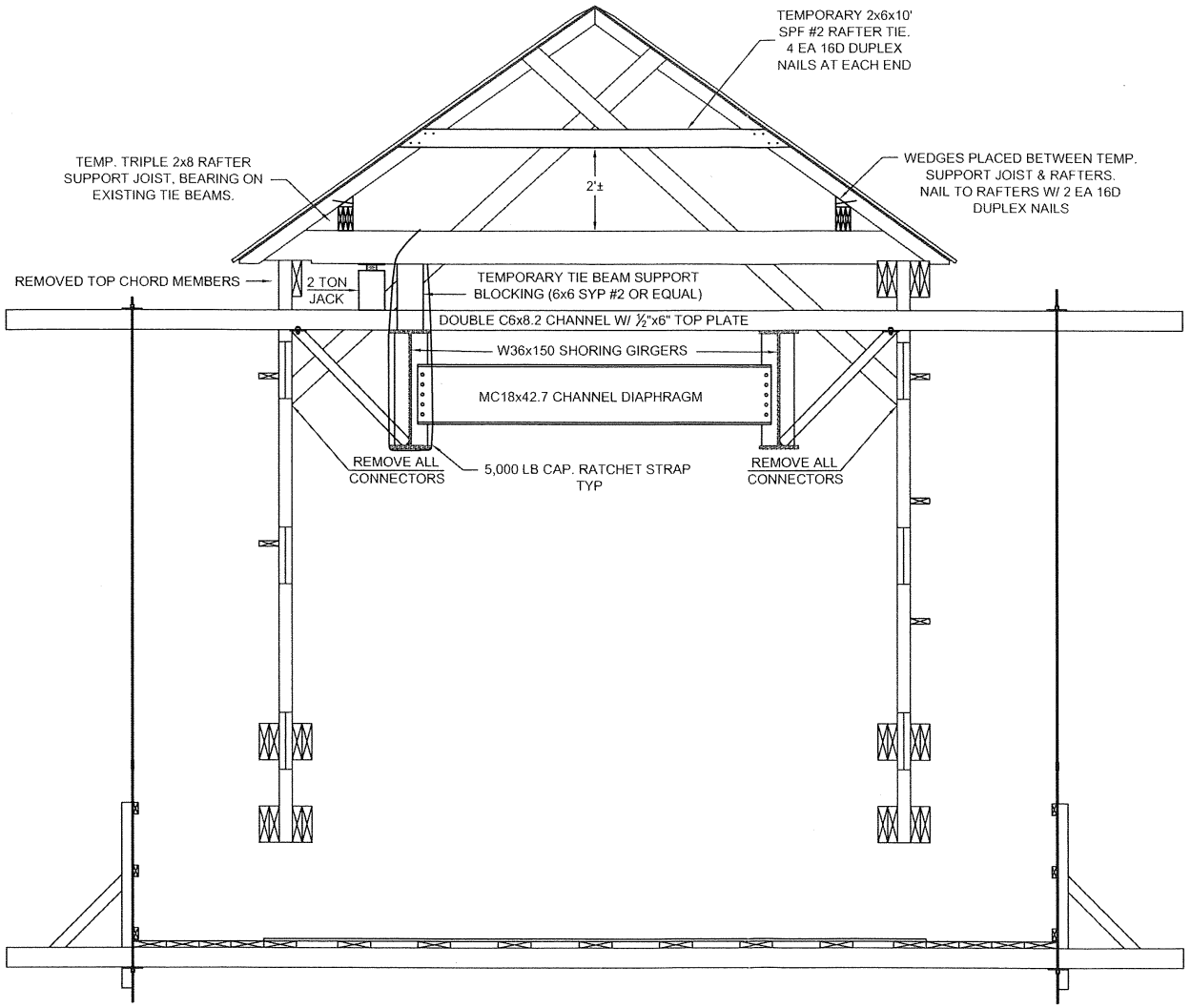
DESIGNED BY

WORRALL COVERED BRIDGE
(BRIDGE #40)
WILLIAMS ROAD

SHORING, STAGING & REHABILITATION PLAN

REHABILITATION PLAN (CAMBER BRIDGE)	
SCALE	N.T.S.
DATE	DECEMBER 1, 2009
JOB NUMBER	BHO 1442 (34)
FILE	BR40.dwg
SHEET	6 OF 9
DRAWING NUMBER	CAMBER-1

DANIELS CONSTRUCTION
ASCUTNEY, VT 05030



THIS BRACING PLAN SHALL BE FOLLOWED PRIOR TO REMOVING ANY TOP CHORD ELEMENT.

NOTES:

1. VERIFY THAT ALL WIND BRACING BLOCKS AND RESTRAINT LINES ARE PROPERLY INSTALLED.
2. INSTALL TRIPLE 2x8 RAFTER SUPPORT JOISTS ABOVE BOTH TRUSS LINES THROUGHOUT THE LENGTH OF THE BRIDGE.
3. INSTALL SHIMS/WEDGES BETWEEN THE RAFTERS AND THE RAFTER SUPPORT JOISTS.
4. INSTALL THE RAFTER COLLAR TIES.
5. INSTALL RATCHET STRAPS AROUND EACH TIE BEAM/GIRDER INTERSECTION - LEAVE APPROXIMATELY 3" OF SLACK.
6. REMOVE THE BOLTS SECURING THE TIE BEAMS TO THE TOP CHORDS.
7. REMOVE ALL FASTENERS CONNECTING THE KNEE BRACES TO THE LATTICE/POSTS.
8. PLACE JACK AS SHOWN AND RAISE THE TIE BEAM APPROX. 2 INCHES, SUCH THAT THE TOP CHORD WILL CLEAR THE SHOULDER OF THE TIE BEAM. LIMIT DIFFERENTIAL JACKING TO ½" BETWEEN ADJACENT TIE BEAMS AND ½" ACROSS EACH TIE BEAM.
9. INSTALL BLOCKING BETWEEN THE TIE BEAM AND THE W36x150 SHORING GIRDER AND REMOVE THE JACK.
10. TIGHTEN RATCHET STRAP.
11. PROCEED TO THE NEXT TIE BEAM LOCATION AND REPEAT STEPS 8-10 ABOVE, OR:
12. UPON COMPLETION OF MEMBER REPLACEMENT, VERIFY STRAIGHTNESS OF TOP CHORD AND CORRECT IF NECESSARY (SEE SHEET 8).
13. SLIGHTLY LOOSEN RATCHET STRAP.
14. JACK TIE BEAM TO REMOVE PRESSURE ON BLOCKING, REMOVE BLOCKING AND LOWER THE TIE BEAM DOWN ONTO THE TOP CHORD. LIMIT DIFFERENTIAL JACKING TO ½" BETWEEN ADJACENT TIE BEAMS AND ½" ACROSS EACH TIE BEAM.
15. RE-INSTALL THE BOLT SECURING THE TIE BEAM TO THE TOP CHORD AND REMOVE THE RATCHET STRAP.
16. PROCEED TO THE NEXT TIE BEAM LOCATION AND REPEAT STEPS 13-15 ABOVE, OR;
17. REMOVE TEMPORARY COLLAR TIES, RAFTER SUPPORT JOISTS AND SHIMS.
18. DO NOT RE-INSTALL THE CONNECTORS FROM THE KNEE BRACES TO THE LATTICE/POSTS - THIS WILL BE PERFORMED AFTER THE BRIDGE HAS BEEN STRAIGHTENED AND PLUMBED (SEE SHEET 9).

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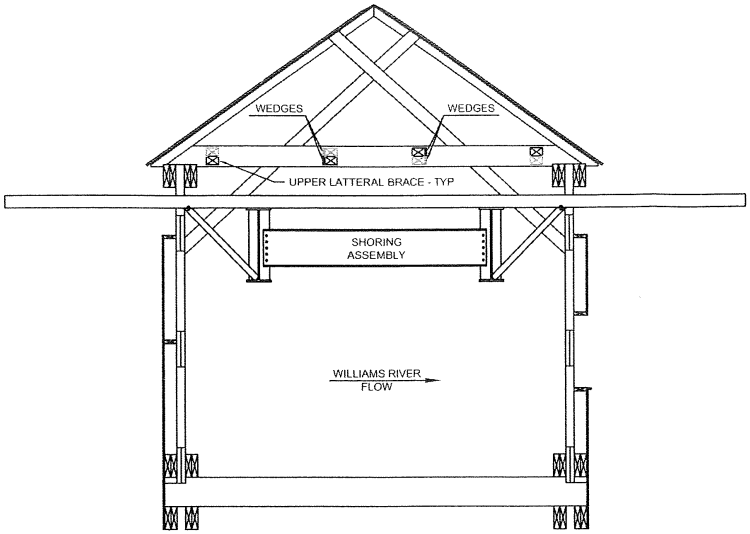
WORRALL COVERED BRIDGE
(BRIDGE #40)
WILLIAMS ROAD

SHORING, STAGING & REHABILITATION PLAN

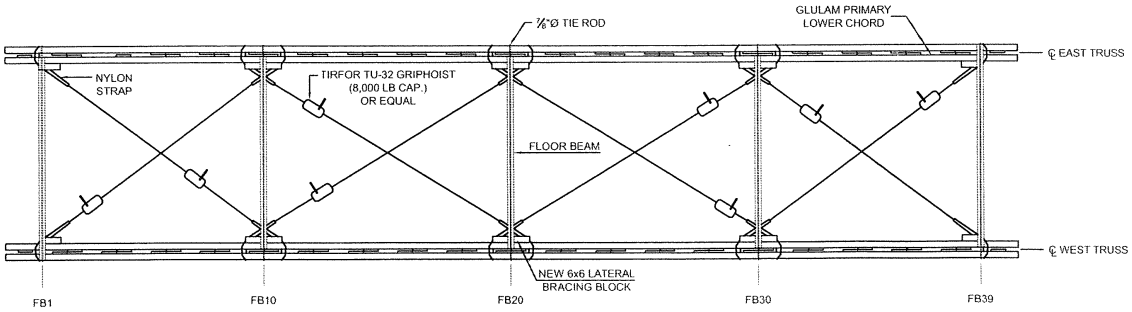
REHABILITATION PLAN (ROOF BRACING)	
SCALE	1" = 3'-0"
DATE	DECEMBER 1, 2009
JOB NUMBER	BHO 1442 (34)
FILE	BR40.dwg
SHEET	7 OF 9
DRAWING NUMBER	ROOF-1

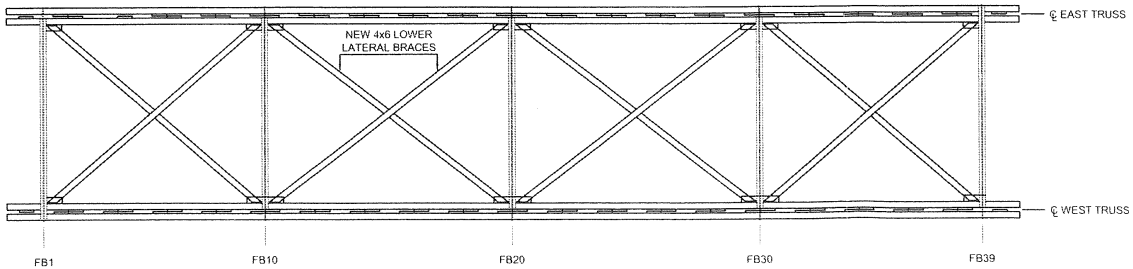
DANIELS CONSTRUCTION
ASCUTNEY, VT 05030

NORTH ELEVATION
SCALE: 1" = 5'-0"



PLAN VIEW
LOWER LATERAL BRACING
SCALE: 1" = 10'-0"





STRAIGHTENING OF TOP CHORD/ROOF STRUCTURE

NOTES:

1. THE EXISTING TOP CHORDS/ROOF STRUCTURE OF THE COVERED BRIDGE HAS A ¾" SWEEP IN THE UPSTREAM DIRECTION (EASTERN FACADE).
2. VAOT HAS SPECIFIED A 2 INCH MAXIMUM ALLOWABLE SWEEP FOR FINAL GEOMETRY.
3. AS THE EXISTING SWEEP IS LESS THAN THE ALLOWABLE SWEEP, NO CORRECTIVE MEASURES WILL BE MADE PRIOR TO THE JACKING OF THE COVERED BRIDGE.
4. DUE TO THE NEED TO SEPARATE THE ROOF STRUCTURE FROM THE TRUSSES (TOP CHORD MEMBER REPLACEMENT), IT IS ANTICIPATED THAT THE TRUSSES (TOP CHORD) MAY SLIGHTLY DEVIATE FROM THEIR EXISTING ALIGNMENT WHILE SEPARATED FROM THE HEAVILY LATERAL BRACED ROOF. THE FOLLOWING PROCEEDURE SHALL BE FOLLOWED PRIOR TO SETTING THE ROOF STRUCTURE DOWN UPON THE REHABILITAED TRUSSES.

PROCEDURE:

1. VERIFY THE ¾" UPSTREAM SWEEP OF THE ROOF STRUCTURE (STRING LINE). IF THERE IS ANY DEVIATIONIN TO THIS ¾" SWEEP NOTIFY THE RESIDENT ENGINEER, AND IF REQUIRED, SUBMIT A REVISED STRAIGHTENING PLAN - SUCH AS ADJUSTING THE WEDGES IN THE UPPER LATERAL BRACING IN/OUT TO CORRECT FOR EXCESS SWEEP.
2. VERIFY THE STRAIGHTNESS OF THE TOP CHORD (STRING LINE) TO CONFIRM THAT THE TOP CHORD WILL SET INTO THE NOTCHES OF THE TIE BEAMS AS THE ROOF STRUCTURE IS LOWERED.
3. IF THE TRUSSES SHIFTED WHILE SEPARATED FROM THE ROOF, PUSH/PULL THE TOP CHORD (UTILIZING THE W36x150 SHORING GIRDERS) TO PRE-REHABILITATION ALIGNMENT SO THAT IT WILL SET INTO THE NOTCHES OF THE TIE BEAMS AS THE ROOF STRUCTURE IS LOWERED. USE NYLON STRAPS TO CAPTURE THE TOP CHORD AND 1 TON COME-A-LONGS TO PULL AS REQUIRED. IF THE CHORD NEEDS TO BE PUSHED OUTWARDS, UTILIZE A PORTA-POWER OR MANUAL SCREW JACK. KEEP PUSH/PULL FORCES HORIZONTAL AND PERPINDICULAR TO THE TRUSSES AND GIRDERS.

STRAIGHTENING OF BOTTOM CHORD

NOTES:

1. WHILE THE TRUSSES ARE BEING REHABILITAED, IT IS ANTICIPATED THAT THE BOTTOM CHORD WILL DEVELOP SOME AMOUNT OF LATERAL SWEEP. THE FOLLOWING PROCEEDURE SHALL BE FOLLOWED TO CORRECT FOR THIS CONDITION.

PROCEDURE:

1. UPON COMPLETION OF TRUSS MEMBER REPLACEMENT, INSTALL FLOOR BEAMS: FB1, FB10, FB20, FB30, AND FB39.
2. INSTALL ALL LOWER LATERAL BRACING BLOCKS AND TIE ROD ASSEMBLIES. WHEN NECESSARY;
   A. USE NYLON STRAPS WRAPPED AROUND LOWER CHORDS IN CONJUNCTION WITH MECHANICAL HOISTS TO PULL CHORDS TOGETHER.
   B. USE A HYDRAULIC PROTA-POWER OR MANUAL SCREW JACK TO SPREAD CHORDS APART.
4. VERIFY THE STRAIGHTNESS OF THE BOTTOM CHORD (STRING LINE). IF THE BOTTOM CHORD HAS A DIFFERENT LATERAL SWEEP THAN THE TOP CHORD, PLACE NYLON STRAPS AT EACH LATERAL BRACING BLOCK LOCATION, AND CONNECT STRAPS TO MECHANICAL HOISTS AS SHOWN.
5. VERIFY THE NYLON STRAPS WILL NOT INTERFEAR WITH THE PROPOSED LATERAL BRACES AND ADJUST STRAPS ACCORDINGLY.
6. TIGHTEN THE MECHANICAL HOISTS TO STRAIGHTEN THE CHORDS AND MATCH THE SWEEP OF THE TOP CHORD.
7. INSTALL THE LATERAL TIMBER BRACES AND REMOVE THE STRAPS AND HOISTS.

GENERAL NOTES

1. ALL RIGGING EQUIPMENT SHALL BE RATED FOR A MINIMUM LOAD CAPACITY OF 4 TONS (8,000 LBS), INCLUDING BUT NOT LIMITED TO; NYLON STAPS, CABLES, CHAINS, AND CLEVIS. COMALONGS, GRIPHOISTS AND LEVER CHAIN HOISTS SHALL BE RIGGED SUCH TO BE CAPABLE OF LIFTING AN 8,000 LB LOAD, BY USING EITHER SINGLE OR MULTIPLE LINES.

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CHECKED BY
DESIGNED BY

WORRALL COVERED BRIDGE
(BRIDGE #40)
WILLIAMS ROAD

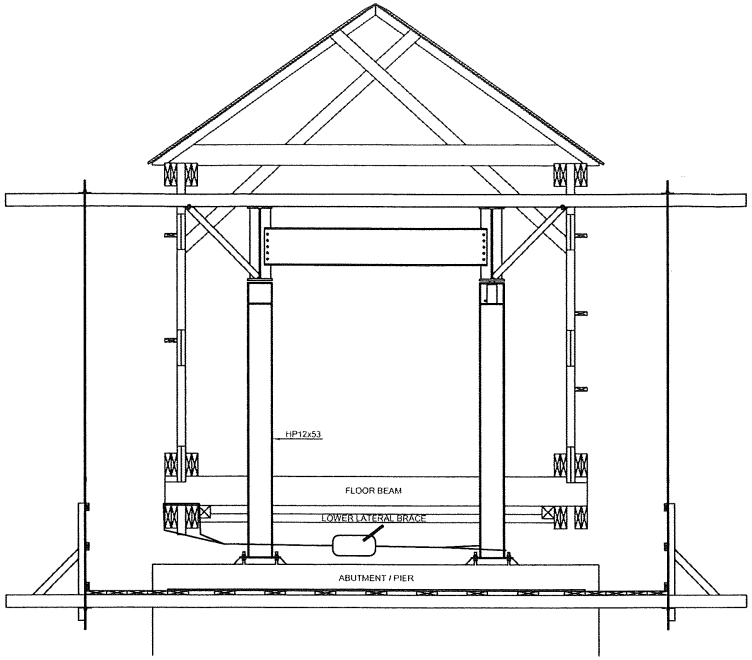
SHORING, STAGING &
REHABILITATION PLAN

REHABILITATION PLAN (STRAIGHTENING)	
SCALE	AS NOTED
DATE	DECEMBER 1, 2009
JOB NUMBER	BHO 1442 (34)
FILE	BR40.dwg
SHEET	8 OF 9
DRAWING NUMBER	STRAIGHT-1

DANIELS CONSTRUCTION
ASCUTNEY, VT 05030

FRONT ELEVATION

SCALE: 1" = 5'-0"



PLUMBING OF TRUSSES

NOTES:

1. THE EXISTING COVERED BRIDGE STRUCTURE HAS AN UPSTREAM RACKING OF APPROXIMATELY ¼".
2. VAOT HAS SPECIFIED A 1 INCH MAXIMUM ALLOWABLE RACKING FOR FINAL GEOMETRY.
3. AS THE EXISTING RACKING IS LESS THAN THE ALLOWABLE RACKING, NO CORRECTIVE MEASURES WILL BE MADE PRIOR TO JACKING THE COVERED BRIDGE.
4. SHOULD THE BRIDGE BE OUT-OF-PLUMB AFTER THE TRUSSES HAVE BEEN REHABILITATED AND STRAIGHTENED, THE FOLLOWING PROCEEDURE SHALL BE FOLLOWED PRIOR TO SETTING THE BRIDGE DOWN UPON ITS' BEARINGS. (AS THE BRIDGE WILL BE JACKED FROM PLUMB (+/-) CONDITION, THE TOP CHORD WILL BE PROPERLY ALIGNED WITH THE ROADWAY AND ONLY THE BOTTOM CHORD WILL REQUIRE CORRECTIVE MEASSURES)

NOTES:

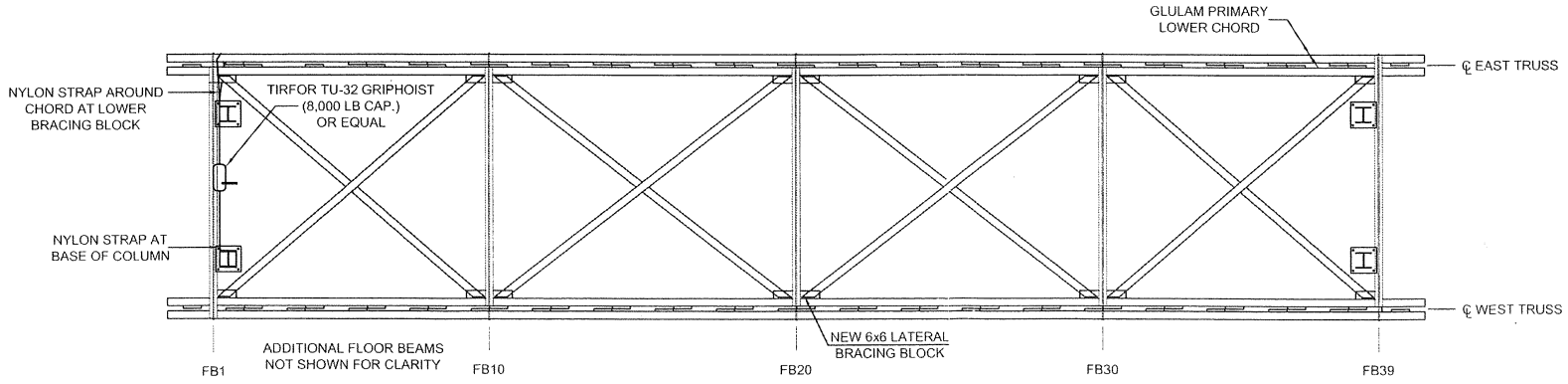
1. AFTER THE TOP & LOWER CHORDS HAVE BEEN REHABILITATED AND STRAIGHTENED AND THE LOWER LATERAL BRACING MEMBERS HAVE BEEN INSTALLED, CHECK THE TRUSSES FOR PLUMB.
2. SHOULD THE TRUSSES BE OUT OF PLUMB, PULL THE LOWER CHORDS FROM THE LOWER LATERAL BRACING BLOCK TO THE HP12X53 SHORING COLUMN, AS SHOWN, UNTIL THE TRUSSES ARE PLUMB.
3. REINSTALL ALL KNEE BRACE CONNECTIONS (REMOVED TO JACK ROOF OFF TRUSSES) AND REMOVE RIGGING EQUIPMENT.

GENERAL NOTES

1. ALL RIGGING EQUIPMENT SHALL BE RATED FOR A MINIMUM LOAD CAPACITY OF 4 TONS (8,000 LBS), INCLUDING BUT NOT LIMITED TO; NYLON STAPS, CABLES, CHAINS, AND CLEVIS. COMALONGS, GRIPHOISTS AND LEVER CHAIN HOISTS SHALL BE RIGGED SUCH TO BE CAPABLE OF LIFTING AN 8,000 LB LOAD, BY USING EITHER SINGLE OR MULTIPLE LINES.

PLAN VIEW

SCALE: 1/8" = 1'-0"



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WORRALL COVERED BRIDGE
(BRIDGE #40)
WILLIAMS ROAD

SHORING, STAGING & REHABILITATION PLAN

REHABILITATION PLAN (PLUMBING)

SCALE	AS NOTED
DATE	DECEMBER 1, 2009
JOB NUMBER	BHO 1442 (34)
FILE	BR40.dwg
SHEET	9 OF 9
DRAWING NUMBER	PLUMB-1

DANIELS CONSTRUCTION
ASCUTNEY, VT 05030

FW: WORRALL COVERED BRIDGE

MATTHEW BELDEN [mbelden@neilhdaniels.com]

Sent: Wednesday, June 30, 2010 2:47 PM

To: Hull, Daniel

Cc: Colby, Butch [butch.colby@state.vt.us]; Mark Thompson [mthompson@neilhdaniels.com]

Attachments: 2010 6-14 Glulam Shops - S~1.pdf (2 MB) ; SK3.pdf (182 KB) ; 2010 2-2 Glulam Design Calcs.pdf (1 MB) ; 2010 3-19 Rev Additional C~1.pdf (1 MB) ; 2010 6-21 Memo.pdf (125 KB)

Dan,

See Mark's comments below...
I do not have a set of shop drawings with an 'Approved Stamp,' all I have are the attached files which we most recently submitted (on June 14th & 21st).

Thanks,

Matthew Belden, EIT
Project Engineer
Daniels Construction
Tele: (802) 674-6323
Fax: (802) 674-5346
Email: MBelden@NeilHDaniels.com

From: Sargent, Mark [mailto:Mark.Sargent@state.vt.us]
Sent: Wednesday, June 30, 2010 7:41 AM
To: 'MATTHEW BELDEN'
Subject: RE: Worrall Covered Bridge

Your good to go Matt. Thanks.

Mark Sargent
Project Manager - Structures
1 National Life Drive
Montpelier, Vt 05633-5001

802-828-6576(Phone)
802-828-3566(Fax)
mark.sargent@state.vt.us

From: MATTHEW BELDEN [mailto:mbelden@neilhdaniels.com]
Sent: Tuesday, June 29, 2010 10:18 AM
To: Sargent, Mark
Cc: Colby, Butch; 'Ron Joy'; 'Hull, Daniel'; 'Mark Thompson'
Subject: Worrall Covered Bridge

Good morning Mark,

Where do we stand with our glulam shop drawing submittal?

Thanks,

Matthew Belden, EIT
Project Engineer

Daniels Construction
Tele: (802) 674-6323
Fax: (802) 674-5346
Email: MBelden@NeilHDaniels.com

From: MATTHEW BELDEN [mailto:mbelden@neilhdaniels.com]
Sent: Monday, June 21, 2010 2:33 PM
To: 'Sargent, Mark'
Cc: 'Colby, Butch'; 'Ron Joy'; 'Hull, Daniel'; 'Mark Thompson'
Subject: FW: Worrall Covered Bridge

Mark,

Attached, please find confirmation that figures SK-1, SK-2 and SK-3 from the design calcs may be disregarded. Please let me know if you require any additional info.

Thank you,

Matthew Belden, EIT
Project Engineer
Daniels Construction
Tele: (802) 674-6323
Fax: (802) 674-5346
Email: MBelden@NeilHDaniels.com

Matt, please review Ron's note below and respond with your intent. Thanks, mark

Mark Sargent
Project Manager - Structures
1 National Life Drive
Montpelier, Vt 05633-5001

802-828-6576(Phone)
802-828-3566(Fax)
mark.sargent@state.vt.us

From: Ron Joy [mailto:rjoy@mjinc.com]
Sent: Wednesday, June 16, 2010 9:06 AM
To: Sargent, Mark
Cc: Darren Benoit
Subject: Worrall

Mark, We noted that dimensions were updated since the last submittal, so it appears that Goodfellow corrected these. Figures SK-1, SK-2 in the DeStafano and Chamberlain design calculations still do not match the shop drawings. However, since DeStafano and Chamberlain stamped shop drawings E-01, E-02 and E-03, we may want to have Daniels confirm that we can disregard Figures SK-1 and SK-2 from the design calculation package. Let me know if additional information is needed. Ron

From: "Sargent, Mark" <Mark.Sargent@state.vt.us>
To: 'Ron Joy' <rjoy@mjinc.com>
Date: 6/15/2010 9:20 AM
Subject: FW: WORRALL COVERED BRIDGE
Attachments: 2010 6-14 Glulam Shops - Submittal 5.pdf; SK3.pdf; 2010 2-2 Glulam Design Calcs.pdf; 2010 3-19 Rev Additional Calcs.pdf

GENERAL STEPS IN GLUING, FABRICATION & TREATMENT

STRUCTURAL GLUED LAMINATED FRAMING:

i. Manufactured as per ANSI/AITC A 190.1 "American National Standard, Structural Glued Timber." and applicable lumber association standards cited therein for grades required to achieve glued-laminated timber requirements for allowable stress, appearance, fabrication limitations and species.

ii. Lumber species for glued laminated members to be Southern Pine (no mixing of species allowed). Glued laminated members to be minium Grade Comination 47 / 16F-V2 (SEE DRAWINGS) or greater, if required by design. Laminating combinations to be determined by the manufacturer, as necessary to meet structural requirements and maintain the geometry indicated. Structural design shall be in accordance with AITC 117 "Standard Specifications for Structural Glued-Laminated Timber of Softwood Species." and certified by APA.

iii. Where stress rated timber is required, minimum stress rating shall be as indicated on the drawings. Timber supplied has been either graded or tested and certified to be in compliance with required stress ratings.

iv. Timber used in Glued-laminated members shall be dried to a maximum 15% moisture content prior to gluing.

v. Adhesives shall be wet-use type, complying with ANSI/AITC A 190.1.

vi. Members fabricated according to the attached fabrication drawings (refer to last 9 pages) and in conjunction with E-01 to E-03.

vii. After fabrication (drilling, cutting...) glued laminated timbers shall receive a treatment of 0.6 Type A Pentachlorophenol as per AWPA Standard C28, Ground contact.

ix. Materials shall be fabricated & treated at Quebec manufacturing facility.

GOODFELLOW DISTRIBUTION INC.

DIVISION GOODLAM

368, Pepsi Road
Manchester, NH 03109
Tel.: 1-800-361-0625
Fax: 1-877-638-8135

ISO 9001:2000
ISO 9001:2000; BS EN ISO 9001:200; ANSI/ASQ Q9001:2000

GLUED-LAMINATED SPECIFICATION

SPECIES:	SOUTHERN PINE
STRESS GRADE:	COMB. 47 // 16F-V2 (SEE DRAWINGS)
CAMBER:	NO CAMBER
LAMINATIONS:	1 3/8"
STANDARDS:	AS PER ANSI/AITC A 190.1, AITC 117 & APA CERTIFIED
APPEARENCE GRADE:	INDUSTRIAL
TREATMENT:	0.6 TYPE A PENTACHLOROPHENOL AS PER AWPA STANDARD C28, GROUND CONTACT
END / SIDE SEALER:	NONE
WRAPING:	BUNDEL WRAPPED

CONNECTING STEEL SPECIFICATION

STEEL CONNECTION SPECIFICATION: CONFORMS TO CSA G40.21M - 300W (MEETS OR EXCEEDS ASTM A36-36)	
FABRICATION AS PER CSA S16:STEEL TYPE 300W	
WELDS AS PER CSA W59:ELECTRODES E480XX	
COATING:	HOT DIPPED GALVANIZED CONNECTIONS AS PER AASHTO M 232M / M232

HARDWARE SPECIFICATION

THREADED RODS (3/4"Ø) : CONFORMS TO ASTM A307	
NUTS (3/4"Ø) : CONFORMS TO ASTM A563	
SHEAR PLATES (4"Ø) : CONFORMS TO ASTM A47 GRADE 32510	
WASHERS (2"Ø) : CONFORMS TO ASTM F844	
COATING:	HOT DIPPED GALVANIZED CONNECTIONS AS PER AASHTO M 232M / M232

FOR RE-APPROVAL - 14/04/2010
FOR RE-APPROVAL - 19/03/2010
FOR RE-APPROVAL - 19/02/2010
FOR APPROVAL - 02/02/2010

(TYP) Recd from Matt B. via Allan Davis on 7/4/10 DK

SCOPE OF WORK FOR PURCHASE ORDER No. 18208

- *MANUFACTURE, SUPPLY AND FABRICATION (HOLES, CUTS ...) OF GLUE LAMINATED TIMBER :*
  - *> DECK PANELS*
  - *> RAILS*
  - *> SPACER BLOCKS*
  - *> STIFFNER BEAMS*
  - *> PRIMARY LOWER CHORDS (BILLETS - NO FABRICATION)*

- *SUPPLY AND FABRICATION (HOLES, CUTS ...) OF HEAVY TIMBER MEMBERS EXCLUDED.*

- *STEEL CONNECTION AND HARDWARE (APPROACH SPAN ONLY) BY GOODFELLOW INC. DOWELS EMBEDDED IN CONCRETE BY OTHERS.*

LIST OF HARDWARE MATERIALS

DESCRIPTION	QTY	DIA	LENGTH	WASHER TYPE @ HEAD	WASHER TYPE @ NUT	NUTS	SHEAR PLATE	TYPE
DECK TO STIFFENER BEAM	24	3/4"Ø	20"	2"Ø C.W.	2"Ø C.W.	2	---	THRD ROD
CURB THRU DECK TO STIFF. BM	8	3/4"Ø	31"	2"Ø C.W.	L6"x4"x3/8"x7.5"	2	7	THRD ROD
CURB TO DECK	48	3/4"Ø	24"	2"Ø C.W.	2"Ø C.W.	2	4	THRD ROD
POST TO CURB	16	3/4"Ø	22"	5.5"x7.5"x1/4" PL	5.5"x7.5"x1/4" PL	2	---	CARRIAGE BOLT
POST TO DECK	16	3/4"Ø	52"	2"Ø C.W.	5.5"x7.5"x1/4" PL	3	---	THRD ROD
POST TO STIFFENER BEAM	8	3/4"Ø	9"	L6"x4"x3/8"x7.5"	2"Ø C.W.	2	---	MACHINE BOLT
RAIL TO POST	16	3/4"Ø	24"	2"Ø C.W.	2"Ø C.W.	2	---	CARRIAGE BOLT

GOODFELLOW DISTRIBUTION INC.

DIVISION GOODLAM

368, Pepsi Road
Manchester, NH 03109
Tel.: 1-800-361-0625
Fax: 1-877-638-8135

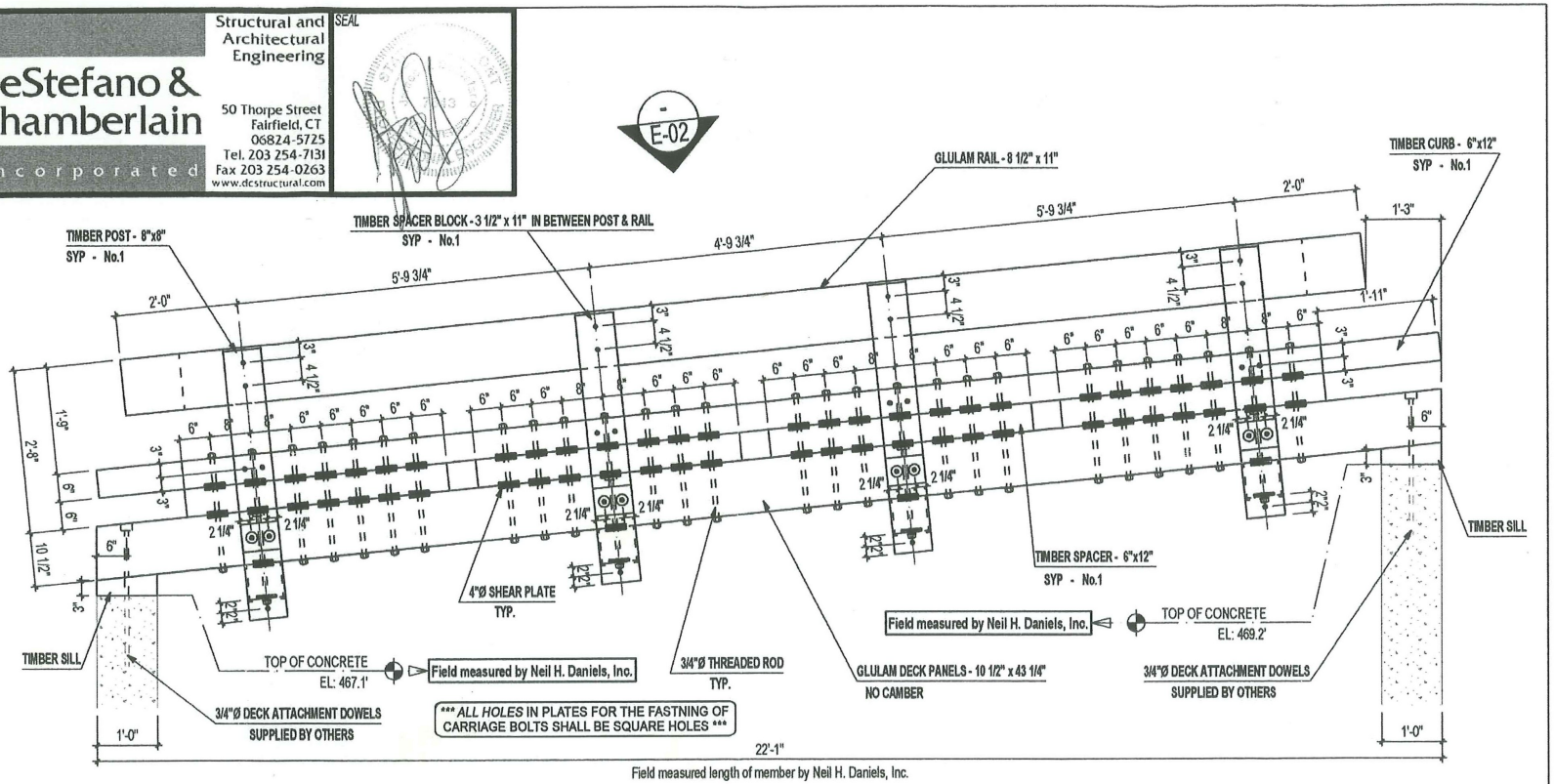
ISO 9001:2000
ISO 9001:2000; BS EN ISO 9001:200; ANSI/ASQ Q9001:2000

FOR RE-APPROVAL - 14/04/2010
FOR RE-APPROVAL - 19/03/2010
FOR RE-APPROVAL - 19/02/2010
FOR APPROVAL - 02/02/2010

Recd 7/5/10 PH

DeStefano & Chamberlain
Incorporated
Structural and Architectural Engineering
50 Thorpe Street
Fairfield, CT
06824-5725
Tel. 203 254-7131
Fax 203 254-0263
www.dcstructural.com

SEAL



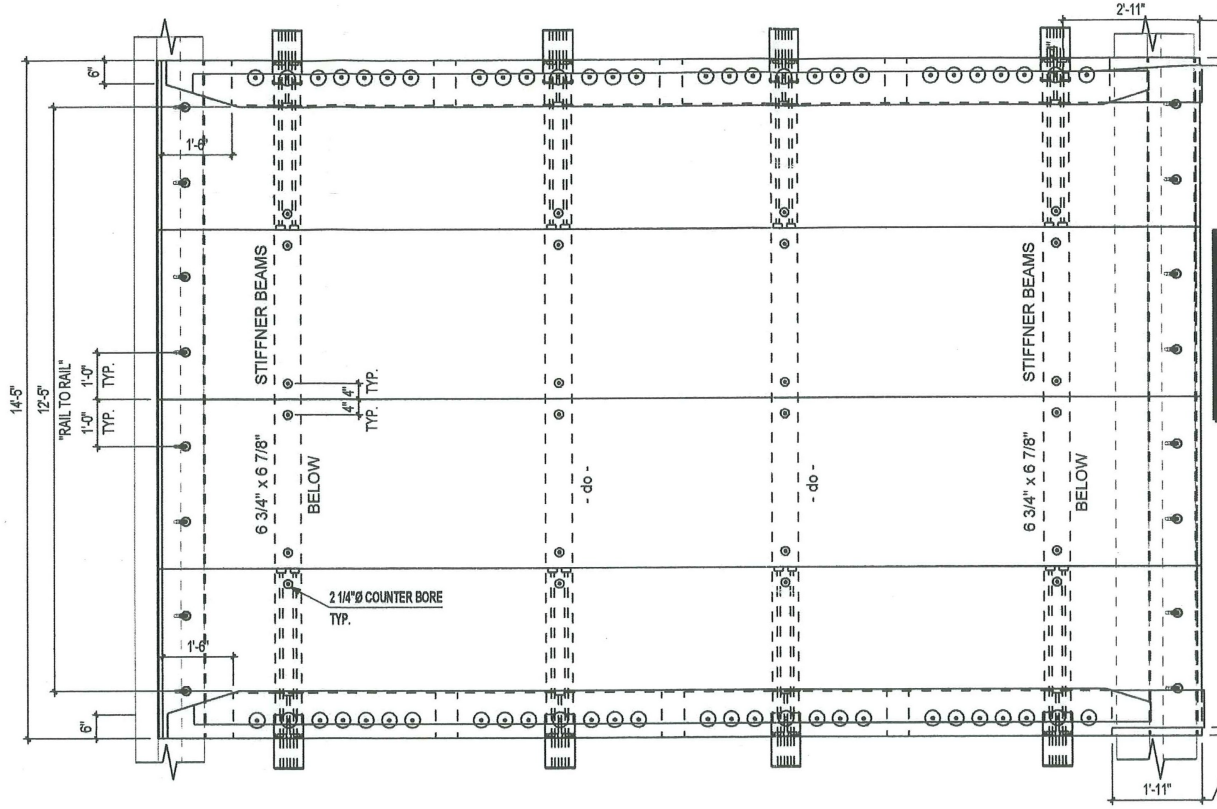
Field measured length of member by Neil H. Daniels, Inc.

THIS DRAWING MUST BE READ IN CONJUNCTION WITH SK-1 TO SK-3 PREPARED BY JAMES B. DeSTEFANO P.E.

E-01

BRIDGE ELEVATION VIEW PRINTED: 13.04.2010		Scale: 1:24	FOR RE-APPROVAL - 14/04/2010 FOR RE-APPROVAL - 19/03/2010 FOR RE-APPROVAL - 19/02/2010 FOR APPROVAL - 02/02/2010	START DATE: 14.01.2010 By: J.M. Checked: R.D.	**Goodfellow Distribution inc.** 368, Pepsi Road Manchester, NH, 03109 Tel.: 1-800-361-0625 Fax : 1-877-638-8135
Projet/Project : Worrall Covered Bridge - Rockingham, VT No.: 2009-190-U // G-65639 Client / Customer: NEIL H. DANIELS, INC.	FABRICATION 26-04-2010	---------- ---------- ---------- ---------- DATE: REVISION			

Rec'd 7/9/10



DeStefano & Chamberlain
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Structural and Architectural Engineering
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Fairfield, CT
06824-5725
Tel. 203 254-7131
Fax 203 254-0263
www.dcstructural.com

SEAL

THIS DRAWING MUST BE READ IN CONJUNCTION WITH SK-1 TO SK-3 PREPARED BY JAMES B. DeSTEFANO P.E.

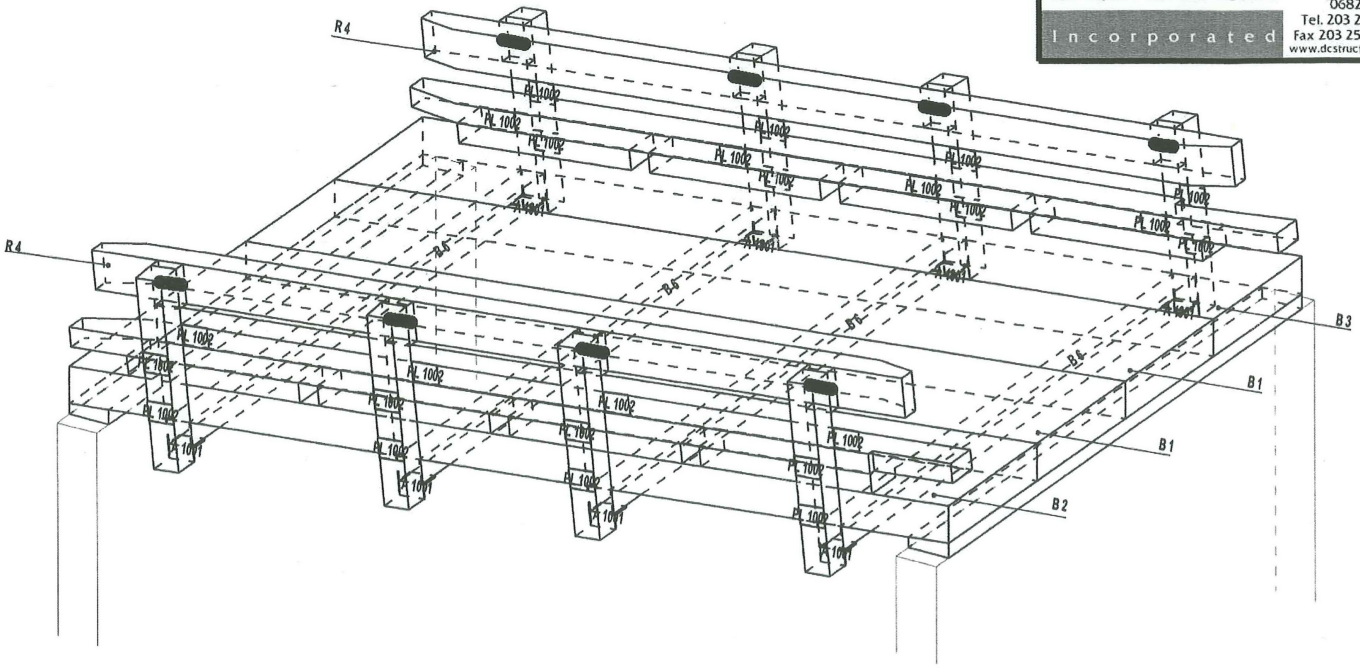
E-02

BRIDGE PLAN VIEW PRINTED: 13.04.2010		Scale: 1:32	FOR RE-APPROVAL - 14/04/2010 FOR RE-APPROVAL - 19/03/2010 FOR RE-APPROVAL - 19/02/2010 FOR APPROVAL - 02/02/2010	START DATE: 14.01.2010 By: Par: J.M. Checked: Vérifier: R.D.	**Goodfellow Distribution inc.** 368, Pepsi Road Manchester, NH, 03109 Tel.: 1-800-361-0625 Fax : 1-877-638-8135
Projet/Project : Worrall Covered Bridge - Rockingham, VT No.: 2009-190-U // G-65639 Client / Customer: NEIL H. DANIELS, INC.	FABRICATION 26-04-2010	---------- ---------- ---------- ---------- DATE: REVISION			

Rec'd 7/9/10 DBA

DeStefano & Chamberlain
Incorporated
Structural and Architectural Engineering
50 Thorpe Street
Fairfield, CT
06824-5725
Tel. 203 254-7131
Fax 203 254-0263
www.dcstructural.com

SEAL



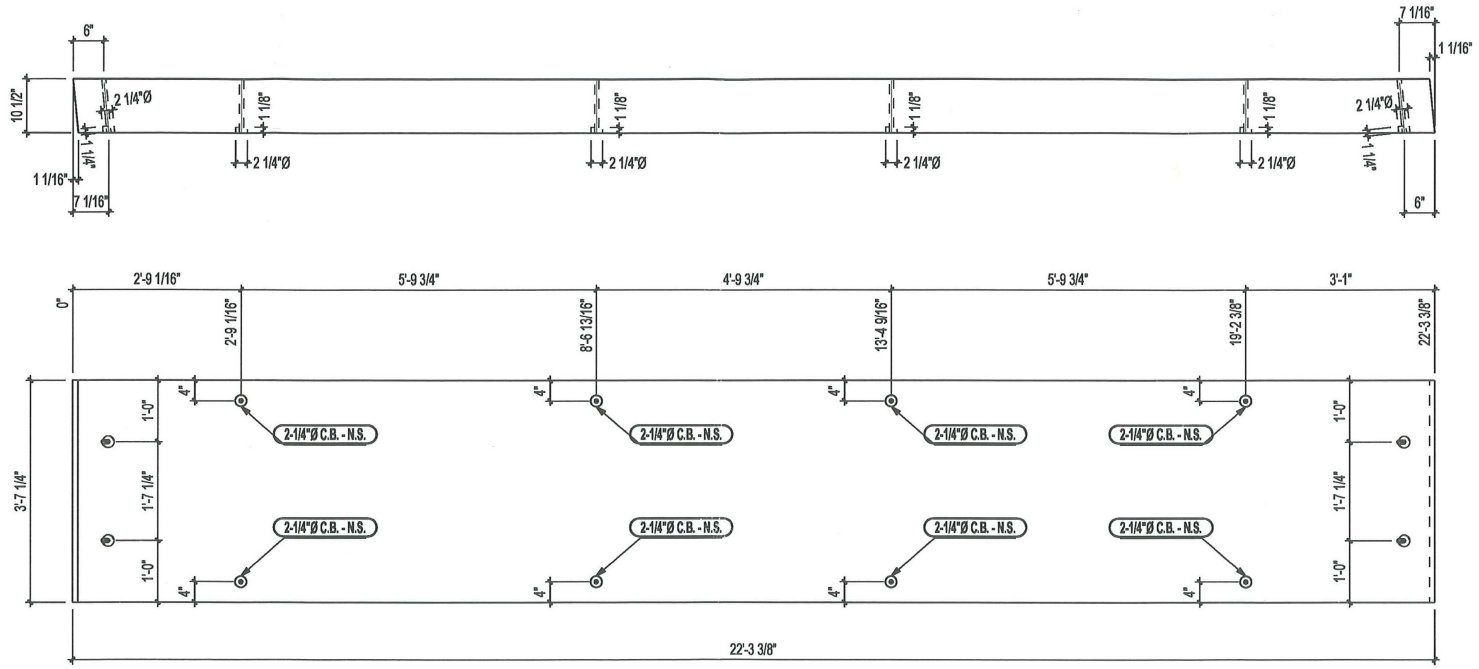
THIS DRAWING MUST BE READ IN CONJUNCTION WITH SK-1 TO SK-3 PREPARED BY JAMES B. DeSTEFANO P.E.

E-03

AXONOMETRIC VIEW PRINTED: 13.04.2010		Scale: 1:32	FOR RE-APPROVAL - 14/04/2010 FOR RE-APPROVAL - 19/03/2010 FOR RE-APPROVAL - 19/02/2010 FOR APPROVAL - 02/02/2010	START DATE: 14.01.2010 Par: J.M. Checked/ Verifier: R.D.	**Goodfellow Distribution inc.** 368, Pepsi Road Manchester, NH, 03109 Tel.: 1-800-361-0625 Fax : 1-877-638-8135
Projet/Project : Worrall Covered Bridge - Rockingham, VT No.: 2009-190-U // G-65639 Client / Customer: NEIL H. DANIELS, INC.	FABRICATION 26-04-2010	---------- ---------- ---------- ---------- DATE: REVISION			

Recd 7/2/10 JBH

TREATMENT AFTER FAB. WITH 0.6 TYPE A PENTACHOLROPHENOL



FOR RE-APPROVAL - 14/04/2010
FOR RE-APPROVAL - 19/03/2010
FOR RE-APPROVAL - 19/02/2010
FOR APPROVAL - 02/02/2010

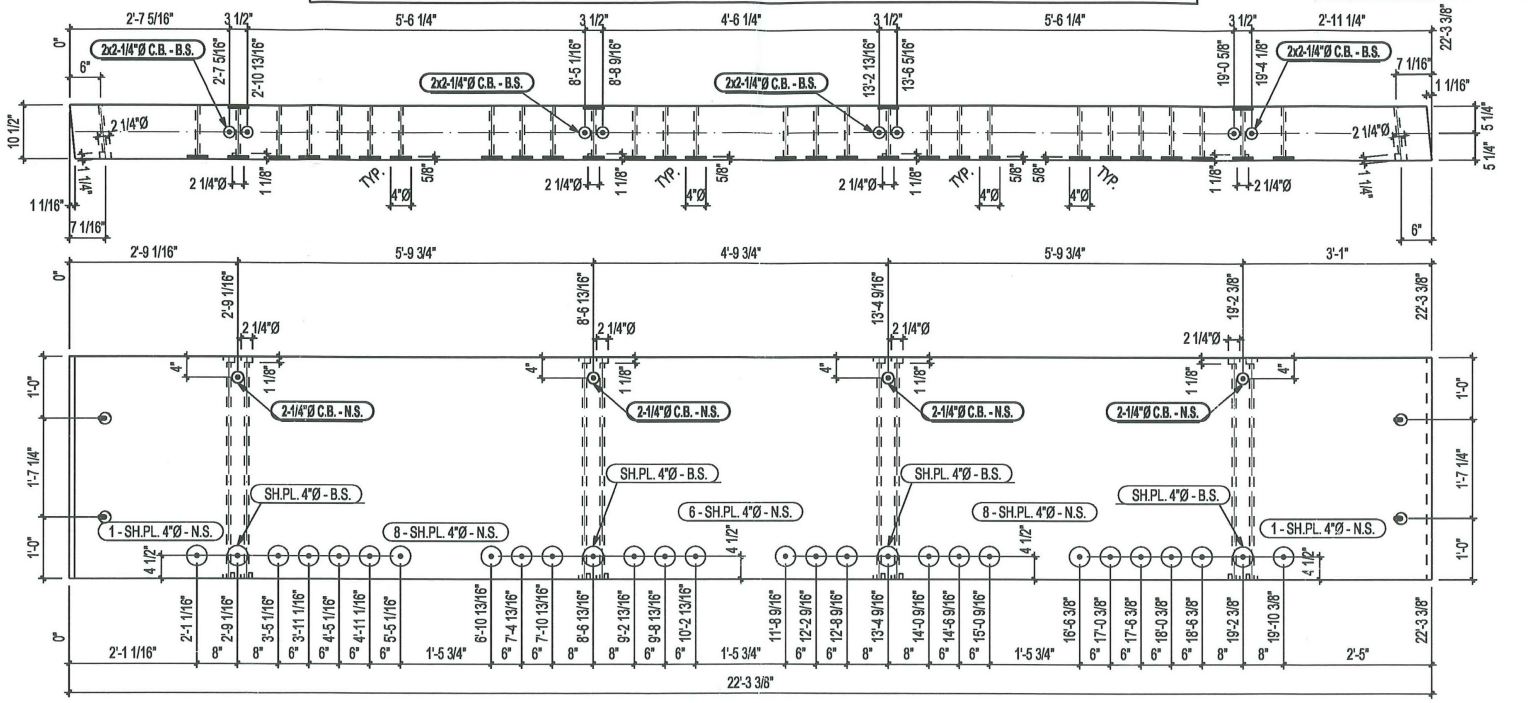
Prod: B1

Deck Panel	PRINTED: 14.06.2010	TROU/HOLE TYP. S.I.C./U.N.O.	21mmØ 13/16"Ø	Qté/Qty: 2	Echelle/Scale: 1:24	14.01.2010	**Goodfellow Distribution inc.**
Projet/Project : Worrall Covered Bridge - Rockingham, VT No.: 2009-190-U // G-65639 Client / Customer: NEIL H. DANIELS, INC.	**FABRICATION** 26/04/2010	---------- ---------- DATE:	---------- ---------- REVISION	Stress Grade: Comb. 47 App. Grade: Industrial	X-section: 10 1/2"/3'-7 1/4" Longueur/Lenght: 22'-3 3/8" Materiel/Material: Southern Pine	By: Par: J.M. Checked: Vérifier: R.D.	368, Pepsi Road Manchester, NH, 03109 Tel.: 1-800-361-0625 Fax : 1-877-638-8135

Recd 7/2/10 RA

TREATMENT AFTER FAB. WITH 0.6 TYPE A PENTACHOLROPHENOL

FINISH 4 SIDES



FINISH 4 SIDES

FOR RE-APPROVAL - 14/04/2010
FOR RE-APPROVAL - 19/03/2010
FOR RE-APPROVAL - 19/02/2010
FOR APPROVAL - 02/02/2010

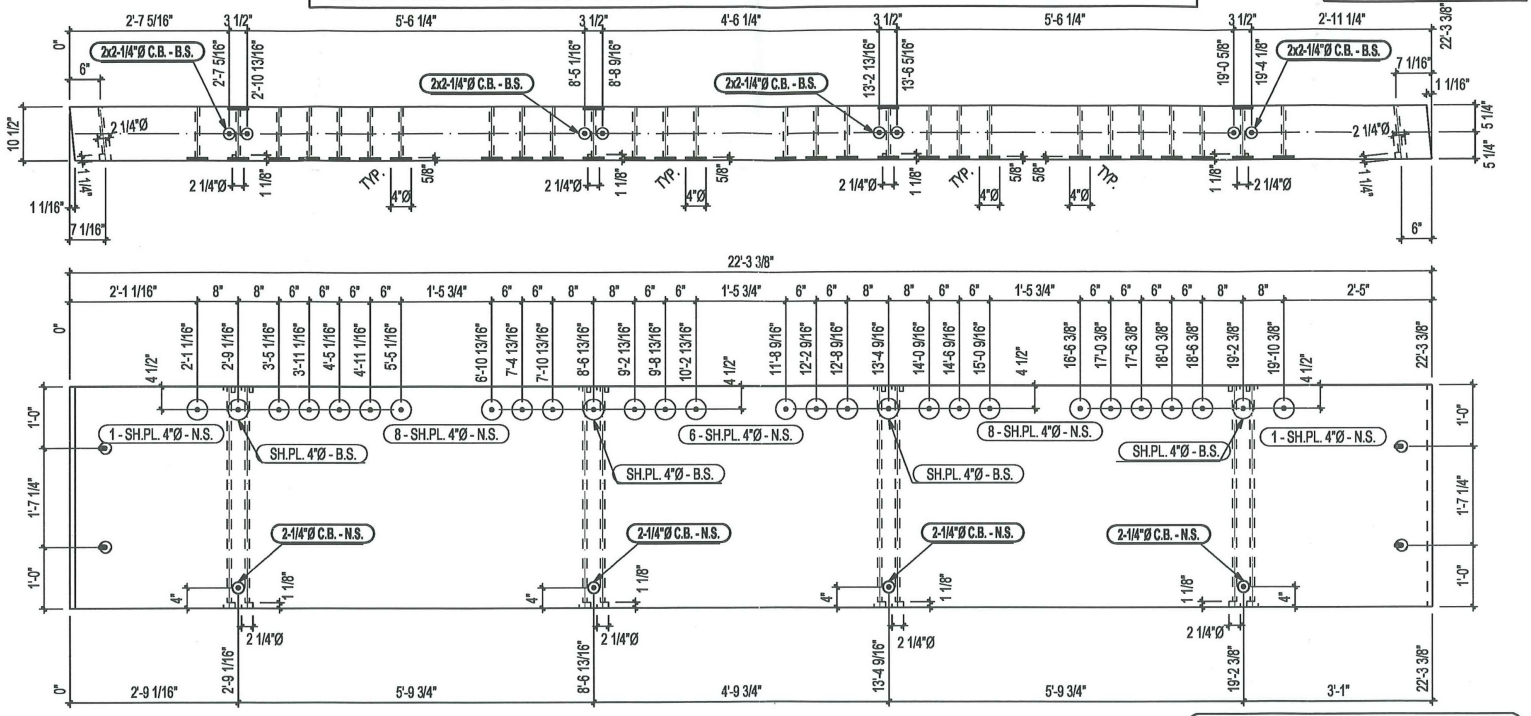
Prod: B2

Deck Panel	PRINTED: 14.06.2010	TROU/HOLE TYP. S.I.C./U.N.O. 21mmØ 13/16"Ø	Qté/Qty: 1	Echelle/Scale: 1:24	14.01.2010	**Goodfellow Distribution inc.**
Projet/Project : Worrall Covered Bridge - Rockingham, VT No.: 2009-190-U // G-65639 Client / Customer: NEIL H. DANIELS, INC.	**FABRICATION** 26/04/2010	---------- ---------- DATE:	---------- ---------- REVISION	Stress Grade: Comb. 47 App. Grade: Industrial	X-section: 10 1/2"/3'-7 1/4" Longueur/Lenght: 22'-3 3/8" Materiel/Material: Southern Pine	By: Par: J.M. Checked: Vérifier: R.D.	368, Pepsi Road Manchester, NH, 03109 Tel.: 1-800-361-0625 Fax : 1-877-638-8135

Recd 7/2/10 MA

TREATMENT AFTER FAB. WITH 0.6 TYPE A PENTACHOLROPHENOL

FINISH 4 SIDES



FINISH 4 SIDES

FOR RE-APPROVAL - 14/04/2010
FOR RE-APPROVAL - 19/03/2010
FOR RE-APPROVAL - 19/02/2010
FOR APPROVAL - 02/02/2010

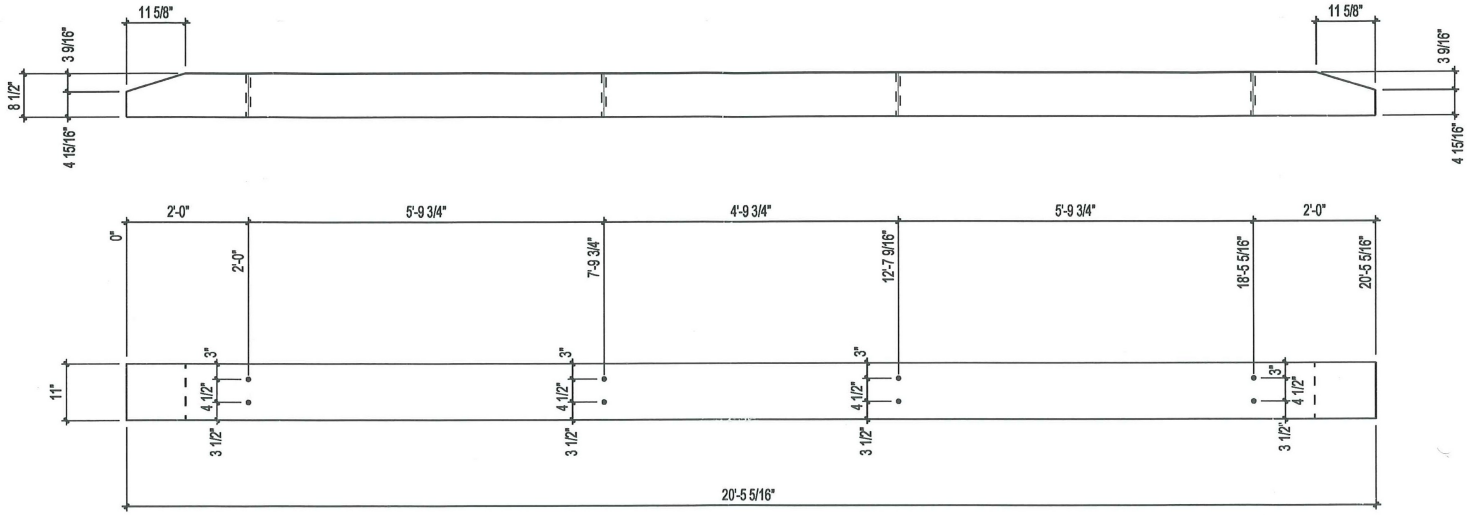
Prod: B3

Deck Panel	PRINTED: 14.06.2010	TROU/HOLE TYP. S.I.C./U.N.O. 21mmØ 13/16"Ø	Qté/Qty: 1	Echelle/Scale: 1:24	14.01.2010	**Goodfellow Distribution inc.**
Projet/Project : Worrall Covered Bridge - Rockingham, VT No.: 2009-190-U // G-65639 Client / Customer: NEIL H. DANIELS, INC.	**FABRICATION** 26/04/2010	---------- ---------- DATE:	---------- ---------- REVISION	Stress Grade: Comb. 47 App. Grade: Industrial	X-section: 10 1/2"/3'-7 1/4" Longueur/Lenght: 22'-3 3/8" Materiel/Material: Southern Pine	By: Par. J.M. Checked: Vérifié: R.D.	368, Pepsi Road Manchester, NH, 03109 Tel.: 1-800-361-0625 Fax : 1-877-638-8135

Recd 9/2/10 MS

TREATMENT AFTER FAB. WITH 0.6 TYPE A PENTACHOLROPHENOL

FINISH 4 SIDES



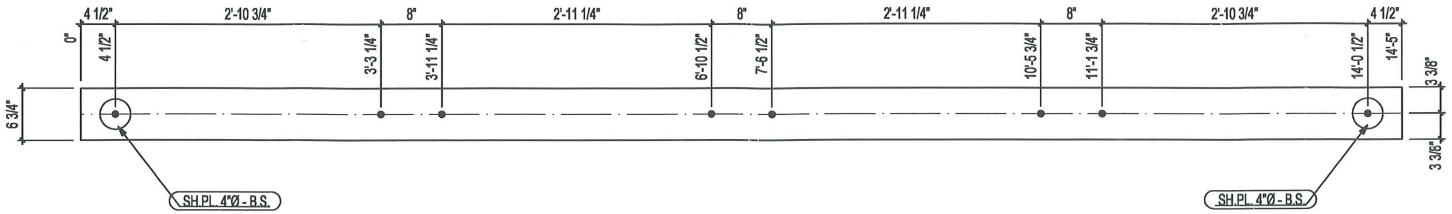
FOR RE-APPROVAL - 14/04/2010
FOR RE-APPROVAL - 19/03/2010
FOR RE-APPROVAL - 19/02/2010
FOR APPROVAL - 02/02/2010

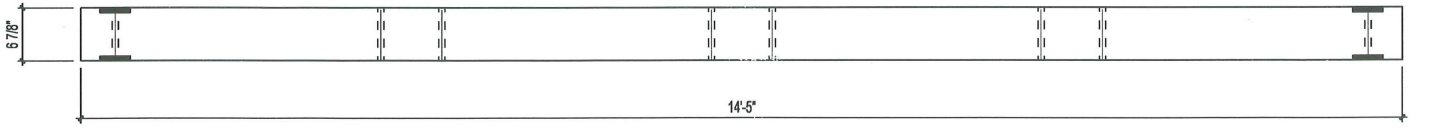
Prod: R4

Rail	PRINTED: 14.06.2010	TROU/HOLE TYP. S.I.C./U.N.O.	21mmØ 13/16"Ø	Qté/Qty: 2	Echelle/Scale: 1:24	14.01.2010	**Goodfellow Distribution inc.**
Projet/Project : Worrall Covered Bridge - Rockingham, VT No.: 2009-190-U // G-65639 Client / Customer: NEIL H. DANIELS, INC.	**FABRICATION** 26/04/2010	---------- ---------- DATE:	---------- ---------- REVISION	Stress Grade: 16F-V2 App. Grade: Industrial	X-section: 8 1/2"/11" Longueur/Lenght: 20'-5 5/16" Materiel/Material: Southern Pine	By: Par: J.M. Checked: Vérifié: R.D.	368, Pepsi Road Manchester, NH, 03109 Tel.: 1-800-361-0625 Fax : 1-877-638-8135

Read 9/2/10

TREATMENT AFTER FAB. WITH 0.6 TYPE A PENTACHOLROPHENOL





FOR RE-APPROVAL - 14/04/2010
FOR RE-APPROVAL - 19/03/2010
FOR RE-APPROVAL - 19/02/2010
FOR APPROVAL - 02/02/2010

Prod: B6

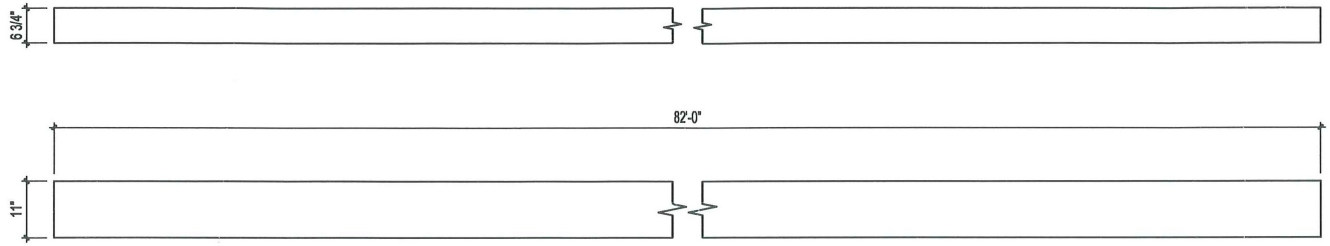
Stiffner Beam	IMPRIMER / PRINTED: 14.06.2010	TROU/HOLE TYP. S.I.C./U.N.O. 21mmØ 13/16"Ø	Qté/Qty: 4	Echelle/Scale: 1:16	14.01.2010	**Goodfellow Distribution inc.**
Projet/Project : Worrall Covered Bridge - Rockingham, VT No.: 2009-190-U // G-65639 Client / Customer: NEIL H. DANIELS, INC.	**FABRICATION** 26/04/2010	---------- ---------- DATE: REVISION	Stress Grade: 16F-V2 App. Grade: Industrial	X-section: 6 3/4"/6 7/8" Longueur/Lenght: 14'-5" Materiel/Material: Southern Pine	By: Par: J.M. Checked: Vérifié: R.D.	388, Pepsi Road Manchester, NH, 03109 Tel.: 1-800-361-0625 Fax : 1-877-638-8135

Bc ok 9/4/10
MA

TREATMENT AFTER FAB. WITH 0.6 TYPE A PENTACHOLROPHENOL

BILLET - NO FABRICATION

NO CAMBER



NOTES:
1. Field measured length of member = 82'-0" (by Neil H. Daniels, Inc.)
2. Materials shall be fabricated & treated at Quebec manufacturing facility.
3. Tunnel holes and Tie Rod holes shall be field drilled in members. Field drilled holes shall be treated in accordance with VAOT Specification 726.04.
4. Applicable Material Certifications shall be provided after fabrication.

FOR RE-APPROVAL - 14/04/2010
FOR RE-APPROVAL - 19/03/2010
FOR RE-APPROVAL - 19/02/2010
FOR APPROVAL - 02/02/2010

Prod: B7

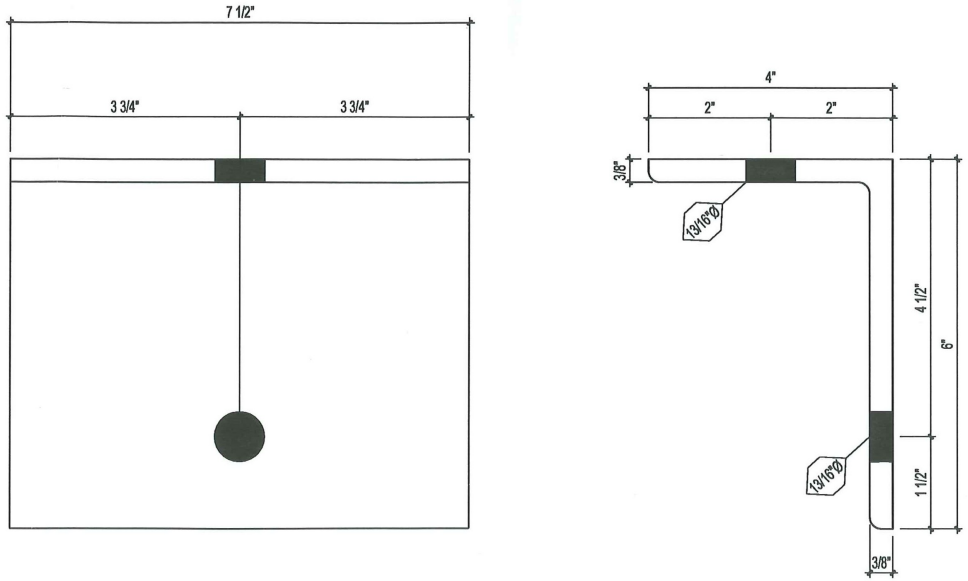
PRIMARY LOWER CHORDS	PRINTED: 14.06.2010		Qté/Qty: 4	Echelle/Scale: 1:24	14.01.2010	**Goodfellow Distribution inc.**	
Projet/Project : Worrall Covered Bridge - Rockingham, VT No.: 2009-190-U // G-65639 Client / Customer: NEIL H. DANIELS, INC.	**FABRICATION** 26-03-2010	---------- ---------- ---------- ---------- DATE: REVISION	Stress Grade: 16F-V2 App. Grade: Industrial	X-section: 6 3/4"/11" Longueur/Lenght: 82'-0" Materiel/Material: Southern Pine	By: Par. J.M. Checked: Vérifier: R.D.	368, Pepsi Road Manchester, NH, 03109	Tel.: 1-800-361-0625 Fax : 1-877-638-8135

Recd 7/5/10

Hot Dipped Galvanized

AS PER AASHTO M 232 M / M232

CUTTING LIST OF PLATES
1 - L 6" x 4" x 3/8" x 7-1/2"



FOR RE-APPROVAL - 14/04/2010
FOR RE-APPROVAL - 19/03/2010
FOR RE-APPROVAL - 19/02/2010
FOR APPROVAL - 02/02/2010

SOUDURE / WELD	TROU/HOLE
1/4" / 6mm 1/4" / 6mm S.I.C./U.N.O.	13/16"Ø 21mmØ S.I.C./U.N.O.

Prod: A1001

Angle

IMPRIMER / PRINTED: 14.06.2010

Qté/Qty: 8

Echelle/Scale: 1:1

DATE: 14.01.2010

Projet/Project : Worrall Covered Bridge - Rockingham, VT
No.: 2009-190-U // G-65639
Client / Customer: NEIL H. DANIELS, INC.

FABRICATION 26/04/2010

REV.#	DATE:	REVISION
#2	----------	----------
#1	----------	----------

SPECIFICATION ACIER/STEEL:
SELON / AS PER; ASTM A36-36
ACIER NUANCE / STEEL GRADE; 44W (300W) CAN/CSA-G-40.21
SOUDURE / WELD; AWD 1.1 : ELECTRODES E60XX

By: Par: J.M.
Checked: Vérifié: R.D.

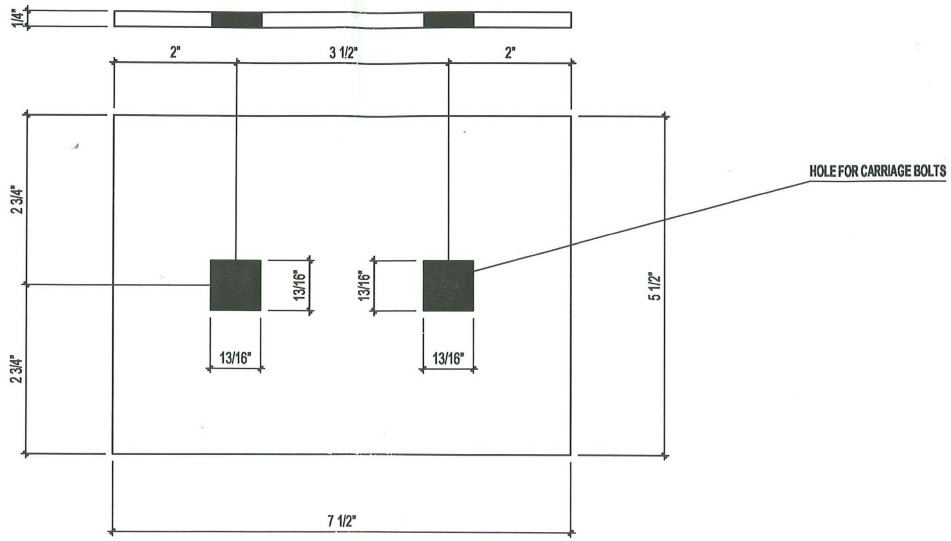
Goodfellow Distribution inc.
368, Pepsi Road
Manchester, NH, 03109
Tel.: 1-800-361-0625
Fax : 1-877-638-8135

Recd 9/21/10 AA

Hot Dipped Galvanized

AS PER AASHTO M 232 M / M232

LISTE DE COUPE DES PLAQUES
1 - PL. 5-1/2" x 7-1/2" x 1/4"



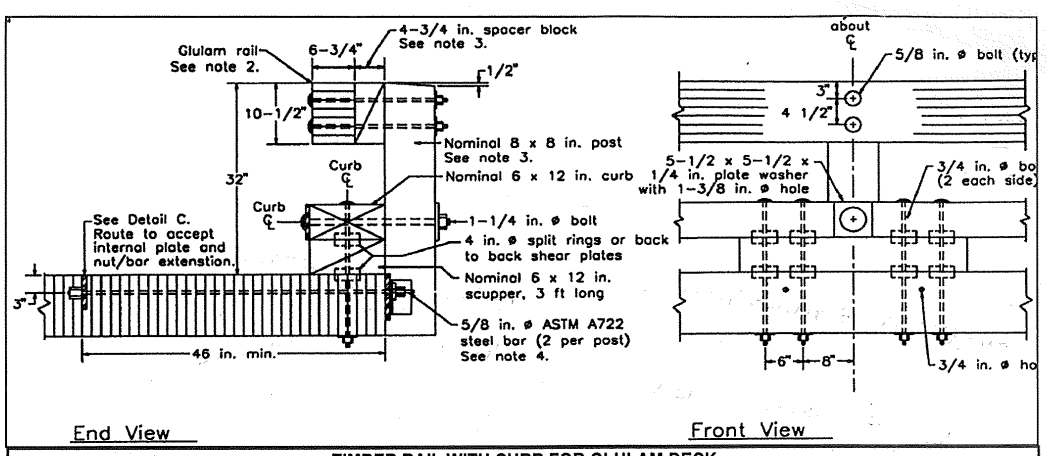
FOR RE-APPROVAL - 14/04/2010
FOR RE-APPROVAL - 19/03/2010
FOR RE-APPROVAL - 19/02/2010
FOR APPROVAL - 02/02/2010

Prod: PL1002

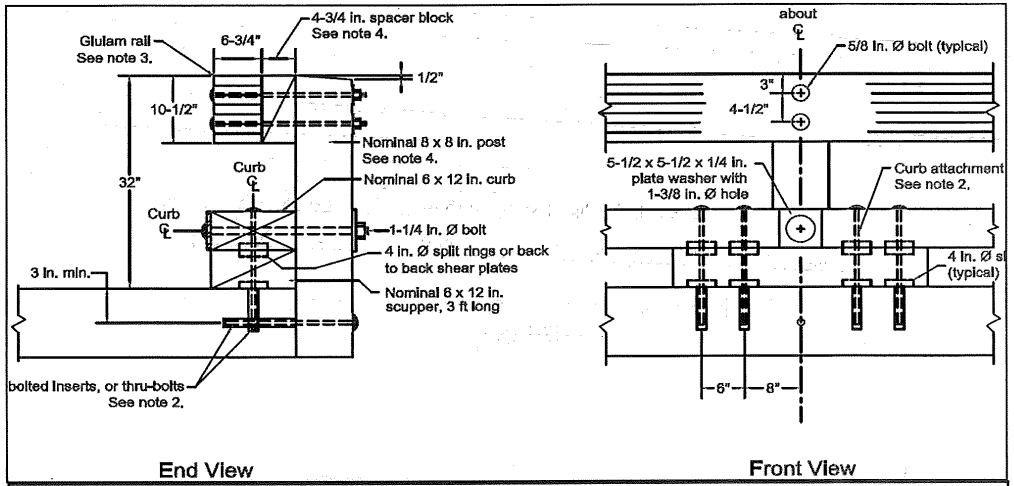
SOUDURE / WELD	TROU/HOLE
1/4" / 6mm 1/4" / 6mm S.I.C./U.N.O.	13/16"Ø 21mmØ S.I.C./U.N.O.

Plate	IMPRIMER / PRINTED: 14.06.2010	**Qté/Qty: 24**	**Echelle/Scale: 1:2**	DATE: 14.01.2010	**Goodfellow Distribution inc.**	
Projet/Project : Worrall Covered Bridge - Rockingham, VT No.: 2009-190-U // G-65639 Client / Customer: NEIL H. DANIELS, INC.	**FABRICATION** 26/04/2010	#2 --------- #1 --------- REV.# DATE:	---------- ---------- REVISION	SPECIFICATION ACIER/STEEL : SELON / AS PER; ASTM A36-36 ACIER NUANCE / STEEL GRADE; 44W (300W) CAN/CSA-G-40.21 SOUDURE / WELD; AWD 1.1 : ELECTRODES E60XX	By: Par: J.M. Checked: Vérifié: R.D.	368, Pepsi Road Manchester, NH, 03109 Tel.: 1-800-361-0625 Fax : 1-877-638-8135

Rec'd 9/3/10



TIMBER RAIL WITH CURB FOR GLULAM DECK



TIMBER RAIL WITH CURB FOR CONCRETE DECK

covered bridges (3)

Need 5/5/10
DBK
HWS office