SunGuide®:

Software Users Manual

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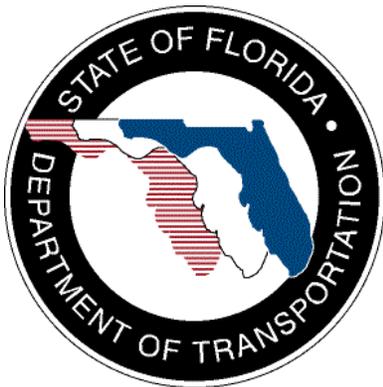
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Created By:	Steve Dellenback, SwRI	SWD	08/24/2004
	Tammy Duncan, SwRI	TD	08/24/2004
Reviewed By:	Steve Dellenback, SwRI	SWD	11/29/2004
	Steve Novosad, SwRI	SEN	11/29/2004
	Steve Novosad, SwRI	SEN	01/10/2005
	Steve Novosad, SwRI	SEN	05/26/2005
	Mike Brown, SwRI	MAB	10/27/2005
	Mike Brown, SwRI	MAB	04/10/2006
	Steve Novosad, SwRI	SEN	04/10/2006
	Steve Dellenback, SwRI	SWD	11/27/2006
	Steve Dellenback, SwRI	SWD	01/03/2007
	Steve Dellenback, SwRI	SWD	01/08/2007
	Steve Dellenback, SwRI	SWD	03/06/2007
	Steve Dellenback, SwRI	SWD	04/29/2007
	Steve Dellenback, SwRI	SWD	08/22/2007
	Steve Dellenback, SwRI	SWD	12/04/2007
	Steve Dellenback, SwRI	SWD	04/04/2008
	Steve Dellenback, SwRI	SWD	05/07/2008
	Steve Dellenback, SwRI	SWD	05/28/2008
	Steve Dellenback, SwRI	SWD	07/21/2008
	Steve Dellenback, SwRI	SWD	08/07/2008
	Steve Dellenback, SwRI	SWD	09/22/2008
	Steve Dellenback, SwRI	SWD	11/02/2008
	Steve Dellenback, SwRI	SWD	12/04/2008
	Steve Dellenback, SwRI	SWD	04/08/2009
	Kevin Allen, SwRI	KEA	01/29/2010
	Robert Heller, SwRI	RWH	06/03/2010
	Kirk E. Smith, SwRI	KES	06/04/2010
	Robert W. Heller, SwRI	RWH	06/07/2010
	Steven W. Dellenback, SwRI	SWD	06/09/2020
	Tucker Brown, SwRI	TJB	06/11/2010
	Tucker Brown, SwRI	TJB	06/21/2010
	Tucker Brown, SwRI	TJB	11/18/2010

	Tucker Brown, SwRI	TJB	08/12/2011
Modified By:	Steve Dellenback, SwRI	SWD	11/22/2004
	Steve Dellenback, SwRI	SWD	12/31/2004
	Steve Dellenback, SwRI	SWD	05/25/2005
	Steve Dellenback, SwRI	SWD	06/06/2005
	Roger Strain, SwRI	RLS	10/27/2005
	Steve Dellenback, SwRI	SWD	10/27/2005
	Roger Strain, SwRI	RLS	04/07/2006
	Steve Dellenback, SwRI	SWD	04/07/2006
	James Barbosa IBI	JB	10/30/2006
	Steve Dellenback, SwRI	SWD	11/27/2006
	Steve Dellenback, SwRI	SWD	01/08/2007
	Pat Lanigan, SwRI	JPL	02/28/2007
	Roger Strain, SwRI	RLS	02/28/2007
	Steve Dellenback, SwRI	SWD	03/06/2007
	Steve Dellenback, SwRI	SWD	04/29/2007
	James Barbosa IBI	JB	08/21/2007
	Steve Dellenback, SwRI	SWD	08/22/2007
	John Boguslawski, IBI	JB	12/03/2007
	Meredith Moczygemba, SwRI	MRM	04/02/2008
	Roger Strain, SwRI	RLS	05/05/2008
	Amit Misra	AM	05/06/2008
	Amit Misra	AM	05/28/2008
	Amit Misra	AM	07/16/2008
	Robert W. Heller	RWH	08/07/2008
	Roger Strain, SwRI	RLS	09/19/2008
	Meredith Wright, SwRI	MRW	10/31/2008
	Roger Strain, SwRI	RLS	12/04/2008
	Sam Slocum, SwRI	SS	12/04/2008
	Marc Alban, SwRI	MCA	04/01/2009
	Roger Strain, SwRI	RLS	04/07/2009
	Roger Strain, SwRI	RLS	01/15/2010
	Robert Heller, SwRI	RWH	01/19/2010
	Juanita Ortega, SwRI	JVO	05/07/2010
	Robert Heller, SwRI	RWH	06/21/2010
	Robert Heller, SwRI	RWH	06/23/2010
	Robert Heller, SwRI	RWH	06/25/2010
	Roger Strain, SwRI	RLS	06/29/2010
	Roger Strain, SwRI	RLS	10/06/2010

	Tucker Brown, SwRI	TJB	11/19/2010
	Roger Strain, SwRI	RLS	08/10/2011
Completed By:			

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List of Acronyms

ADA............................American Disabilities Act
ADCCTV ....American Dynamics Closed Circuit Television
API............................Application Program Interface
AS ....Administrative Subsystem
ASCII ....American Standard Code for Information Interchange
ASDL ....Asymmetric Digital Subscriber Line
ATIS ....Advanced Traveler Information System
AVI…………………Automated Vehicle Identification
AVL ....Automatic Vehicle Location
BAFO.........................Best and Final Offer
C2C ....Center-to-Center
CCTV.........................Closed Circuit Television
CE ....Configuration Editor
CM ....Configuration Management
CO..............................Central Office
COTS ....Commercial Off the Shelf
CPA............................Control Panel Applet
DBMS ....Database Management System
DD..............................Data Distribution
DMS...........................Dynamic Message Sign
DOM ....Document Object Model
DOT ....Department of Transportation
EH ....Executive Handler
EHTC ....Executive Handler Test Client
EM..............................Event Management
EV ....Event Viewer
FAT............................Factory Acceptance Testing
FDOT ....Florida Department of Transportation
FHP ....Florida Highway Patrol
FIHS...........................Florida Interstate Highway System
GPS ....Global Positioning System
GUI ....Graphical User Interface
HAR ....Highway Advisory Radio
HOT ....High Occupancy Toll
HTML ....Hypertext Markup Language
ICD............................Interface Control Document
ICT ....Incident Clearance Time
IDS ....Incident Detection System
IE...............................Internet Explorer
IE6.............................Internet Explorer 6
IE7.............................Internet Explorer 7
IIS..............................Internet Information Service
IM...............................Incident Management
IMS ....Inventory and Maintenance Subsystem

IP ....Internet Protocol
ITN ....Invitation to Negotiate
ITS ....Intelligent Transportation Systems
IVR ....Interactive Voice Response
JDBC ....Java Database Connectivity
LAN ....Local Area Network
LPR…………………License Plate Reader
MAS ....Message Arbitration Subsystem
N/A ....Not Applicable
NTCIP ....National Transportation Communications for ITS Protocol
NTS ....Network Time Server
ODBC ....Open Database Connectivity
ODS ....Operational Data Store
OID ....Object Identifier
OOCEA ....Orlando-Orange County Expressway Authority
OP ....Operator Map
PDF ....Portable Document Format
PS……………………Pricing Subsystem
PTMC ....Portable Transportation Management Center
RMC ....Ramp Meter Controller
RDBMS ....Relational Database Management System
RPG ....Response Plan Generator
RR ....Road Ranger
RRMA ....Road Ranger Mobile Application
RS ....Reporting Subsystem
RTMC ....Regional Transportation Management Center
RWIS ....Roadway Weather Information System
SAE ....Society of Automobile Engineers
SAS ....Scheduled Actions Subsystem
SB ....Safety Barrier
SDD ....Software Design Document
SICP ....Software Integration Case Procedures
SL ....Status Logger
SRS ....Software Requirements Specification
STMC ....Satellite Transportation Management Center
SUM ....Software Users Manual
SVG ....Scalable Vector Graphics
TBD ....To Be Determined
TCP/IP ....Transport Control Protocol/Internet Protocol
TMC ....Transportation Management Center
TSS ....Transportation Sensor Subsystem
TvT ....Travel Time
URL ....Uniform Resource Locator
VS ....Video Switching
VSL ....Variable Speed Limit
VTMC ....Virtual Transportation Management Center

W3..............................World Wide Web
WWW ....World Wide Web
WYSIWYG ………...What You See Is What You Get
XML...........................Extensible Markup Language

Revision History

Revision	Date	Changes
1.0.0-Draft	November 29, 2004	Initial Release.
1.0.0	January 10, 2005	Updated with final screen graphics.
1.1.0	May 25, 2005	Updated with Release 1.1 functionality and HTML based screens.
1.1.1	June 6, 2005	Updated with "alternative route" terminology and eliminated the date and time markings from selected incident GUIs.
2.0.0	October 27, 2005	Updated for Release 2.0 functionality.
2.1.0	April 10, 2006	Updated to include IM C2C and Proportional fonts
2.2.0-Draft	November 27, 2006	Updated for Release 2.2 functionality
2.2.0	January 3, 2007	Updated with FDOT CO comments
2.2.1	January 8, 2007	Updated with FDOT CO comments
2.2.2	March 6, 2007	Updated for Scheduled Actions Subsystem (SAS) and GUI Performance Enhancement. Sections that were either significantly updated or added include: • Scheduled Actions • Scheduled Actions Editor Note that many of the GUI snapshots were updated due to the performance improvement efforts but the functionality (i.e. buttons and fields) is the same.
2.2.2a	April 29, 2007	Updated based on feedback after the 2.2.2 installations.
3.0.0-Draft	August 22, 2007	Updated with Release 3.0 functionality: • Tabbed GUI implementation • 511 • AVL/RR • Event Management • Reporting Subsystem • Variable Speed Limit • Geo-fence Editor • Configuration Editor • Web Server • Event Viewer • Updated screen snapshots of all Admin editors
3.0.0	December 4, 2007	Updated with final release 3.0 screen snapshots and associated text
3.1.0-Draft	April 4, 2008	Added Release 3.1 (Express Lanes) functionality
3.1.0	May 7, 2008	Updated based on FDOT comments, added text in Express Lanes configuration sections
3.1.1	May 30, 2008	Updated with revised screen snapshots for Express Lanes enhancements. Added virtual video wall.

Revision	Date	Changes
3.1.2	July 21, 2008	Updated for Express Lanes and Safety Barrier Editor
4.0.0-Draft	August 7, 2008	Updated for Release 4.0
4.1.0-Draft	September 22, 2008	Updated for Release 4.1
4.1.0	November 2, 2008	Updated with R4.1 FAT updates
4.1.1	December 4, 2008	Updated with FDOT CO comments
4.2.0-Draft	April 8, 2009	Updated with R4.2.0 functionality
4.3.0-Draft	February 5, 2010	Updated with R4.3.0 functionality
5.0.0-Draft	June 9, 2010	Updated for Release 5.0
5.0.0	June 21, 2010	Updated IAW FDOT Comments
5.0.1	June 23, 2010	Update to correct minor cross reference issue.
5.0P1	August 20, 2010	Update to address FP1209;
5.0.4	November 19, 2010	Update for Release 5.0.4
5.1.0	August 12, 2011	Update for Release 5.1.0

1. Scope

1.1 Document Identification

This document serves as the Software Users Manual (SUM) for the SunGuide® software.

1.2 Project Overview

The Florida Department of Transportation (FDOT) is conducting a program that is developing SunGuide software. The SunGuide software is a set of Intelligent Transportation System (ITS) software that allows the control of roadway devices as well as information exchange across a variety of transportation agencies. The goal of the SunGuide software is to have a common software base that can be deployed throughout the state of Florida. The SunGuide software development effort was based on ITS software available from the state of Texas. In addition to the reuse of software (along with customization of this software), a number of new software modules are being developed. Figure 1–1 provides a graphical view of the software:
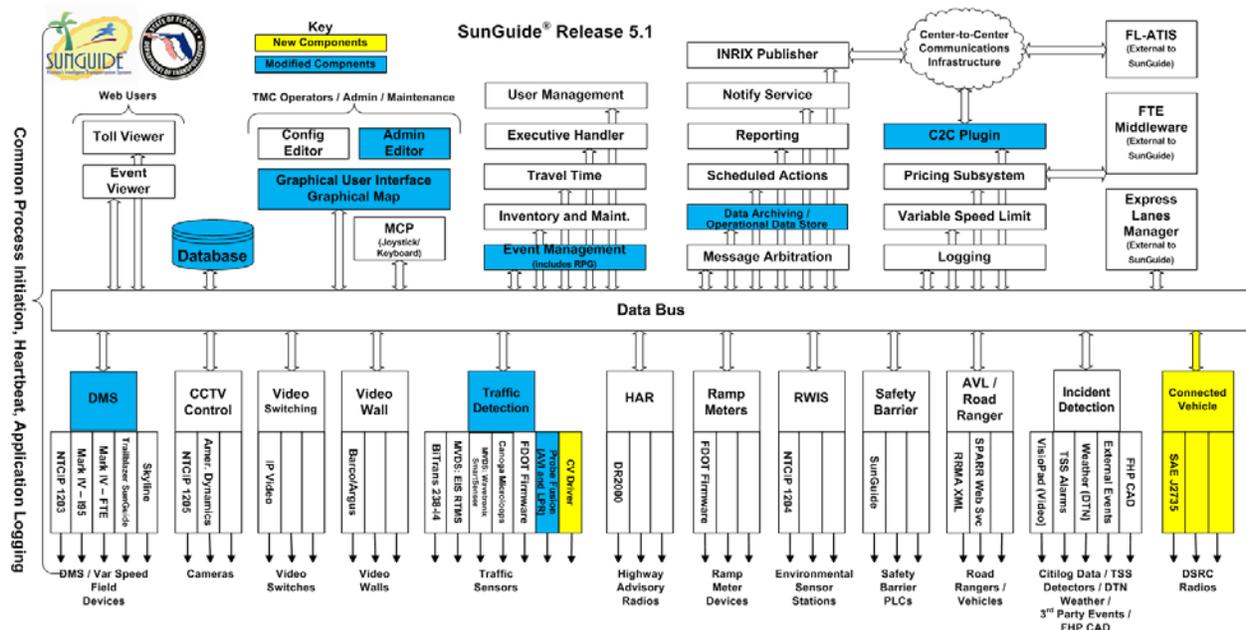
Figure 1–1 - High – Level Architectural Concept

After the development, the software will be deployed to a number of Districts and Expressway Authorities throughout Florida and support activities will be performed.

1.3 Related Documents

The following documents were used to develop this document:

- FDOT Scope of Services: *BDQ69, Standard Written Agreement for SunGuide Software Support, Maintenance, and Development, Exhibit A: Scope of Services.* July 1, 2010.
- Notice to Proceed: Letter to SwRI for BDQ69, July 1, 2010
- Letter of Authorization 001: Letter to SwRI for BDQ69, July 1, 2010.
- Letter of Authorization 002: Letter to SwRI for BDQ69, August 3, 2010.
- Letter of Authorization 003: Letter to SwRI for BDQ69, August 19, 2010.

- Letter of Authorization 004: Letter to SwRI for BDQ69, October 20, 2010.
- Letter of Authorization 005: Letter to SwRI for BDQ69, November 9, 2010.
- SunGuide Project website: http://sunguide.datasys.swri.edu.

1.4 Contacts

The following are contact persons for the SunGuide software project:

- Elizabeth Birriel, ITS Section, Traffic Engineering and Operations Office, elizabeth.birriel@dot.state.fl.us, 850-410-5606
- Arun Krishnamurthy, FDOT SunGuide Project Manager, arun.krishnamurthy@dot.state.fl.us, 850-410-5615
- Clay Packard, PBS&J Project Manager, clay.packard@dot.state.fl.us, 850-410-5623.
- David Chang, PBS&J Project Advisor, David.Chang@dot.state.fl.us, 850-410-5622
- Robert Heller, SwRI Project Manager, rheller@swri.org, 210-522-3824
- Tucker Brown, SwRI Software Project Manager, tbrown@swri.com, 210-522-3035

2. Software Summary

2.1 Software Application

The SunGuide software is a set of Intelligent Transportation System (ITS) software that allows the control of roadway devices as well as information exchange across a variety of transportation agencies. The goal of the SunGuide software is to have a common software base that can be deployed throughout the state of Florida.

The various software applications utilize socket connections to communicate with each other, and transfer data via a standard format (Extensible Markup Language [XML]). Data is stored in an underlying Oracle database.

2.2 Software Organization and Overview of Operation

The SunGuide software is comprised of various subsystems that interact with each other in a cooperative environment. Operators will interact with these subsystems and the database through both browser- and Windows-based applications, described below.

- Executive Handler is a Windows-based application that enables execution control of other SunGuide subsystems, and operational status reporting from subsystem processes under its control.

- Status Logger is a set of Windows-based software tools that allows SunGuide applications to send status information to a central archive server, and display this information to the operator within a viewer.

- The Administrative Editor is a web-based application (meaning it is accessible from a web browser) that provides an interface to the database, allowing the operator to add, modify, and delete operator, and equipment-related data to/from the database.

- The Operator Map is a browser-based application and the primary user-interface, providing a means by which SunGuide software operators may observe current traffic operations and field equipment status and manipulate field equipment to both gather and disseminate pertinent data.

- The Event Viewer is a browser-based application that provides a "read-only" method to review events currently known to the SunGuide deployment.

- The Toll Viewer is a browser-based application that allows the history or Express Lane toll rate changes to be reviewed.

2.3 Contingencies and Alternate States and Modes of Operation

FDOT has defined four types of Traffic Management Centers (TMCs) that will operate the SunGuide software:

- RTMC: Regional Transportation Management Center
- STMC: Satellite (or Secondary) Transportation Management Center
- VTMC: Virtual Transportation Management Centers
- PTMC: Portable Transportation Management Centers

The following table provides a brief comparison of the four types of TMC configurations possible with the SunGuide software:

Table 2-1 – SunGuide Deployment Alternatives

	Data Bus	Number of Devices Controlled	Supports GUI Access	Platform	Subsystems Deployed	Device Driver Deployment
RTMC	Uses own	Large	Yes	Multi Server typical	All	All
STMC	Shares RTMC Data Bus	Moderate	No	Single or multiple Server	Single or multiple	One or two
VTMC	None	None	No	Desktop/Laptop	None	None
PTMC	Uses own	Small	Yes	Laptop	All	All

The following sections describe how the SunGuide software would be deployed in each of these four types of centers.

2.3.1 Regional Transportation Management Center

RTMCs will serve as hubs for command and control decisions for deployments that have significant amounts of ITS field devices deployed. A RTMC will typically have multiple SunGuide application servers that are connected to a Local Area Network (LAN) within the RTMC that provides access to the various ITS devices deployed in the field. It is expected that an RTMC will have an operations room that has a number of operator workstations deployed. An RTMC is distinguished from other types of centers in that it will typically control the network access to a number of ITS field devices.

2.3.2 Satellite Transportation Management Center

STMCs are deployments where ITS field equipment is connected to the network local to the STMC. STMCs would be deployed when device connectivity is centered on remote buildings and the cost of extending the network to the RTMC outweighs the deployment of SunGuide servers in an STMC to provide local communications to the devices. An STMC does not provide a user interface; it is simply a device collection implementation of SunGuide.

The STMC will utilize the Data Bus of an RTMC as its master data repository and the STMC will simply be an extension of the RTMC. When an STMC is deployed, the subsystem and drivers required to operate the equipment connected to the STMC should be deployed on a SunGuide application server physically in the STMC. The SunGuide application server would then make a connection to an RTMC for its central data services. In this context, the STMC does

not require a database locally within the STMC. Figure 2–1 depicts the relationship between an RTMC and STMC:
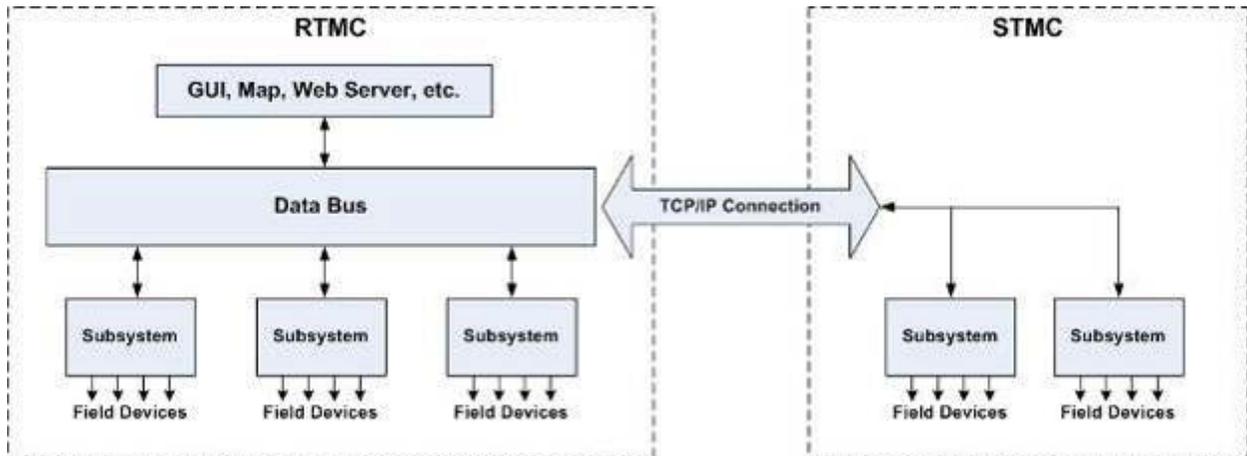
Figure 2–1 – Relationship Between an RTMC and STMC

2.3.3 Virtual Transportation Management Center

VTMCs are deployments that utilize the SunGuide browser interface to perform SunGuide operations from other facilities. Although the operator is physically located outside the RTMC, the browser access makes his/her location transparent.

2.3.4 Portable Transportation Management Center

PTMCs are deployments that utilize laptop computers to provide "mini" SunGuide deployments that are used for demonstration, interim operations or field debugging of software. To implement PTMC using laptops can be problematic depending on the speed/performance of the laptop(s) being used. The SunGuide software itself is implemented to allow it to execute on a single laptop. However, the use of Oracle as the database requires a significant computing platform and testing has demonstrated that the use of Oracle and SunGuide on the same laptop does not perform well. When running a PTMC, a network device capable of connecting the laptops is required. If field devices are to be accessed, the field devices need to be accessible to the network device utilized to connect the laptops. For demonstration purposes, the use of a "demonstration laptop" (or workstation if connected to the network) is optional as the application server can be used for the demonstration – the use of a third laptop is left to the discretion of the PTMC operator.

When deploying a PTMC, the number of ITS devices should be limited to twenty and minimal data archiving should be initiated. When using a PTMC, all of the configuration that must be performed for an RTMC must be performed for the PTMC (there should be less of it since fewer devices are supported).

As an example, an operational use of a PTMC may include a construction project where it is known that network connectivity to the RTMC will be lost from a cluster of devices. In this situation, the operational staff will know what devices will be isolated so that the PTMC may be configured prior to deploying in the field. This type of configuration includes device addresses, type, attributes, etc. The PTMC will have its own database and if standard messages are desired, the message database would need to be populated with these messages.

Since the PTMC is a SunGuide implementation, all functionality of SunGuide is available within the PTMC. This implies that a C2C connection could be established between the PTMC and the C2C infrastructure, but performance limitations of the PTMC host computer limit how much data is exchanged between the PTMC and the C2C infrastructure (but again, this data is configurable by the SunGuide administrator).

2.4 Security and Privacy

The SunGuide software assumes a network environment that will support the exchange of Transmission Control Protocol/Internet Protocol (TCP/IP) packets between SunGuide applications. No specific security (other than the encryption of passwords) is performed by the SunGuide software. If additional network security is required by a deploying organization, a careful analysis of how data will be exchanged needs to be made when the implementation plan for the deployment is developed.

2.5 Accessing the SunGuide User Interface

The SunGuide software is started by pointing Internet Explorer to the default page of the web server where the software was installed, the startup screen is shown in Figure 2–2. The options on this screen are discussed in the following sections:

- SunGuide Applications:
  - o Operator Map: Section 3 of this document
  - o Configuration Editor: Section 4.1 of this document
  - o Executive Handler: Section 4.2 of this document
  - o Status Logger: Section 4.3 of this document
  - o Administrative Editor: Section 4.4 of this document
  - o Link and Shield Editor: Section 4.5 of this document
  - o DMS Sequencing Editor: Section 4.6 of this document
  - o Geofence Editor: Section 4.7 of this document
  - o Event Viewer: Section 5 of this document

- Workstation Setup:

  - o Microsoft .NET Framework Version 4.0: the .NET framework must be installed on the workstation, this is available from Microsoft.

  - o .NET Security Permissions: Once the .NET framework is installed, the security script must be run for EACH URL that will access SunGuide.

Figure 2–2 – SunGuide Startup Screen

2.6 SunGuide User Interface Menu Tree

The following provides a high-level tree layout to the various SunGuide user screens:

- Maintenance Screens (not browser based):
    - o Executive Handler Editor: Section 4.2.1
    - o Executive Handler Server: Section 4.2.2
    - o Executive Handler Viewer: Section 4.2.3
    - o Status Logger Server: Section 4.3.1
    - o Status Logger Control Panel Application: Section 4.3.2
    - o Status Logger Viewer: Section 4.3.3

- Administrative (Configuration) Editor:
    - o AVL/RR
        - ▪ Add / Edit / Delete Availability Statuses
        - ▪ Add / Edit / Delete Beats
        - ▪ Add / Edit / Delete Radios
        - ▪ Add / Remove Telephone Numbers
        - ▪ Edit Vehicle Agencies
        - ▪ Add / Edit / Delete Vehicle Operators
        - ▪ Add / Edit / Delete Vehicles
    - o CCTV/Video Switching

- Add / Edit / Delete cameras.
- Add / Edit / Delete video destinations.
- Add / Edit / Delete video sources.
- o Data Archive
  - Edit Data Archive properties
- o DMS:
  - Add / Delete approved words.
  - Edit Connection Types
  - Add / Edit / Delete Fonts
  - Add / Delete Manufacturers
  - Add / Delete Polling Process Names
  - Add / Edit / Delete Dynamic Message Signs.
- o Event Management
  - Add / Edit / Delete Activity Types
  - Add / Edit / Delete Agencies
  - Add / Modify / Delete Agency Contacts
  - Add / Edit / Delete Comment Types
  - Add / Edit / Delete Event Status Types
  - Edit Event Types (modify sort order)
  - Add / Edit / Delete Injury Types
  - Add / Edit / Delete Organizations
  - Location Configuration
    - Add / Modify / Delete Locations
    - Add / Edit / Delete Counties
    - Add / Edit / Delete Lane Maps
    - Add / Edit / Delete Lane Types
    - Add / Edit / Delete Reference Points
    - Add / Edit Roadways
  - Add / Edit / Delete Mailing Lists
  - Delete / Add Mailing List Contacts
  - Add / Edit / Delete Procedural Errors
  - Response Plans
    - Add / Edit / Delete Abbreviations
    - Add / Edit / Delete Device Templates
    - Add / Edit / Delete Message Templates
  - Vehicle Tracking
    - Add / Edit / Delete Colors
    - Add / Edit / Delete States
    - Add / Edit / Delete Vehicle Makes
    - Add / Modify / Delete Vehicle Models
    - View Vehicle Types
  - View Weather Conditions (set as default)
- o Express Lanes:
  - Edit System Configuration.
  - Add / Edit / Delete Holidays/Special Events.

- Add / Edit / Delete Segments.
- Add / Edit / Delete Daily Rate Schedules.
- Add / Edit / Delete Segment/Rate Schedules.
- Add / Edit / Delete Toll Rate Signs.
    - o HAR
        - Add / Edit / Delete Highway Advisory Radios.
    - o IDS
        - Add / Edit / Delete CitiLog Cameras
    - o IMS
        - Add / Edit / Delete equipment.
        - Add / Edit / Delete equipment locations.
        - Add / Edit / Delete vendors.
    - o Reporting
        - Add / Edit / Delete Report Groups
        - Add / Edit / Delete Reports
    - o Ramp Metering
        - Configure fuzzy lanes.
        - Configure fuzzy parameters.
        - Add / Edit / Delete Ramp Meter controllers.
        - Add / Edit / Delete Ramp Meter special event plans.
        - Add / Edit / Delete Ramp Meter group data.
    - o RWIS
        - Add / Edit / Delete Poll Cycles
        - Add / Edit / Delete RWIS stations.
    - o Safety Barrier
        - Add / Edit / Delete Safety Barrier stations.
    - o Scheduled Actions
        - Add / Edit / Delete schedules
        - Add / Edit / Delete sequences
    - o TSS
        - Add / Edit / Delete Alarm Thresholds.
        - Map Detectors to the links and lanes they occupy.
        - Add / Edit / Delete Traffic Detectors.
        - Add / Edit / Delete Detector Thresholds.
        - Add / Edit / Delete Poll Cycles
        - Edit System Configuration
    - o Travel Times
        - Add / Edit / Delete travel time alternate routes.
        - Add / Edit / Delete travel time destinations.
        - Edit travel time device templates.
        - Add / Edit / Delete travel time matching routes.
        - Add / Edit / Delete travel time message templates.
        - Modify travel time options.
        - Add / Edit / Delete travel time links.
    - o VSL
        - Add / Edit / Delete Groups

- Add / Edit / Delete VSL Plans
- Modify Zone Settings
- o Miscellaneous
  - Add / Delete Center Information.
  - Add / Remove Device Drivers
  - Add Manufacturers
- o User Management
  - Add / Edit / Delete Permission Groups.
  - Add / Edit / Delete Operator Workstations
  - Calculate Password Hashes
  - Add / Edit / Delete Users.

- Operator Map Context Menu:

  - o Cameras
    - Camera Blocking
    - Camera Control
    - Scheduler
    - USB Joystick Configuration
  - o Center-to-Center (C2C)
    - Camera Control
    - DMS Status
    - Event List
    - Floodgate Messages
    - HAR Status
    - Operator Approval of Remote Messages
    - RWIS Status
    - Select Remote Network Display
  - o Connected Vehicles
    - Configuration Inspector
    - RSE Configuration
    - RSE Status
    - Traveler Advisory Messages
  - o DMSs
    - Active Sequences
    - Device Groups
    - Device Status
    - Message Libraries
    - Message Queue Manager
    - Sequence Libraries
    - Toll Lane Status DMS
    - Toll Rate Sign Status
    - Trailblazer DMS Status
    - Travel Time Messages
    - Variable Speed Limit DMS Status
  - o Event Management (EM)
    - Add New Event

- - - Edit Device Sequencing
    - Event List
    - Predefined Response Plans
    - Remove Events from FL-ATIS
    - Republish Events to FL-ATIS
  - o Express Lanes
    - Express Lanes
    - Offline Synchronization
  - o HAR
    - HAR Status
    - Message Queue Manager
  - o Incident Detection (IDS)
    - Systemwide VisioPaD Detection
    - VisioPaD Camera Detection Status
  - o Inventory and Maintenance (IMS)
    - Inventory
    - Vendors
  - o Preferences
    - Clear Saved Windows Position
    - Save Current Map View
    - Save Current Window Positions
    - Subsystems
    - Tile Sets
  - o Ramp Metering
    - Alarms
    - Control
    - Reset Ramp Meters
    - Status Overview
  - o Reports
  - o Responders
    - Edit Geo-fences
    - Responder Status
    - Vehicle Location Replay
  - o Roadside Weather Systems (RWIS)
  - o Safety Barriers (SB)
  - o System
    - Change Password
    - Edit Map Shields
    - Logout
    - Map Views
    - Set Log Level
    - System Alerts
    - System Messages
    - System Settings
  - o Traffic Detection (TSS)
    - Detector Status

- Dynamic Probe Linking
- Edit Link Placement
- o Travel Times
- o Video Switching (VS)
  - Switching Control
  - Video Tours
  - Video Wall Control
  - Virtual Wall Layout
- o VSL Segment Status

3. Graphical User Interface (GUI)/Map Operation

The Operator Map is a browser-based application which serves as the primary interface for TMC operators to monitor and manipulate the equipment controlled by the various subsystems of the SunGuide software system. The text in **bold** is referencing a 'button' on the GUI. The following sections describe the operations that may be performed via the Map.

3.1 Software Familiarization

The Operator Map application is started by opening a web browser and navigating to the appropriate Operator Map URL. When the Map is initially opened in a browser, the login dialog will be displayed is a separate browser window, Figure 3–1provides an example of how this may appear to an operator.
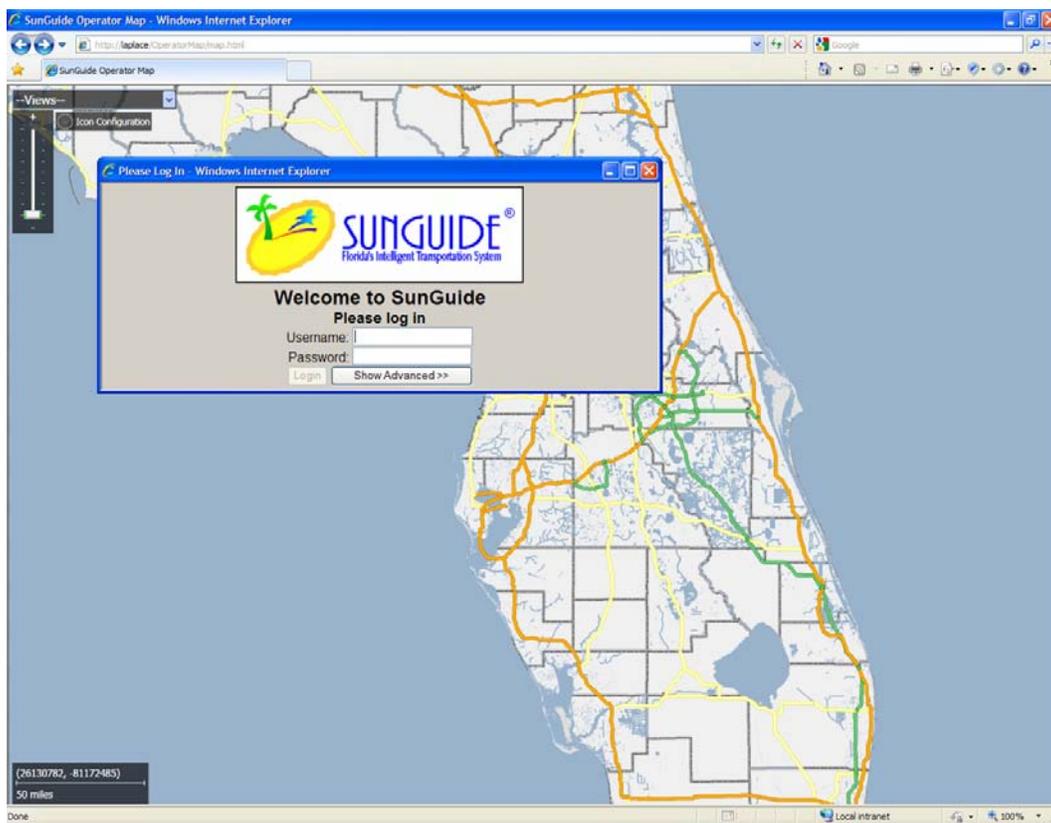
Figure 3–1 – Operator Map Login Dialog

To complete the login process, the operator should enter their username and password, and then click on the **Login** button. As the login process progresses, a status screen will be displayed. Figure 3–2 shows an example status screen that is displayed early in the login process. Once the login process is complete, the dialog will be automatically closed.
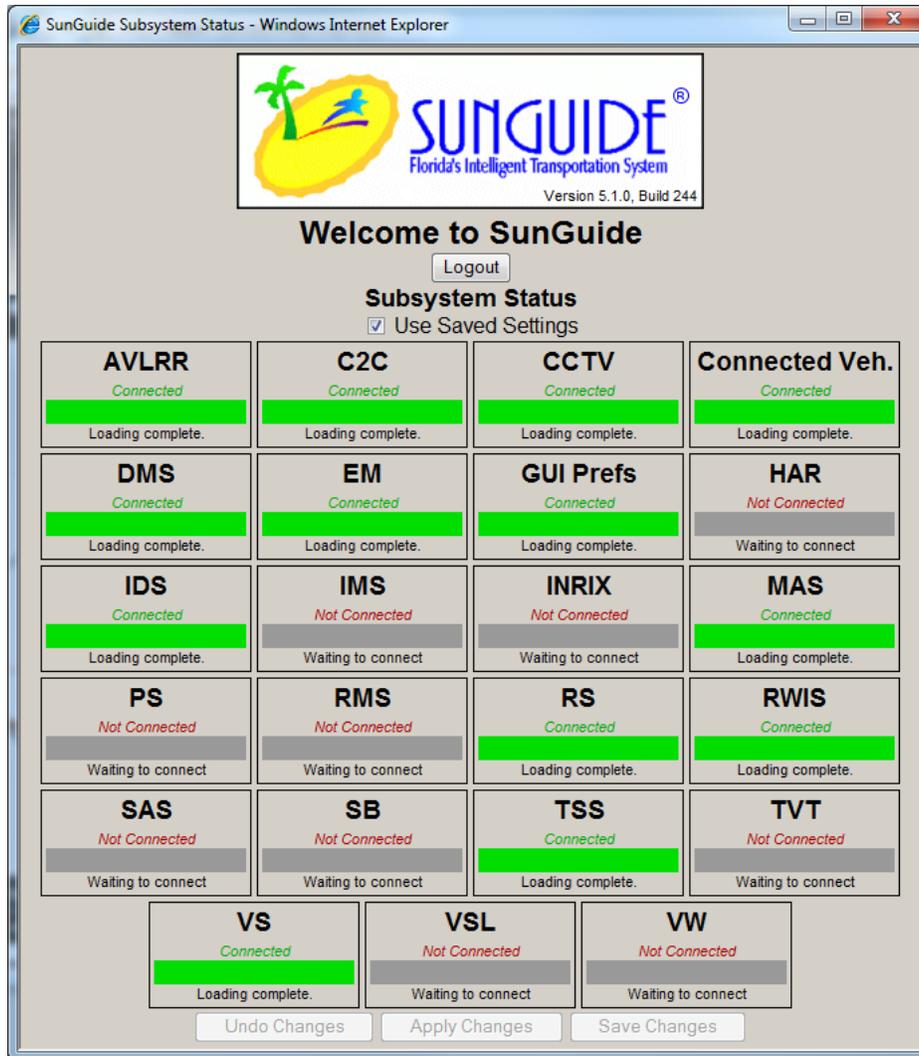
Figure 3–2 – Loading Status Screen
Note: the number of entries will vary based on the number of subsystems configured

While running the Operator Map, informational and error messages are logged to the System Messages status window, see Figure 3–3 for an example of the dialog. Further Map processing is described in the following sections.
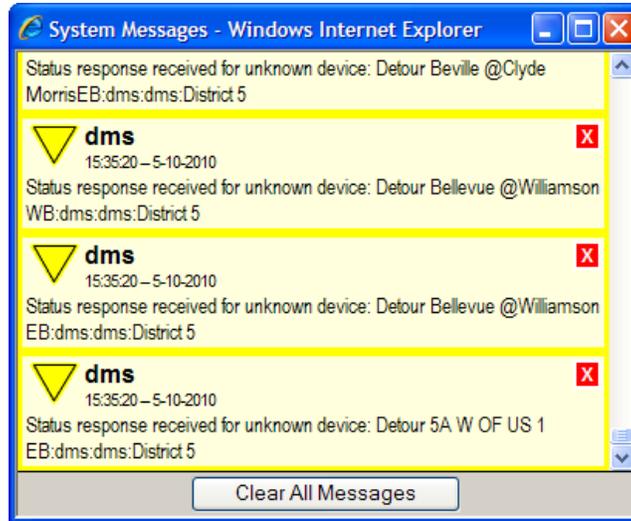
Figure 3–3 – System Messages Window

3.2 Processing Procedures

The following sections detail the processing procedures for the operator map.

3.2.1 Control Panel

Operators may navigate the map by panning the map to position it, and using the zoom controls or View Selector (see Figure 3–4) to adjust the magnification of the map. The following sections discuss the control panel features.

Figure 3–4 – Operator Map Control Panel

3.2.1.1 View

Selecting a view from the View Selector causes the map to be re-centered and magnified based on the location and data associated with the selected view. See Figure 3–5 for an example.
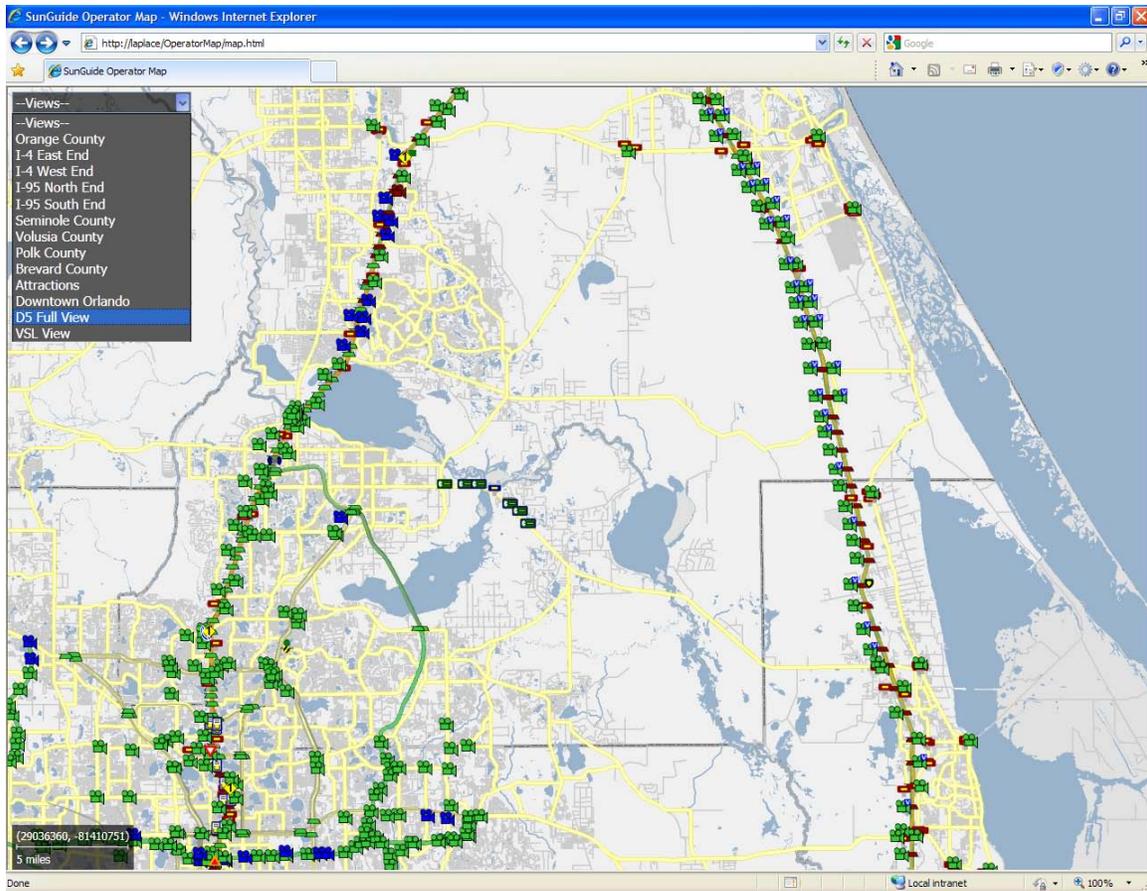
Figure 3–5 – District View

3.2.1.2 Zoom

The zoom slider control on the left side of the Control Panel displays the current and available zoom levels. The position of the slider indicates the current magnification level. Positioning the slider closest to the '-' adjusts the zoom to the greatest possible view, which should show nearly the entire state. After the first position, each position closer to the '+' moves to another zoom level. The maximum zoom level is achieved by placing the slider closest to the '+'.

3.2.2 Map Controls

When the map is presented to the operator, several options are available based on the placement of the mouse. These operations are:

- **Right click**: the context menu will be displayed (see Figure 3–6), this menu will allow different options to be initiated, and these options are discussed in section 3.2.3.

- **Right click, hold mouse and move**: once the mouse is moved from its original position (with the right mouse button being held in a depressed position) a rubber-band box will be shown, when the right mouse button is released the map will be zoomed to as near as possible to the rectangle created (note that the map only allows a zoom to a particular level, after this level is reached zoom requests will be ignored).

- **Left click, hold mouse and move**: once the mouse is moved from its original position (with the left mouse button being held in a depressed position) the map will pan or move along with the mouse.

- **Scrolling:** using the mouse wheel to scroll up will increase the magnification of the map based on where the mouse pointer is located. Scrolling down with the mouse wheel will decrease the magnification.

3.2.3   Context Menu

When the mouse pointer is over the graphical map, the operator can bring up the SunGuide "context" menu with a click of the right mouse button. The menu is shown in Figure 3–6.
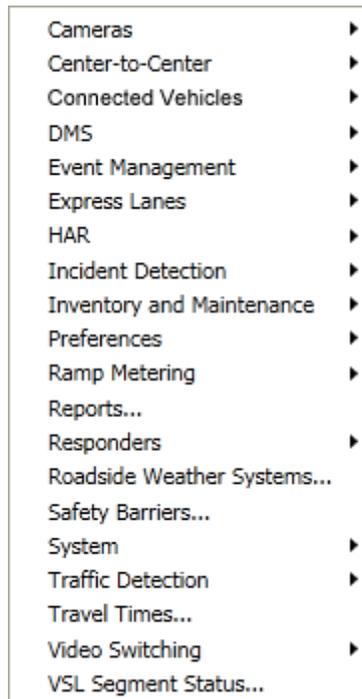
Figure 3–6 - Context Menu
Note: the context will vary based on the number of subsystems logged into.

The following options are available to the operator from the context menu:

- **Cameras Menu** (see Figure 3–7): This option allows the operator to control CCTV cameras; the software is described in detail in Section 3.2.5. When the SAS subsystem is connected Scheduler will be added to the context menu.
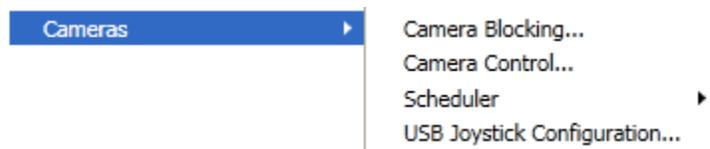
Figure 3–7 – Cameras Menu

- **Center-to-Center Menu** (see Figure 3–8): This option allows the operator to issue commands to other centers using the Center-to-Center (C2C) infrastructure; the software is described in detail in Section 3.2.4.
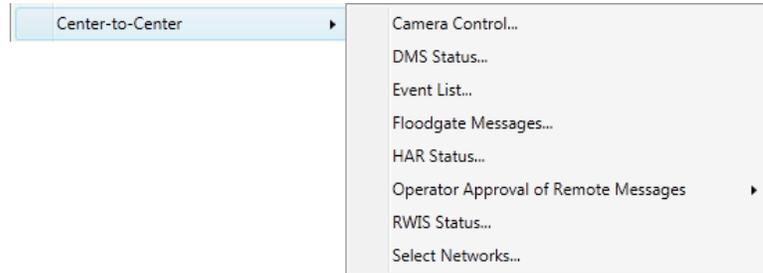
Figure 3–8 – C2C Menu

- **Connected Vehicles Menu** (see Figure 3–9): This option allows the operator to configure and control Connected Vehicle Roadside Equipment; the software is described in detail in Section 3.2.6.
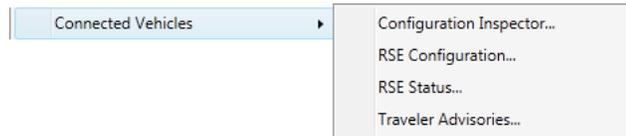
Figure 3–9 – Connected Vehicles Menu

- **DMS Menu** (see: Figure 3–10) This option allows the operator to control DMS devices; the software is described in detail in Section 3.2.7.
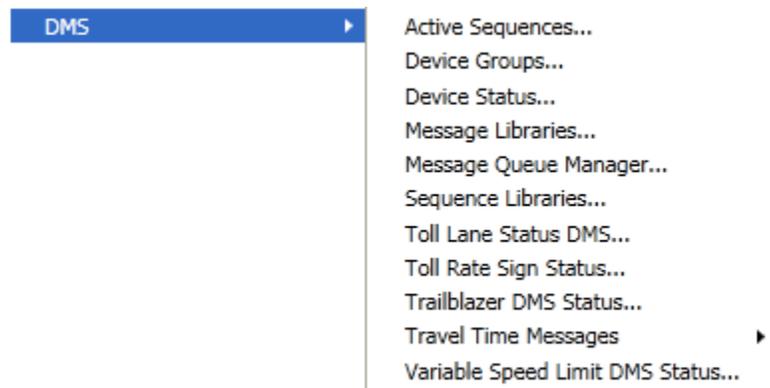
Figure 3–10 – DMS Menu

- **Event Management Menu:** (see Figure 3–11): This option allows the operator to access the Event Management GUI to perform activities related to event management; the software is described in detail in Section 3.3.1.
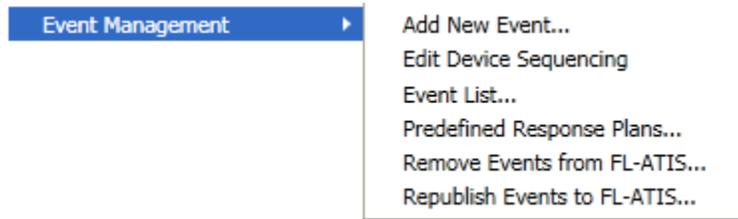
Figure 3–11 – EM Menu

- **Express Lanes Menu** (see Figure 3–12): This option allows the operator to manage Express Lanes Configuration, Events, Segments, and Rate Schedules; the software is described in detail in Section 3.3.9.

Figure 3–12 – Express Lanes Menu

- **HAR Menu** (see Figure 3–13): This option allows the operator to control HAR devices; the software is described in detail in Section 3.2.8.

Figure 3–13 – HAR Menu

- **Incident Detection Menu** (see Figure 3–14): This option allows the operator to monitor and manage VisioPaD detection status; the software is described in detail in Section 3.3.4.
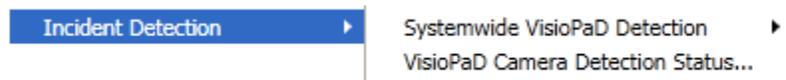
Figure 3–14 – IDS Menu

- **Inventory and Maintenance Menu** (see Figure 3–15): This option allows the operator to manage the inventory and vendors of ITS devices; the software is described in detail in Section 3.2.9.
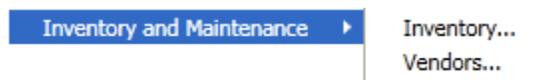
Figure 3–15 – Inventory and Maintenance Menu

- **Preferences Menu** (see Figure 3–16): This option allows the operator to set several preferences for how the GUI is presented. These preferences are discussed later in this section.
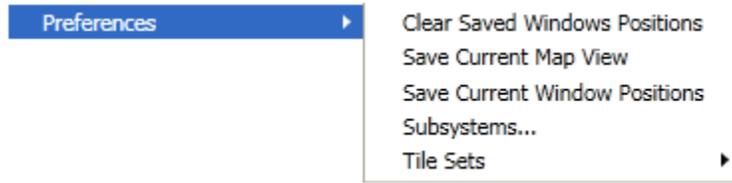
Figure 3–16 – Preferences Menu

- **Ramp Metering Menu** (see Figure 3–17): This option allows the operator to manage Ramp Meter devices; the software is described in detail in Section 3.2.11.
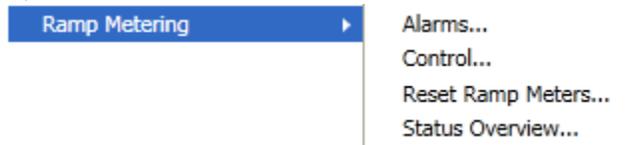
Figure 3–17 – Ramp Metering Menu

- **Reports** (see Figure 3–18): This option allows the operator to generate predefined reports, see Section 3.3.6.

Figure 3–18 – Reports Menu

- **Responders Menu** (see Figure 3–19): This option allows the operator to view and manage responders; the software is described in detail in Section 3.2.18.

Figure 3–19 – Responders Menu

- **Roadside Weather Systems** (see Figure 3–20); This option allows the operator to control Roadside Weather Information Systems (RWIS) devices; the software is described in detail in Section 3.2.13.

Figure 3–20 – RWIS Menu

- **Safety Barriers** (see Figure 3–21): This option allows the operator to monitor and control Safety Barrier devices; the software is described in detail in Section 3.2.14.

Figure 3–21 – Safety Barrier Menu

- **System Menu** (see Figure 3–22): This option allows the operator to perform various system level functions for either the operator identifier or the system, see Section 3.2.16.
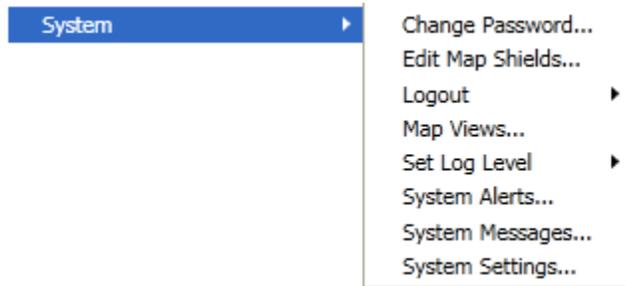
Figure 3–22 – System Menu

- **Traffic Detection Menu** (see Figure 3–23): This option allows the operator to view traffic conditions data; the software is described in detail in Section 3.2.17.

Figure 3–23 – Traffic Detection Menu

- **Travel Times** (see Figure 3–24): This option allows the operator to start/stop the generation of travel time messages and view current travel times; the software is described in detail in Section 3.3.11.

Figure 3–24 – Travel Times Menu

- **Video Switching Menu** (see Figure 3–25): This option allows the operator to perform video switching from camera and video tours to select monitors for display and manage the video wall. This software is described in detail in Section 3.2.19.

Figure 3–25 – Video Switching Menu

- **VSL Segment Status** (see Figure 3–26): This option allows the operator to control the VSL subsystem; the software is described in detail in Section 3.3.8.
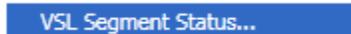
Figure 3–26 – VSL Menu

An operator may customize their map view; these preferences are stored in the SunGuide database so the preferences will "follow" the operator to whatever machine they use to login to SunGuide.

The following preferences located in the Preferences context menu can be modified:

- **Clear Saved Window Positions**: This option will clear (erase) the current stored positions of the windows. The next time the operator logs in; the windows will revert back to the SunGuide default.

- **Save Current Map View**: This option stores the current map position and when the operator logs in again the map will be displayed in this view.

- **Save Current Window Positions**: This option stores the current positions of the windows and when the operator logs in again the windows will be placed in these positions (if supported by the hardware of the workstation). Note that only the "base" windows (e.g., DMS control, CCTV control, etc.) are stored; windows such as incident details are not stored.

- **Subsystems** (see Figure 3–27): Allows the operator to specify which subsystems they should be logged into when they login into the SunGuide environment. If an operator does not plan on using a subsystem or if they do not have permissions to use the subsystem they should modify their preference to not include accessing the subsystem on startup to streamline (shorten) the login process.
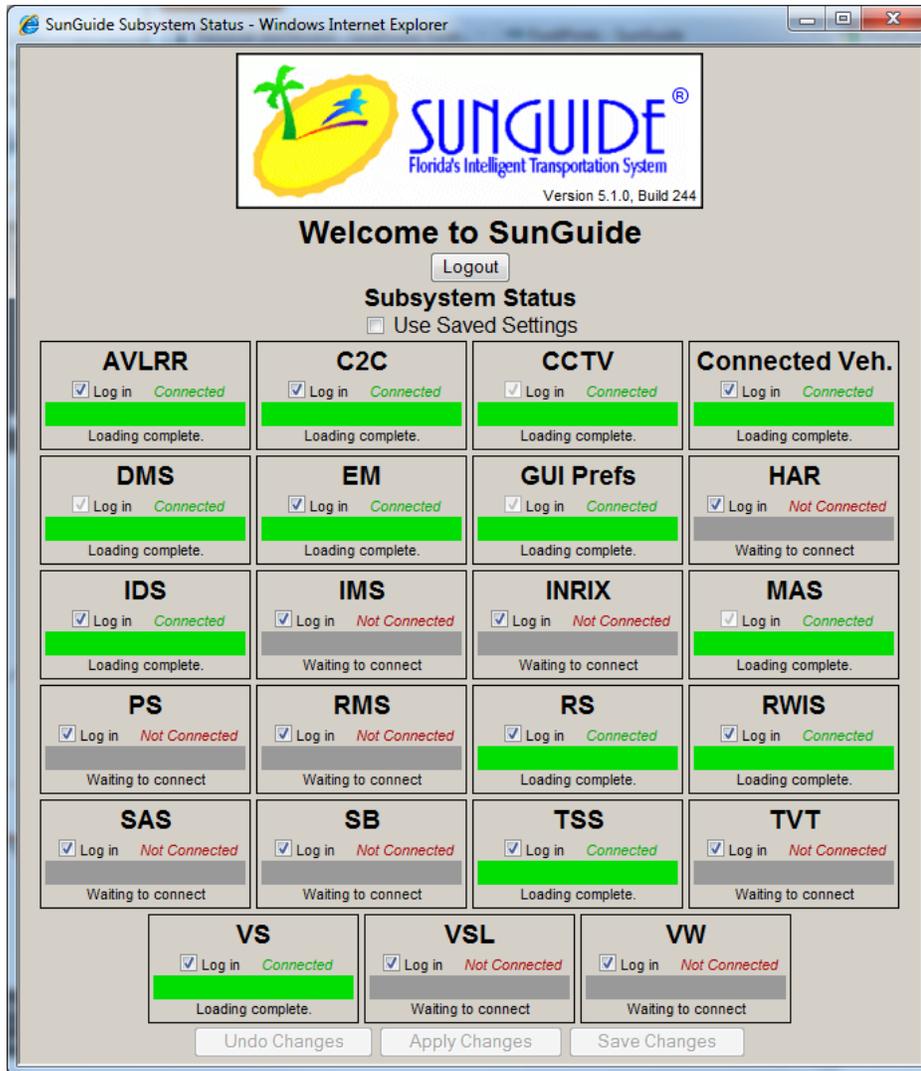
Figure 3–27 – Subsystem Selection

- **Tile Sets** (see Figure 3–28): This option allows the operator to specify a set of map tiles for the map. The functionality of the map will not change, only the background.
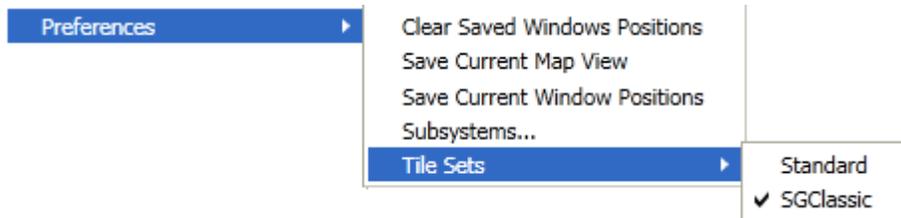
Figure 3–28 – Tile Sets

The following preferences located in the Icon Configuration control can be modified:

- **Icon Legend** (see Figure 3–29): This option displays to the operator a legend of field devices that may be displayed on the map. Selection of a category results in all devices within the category to be selected.
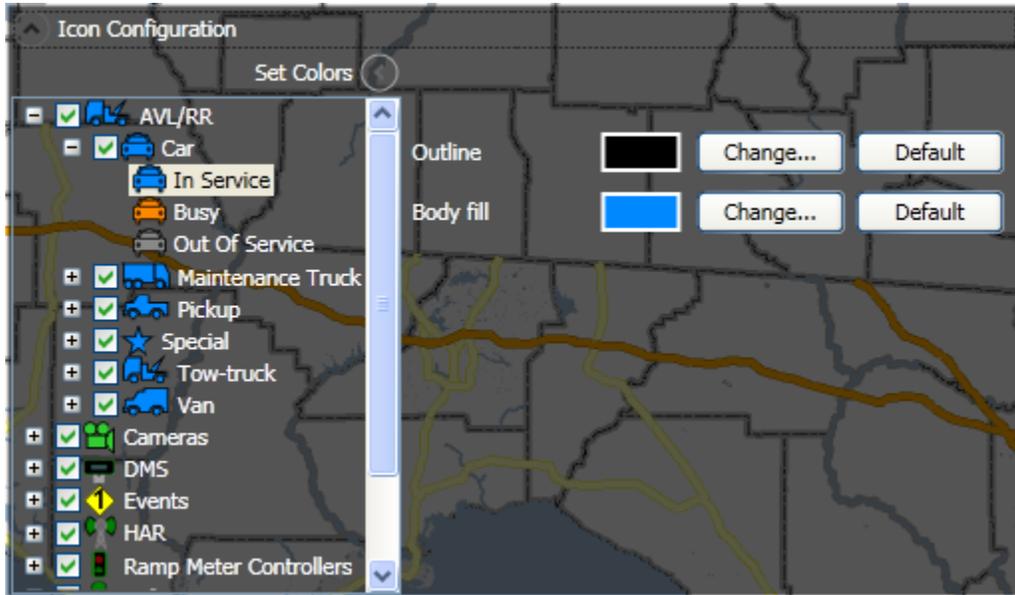
Figure 3–29 – Icon Legend

- **Change Colors** (see Figure 3–30): This option allows the operator to change the colors of individual map components. As the colors are selected, the colors selection will be displayed.
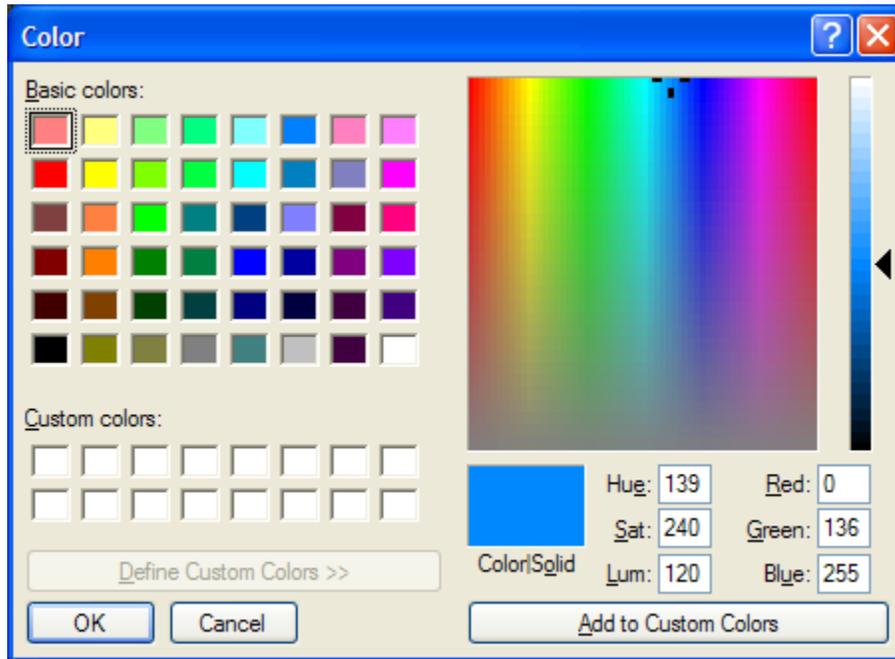
Figure 3–30 – Color Preferences Selector

If an operator hovers the mouse over a device or incident and right clicks, a context menu that is specific to the device or incident is displayed; these typically provide a shortcut to an operation that can be reached through the traditional menus/buttons of the SunGuide dialogs. The following context menus are implemented:

- **Cameras Context Menu** (see Figure 3–31): This context menu allows the operator to pull up control dialogs with the specific camera (being hovered over) being selected in the control GUI through the Camera Control option. It also allows the operator to view a list of monitors that the camera can be switched to as well as a list of viewers on the video wall that the camera could be switched to through the Video Switching option. If SAS is running a Scheduling option will also be available in the context menu. This will open the SAS device dialog, showing what schedules the camera is involved in. The context menu also allows the user to configure a joystick through the USB Joystick Configuration option.

  If a camera is "locked" and included in a schedule, SAS will continue to attempt to execute commands for the entire duration of the schedule. If the camera is locked or otherwise unavailable to SAS when a command should go out, SAS will continue the schedule as though it had sent the command, and attempt to send the next one when its schedule dictates (this implies that when the camera becomes "unlocked" the SAS commands will be processed per the schedule).

Figure 3–31 – Cameras Context Menu

- **C2C Camera Context Menu** (see Figure 3–32): This context menu provides the operator with options for Camera devices available through the C2C interface.
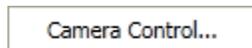
Figure 3–32 – C2C Camera Context Menu

- **C2C DMS Context Menu** (see Figure 3–33): This context menu provides the operator with options for DMS devices available through the C2C interface.

Figure 3–33 – C2C DMS Context Menu

- **C2C HAR Context Menu** (see Figure 3–34): This context menu provides the operator with options for HAR devices available through the C2C interface.
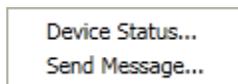
Figure 3–34 – C2C HAR Context Menu

- **C2C RWIS Context Menu** (see Figure 3–35): This context menu provides the operator with options for RWIS devices available through the C2C interface.
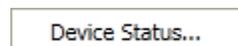
Figure 3–35 – C2C RWIS Context Menu

- **C2C Traffic Conditions Context Menu** (see Figure 3–36): This context menu provides the operator with options for traffic condition links available through the C2C interface.
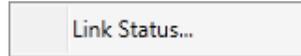
Figure 3–36 – C2C Traffic Conditions Context Menu

- **DMS Context Menu** (see Figure 3–37): If the DMS is configured to display travel time messages, the operator may set generation of travel time messages for the sign on or off. The context menu also allows the operator to pull up control dialogs with the specific DMS (being hovered over) being selected in the control GUI.
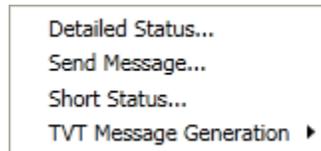
Figure 3–37 – DMS Context Menu

- **EM Context Menu** (see Figure 3–38): This context menu provides the operator with options for viewing event details and response plans.
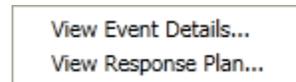
Figure 3–38 – EM Context Menu

- **Trailblazer Context Menu** (see Figure 3–39): The context menu allows the operator to pull up control dialogs with the specific Trailblazer (being hovered over) being selected in the control GUI.

Figure 3–39 – Trailblazer Context Menu

- **HAR Context Menu** (see Figure 3–40): If the operator currently owns any incident, this context menu provides the operator with a list of response plans to which the HAR can be added. The context menu also allows the operator to pull up control dialogs with the specific HAR (being hovered over) being selected in the control GUI.
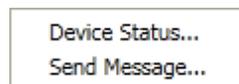
Figure 3–40 – HAR Context Menu

- **IMS Context Menu** (see Figure 3–41): This context menu provides the operator with options for accessing the IMS subsystem by selecting an icon on the map.
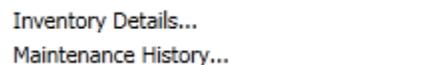
Figure 3–41 – IMS Context Menu

- **Ramp Meter Context Menu** (see Figure 3–42): This context menu provides the operator with options for Ramp Meter devices available by selecting an icon on the map.

Alarms...
Central Time of Day...
Control...
Firmware Parameters...
Reset...

Figure 3–42 – Ramp Meter Context Menu

- **RSE Context Menu** (see Figure 3–43): This context menu provides the operator with options for RSE devices available by selecting an icon on the map.

Configure RSE...
View RSE Status...
View TAMs...
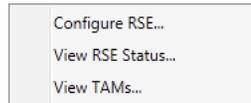
Figure 3–43 – RSE Context Menu

- **RWIS Context Menu** (see Figure 3–44): This context menu provides the operator with options for RWIS devices available by selecting an icon on the map.

Station Status...
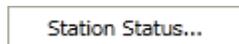
Figure 3–44 – RWIS Context Menu

- **Safety Barrier Context Menu** (see Figure 3–45): This context menu provides the operator with options for Safety Barrier devices available by selecting an icon on the map.

Device Status...
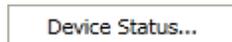
Figure 3–45 – Safety Barrier Context Menu

- **TSS Detector Context Menu** (see Figure 3–46): This context menu allows the operator to view the status of the detector.
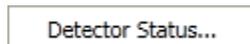
Detector Status...

Figure 3–46 – TSS Detector Context Menu

- **TSS Link / IDS Alarm Context Menu** (see Figure 3–47): The TSS Link context menu allows the operator to view the status of the detector (see Figure 3–47) or view the status of the link (see Figure 3–134). In addition to the capability provided by other device context menus, this context menu provides the operator with a shortcut to handle an alarm from a TSS link, VisioPaD camera, or other alarm source.

Detector Status...
Handle Alarm tss-634093548144996092...
Link Status...
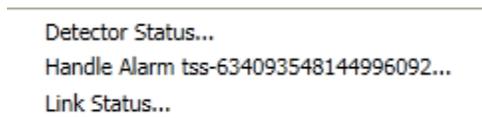
Figure 3–47 – TSS Link / IDS Alarm Context Menu

- **VSL Context Menu** (see Figure 3–48): This context menu allows the operator to view the status of the VSL.

Figure 3–48 – VSL Context Menu

- **Toll Lane Status / Toll Rate DMS Context Menu** (see Figure 3–49): This context menu provides the operator with options for Toll Lane Status Signs and Toll Rate Signs by selecting an icon on the map.
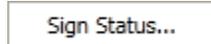
Figure 3–49 – Toll Lane/Toll Rate Context Menu

- **C2C Event Context Menu** (see Figure 3–50): This context menu provides the operator with options for remote events available by selecting an icon on the map.

Figure 3–50 – C2C Event Context Menu

3.2.4 C2C

Cameras from other centers may be controlled via the C2C Camera Control dialog, which can be accessed by left clicking on a camera icon on the map or selecting Camera Control from the Center-to-Center context menu. The C2C Camera Control dialog is shown in Figure 3–51.

Figure 3–51 – C2C Camera Control

Options that can be selected from the C2C Camera Control dialog include:

- **Find on Map:** Pressing this button will cause the graphical map to "re-center" on the selected CCTV.

- **Filter**: Allows the list of CCTV devices to be filtered, options include: **All Cameras, Active, Error / Failed, Out of Service,** by **Group** or by **Center**.

- **Pan/Tilt/Zoom:** Delta commands (i.e., move from current position) can be sent to the CCTV.

- **Presets:** An established preset can be sent to the CCTV.

- **Remote Username and Password:** These are the credentials that will be sent with the command to the center that controls the device; the credentials must have the appropriate permissions to perform the requested operation.

The status of DMSs from other centers may be accessed via the C2C DMS Status dialog, which can be accessed by left clicking on a DMS icon on the map. The C2C DMS Status dialog is shown in Figure 3–52.
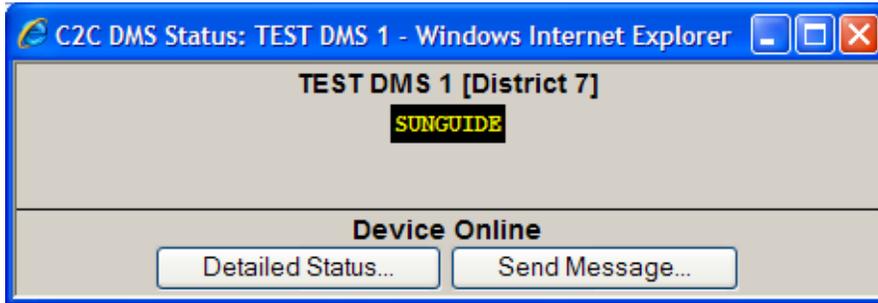
Figure 3–52 – C2C DMS Status

Options that can be selected from the C2C DMS Status dialog include:

- **Detailed Status:** Selecting this button will cause a more detailed status screen to be displayed; this dialog is shown in Figure 3–53.
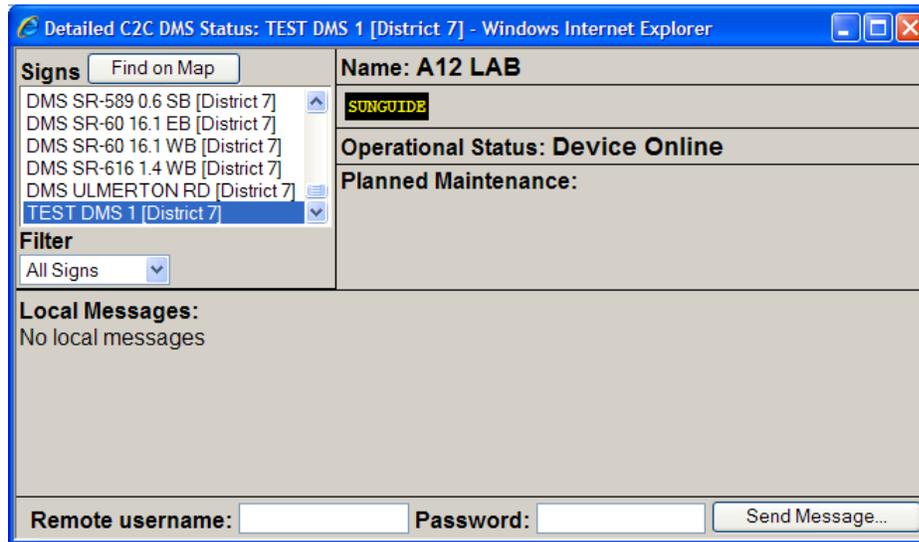
Figure 3–53 – C2C DMS Status

- **Send Message:** Selecting this button will cause the C2C Send DMS Message dialog to be displayed; this dialog is shown in Figure 3–54.
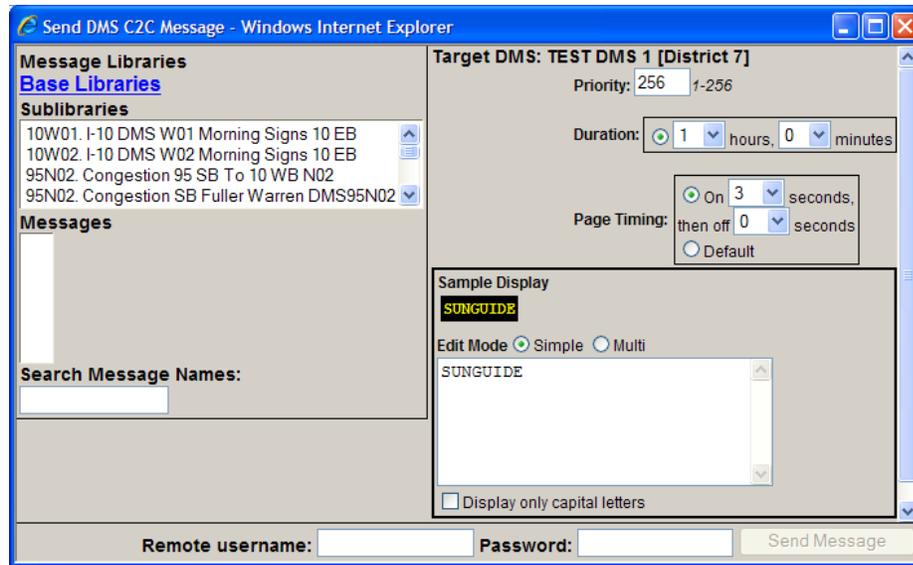
Figure 3–54 – C2C Send DMS Message

Options that can be selected from the C2C DMS Status dialog include:

- **Find on Map:** Pressing this button will cause the graphical map to "re-center" on the selected DMS.

- **Filter**: Allows the list of DMS devices to be filtered, options include: **All Signs, Active, Error / Failed, Out of Service,** by **Group** or by **Center**.

- **Local Messages:** Messages sent to this remote device from the local center are displayed here. Filling in a username and password, then pressing the Remove button allows a locally dispatched message to be cancelled on the remote device.

- **Send Message:** Selecting this button will cause the C2C DMS Control dialog to be displayed; this dialog is shown in Figure 3–54**.**

- **Remote Username and Password:** These are the credentials that will be sent with the command to the center that controls the device; the credentials must have the appropriate permissions to perform the requested operation. In this dialog, these credentials are only necessary for removing locally dispatched messages from remote devices.

Options that can be selected from the C2C Send DMS Message dialog include:

- **Base Libraries:** Selecting this link will reset the list of libraries to the base libraries that have been defined within the DMS subsystem. An operator may then select a library from the list of **Sub-libraries** which will then provide a list of messages within that sub-library (from which the operator can select a message – the selected message will be moved to the edit field of the dialog). When a sub-library is selected, the operator may type in the **Search Message Names** field to locate messages that match the sequence of characters being typed. **Duration**: Allows the operator to specify how long the message should be displayed, a specific number of h**ours can be specified** or the message can be displayed indefinitely.

- **Page Timing**: Allows the opera**tor to sel**ect th**e page tim**ing for the message.

- **Priority**: The priority to assign the message in the remote center's device queue**.**

- **Sample Display**: The **Sample Display** box is used to enter the text that should be displayed on the sign. The operator may type in either **Simple** text (the default) or in **MULTI** format (this is the NTCIP DMS formatting standard). As the numbers of characters exceed the size of the sign the dialog will automatically generate phases (pages) to be displayed.

- **Send Message**: When selected, the message (and its attributes) will be sent to the remote center for processing.

- **Remote Username and Password:** These are the credentials that will be sent with the command to the center that controls the device; the credentials must have the appropriate permissions to perform the requested operation.

The status of HARs from other centers may be accessed via the C2C HAR Status dialog, which can be accessed by left clicking on a HAR icon on the map or selecting HAR Status from the Center-to-Center context menu. The C2C HAR Status dialog is shown in Figure 3–55.
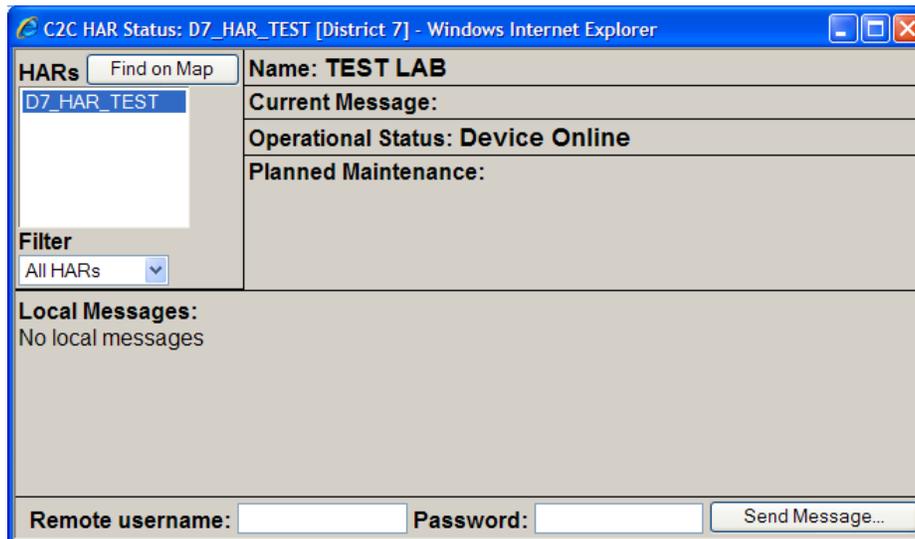
Figure 3–55 – C2C HAR Status

Options that can be selected from the C2C HAR Status dialog include:

- **Find on Map:** Pressing this button will cause the graphical map to "re-center" on the selected HAR.

- **Filter**: Allows the list of HAR devices to be filtered, options include: **All HARs, Active, Error / Failed, Out of Service,** by **Group** or by **Center**.

- **Local Messages:** Messages sent to this remote device from the local center are displayed here. Filling in a username and password, then pressing the Remove button allows a locally dispatched message to be cancelled on the remote device. **Remote Username and Password:** These are the credentials that will be sent with the command to the center that controls the device; the credentials must have the appropriate permissions to perform the

requested operation. In this dialog, these credentials are only necessary for removing locally dispatched messages from remote devices.

- **Send Message:** Selecting this button will cause the C2C Send HAR Message dialog to be displayed; this dialog is shown in Figure 3–56**.**
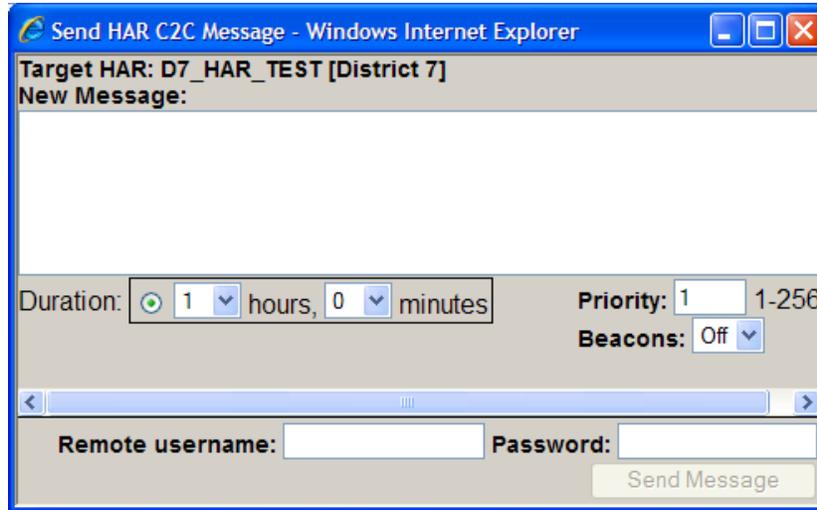
Figure 3–56 – C2C Send HAR Message

Options that can be selected from the C2C Send HAR Message dialog include:

- **Target HAR**: The **Target HAR** box is used to enter the text that should be played on the HAR device.

- **Duration**: Allows the operator to specify how long the message should be played

- **Priority**: Allows the operator to place a priority on the message.

- **Beacons**: Specify whether or not the beacons should be activated.

- **Send Message**: When selected, the message (and its attributes) will be sent to the remote center for processing.

- **Remote Username and Password:** These are the credentials that will be sent with the command to the center that controls the device; the credentials must have the appropriate permissions to perform the requested operation.

The status of RWIS devices from other centers may be accessed via the C2C RWIS Status dialog, which can be accessed by left clicking on a RWIS icon on the map or selecting RWIS Status from the Center-to-Center context menu. The C2C RWIS Status dialog is shown in Figure 3–57.
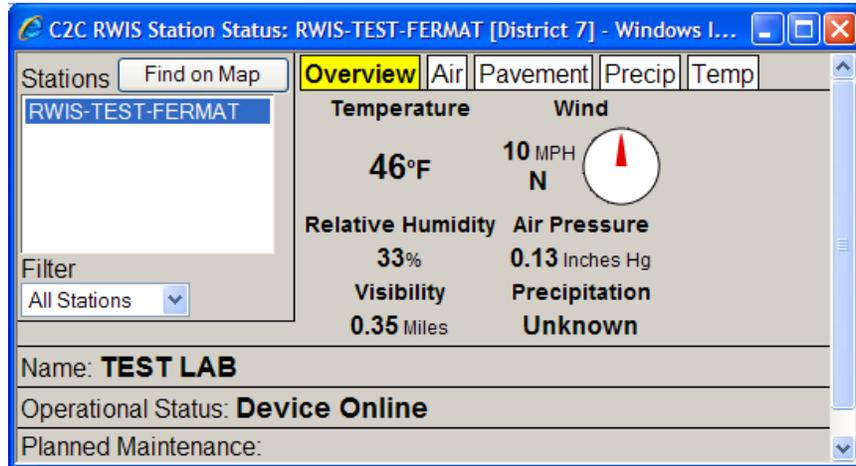
Figure 3–57 – C2C RWIS Status

Options that can be selected from the RWIS Status dialog include:

- **Find on Map:** Pressing this button will cause the graphical map to "re-center" on the selected RWIS.

- **Filter**: Allows the list of RWIS devices to be filtered, options include: **All Stations, Active, Error / Failed, Out of Service,** by **Group** or by **Center**.

- **Tabs:** The dialog has tabs for other categories of information (e.g., air, pavement, precipitation and temperature), selecting these tabs will provide a detailed view of information for the class of data.

The status of traffic condition links from other centers may be accessed via the C2C Link Status dialog, which can be accessed by left clicking on a C2C traffic link on the map. The C2C Link Status dialog is shown in Figure 3–58.
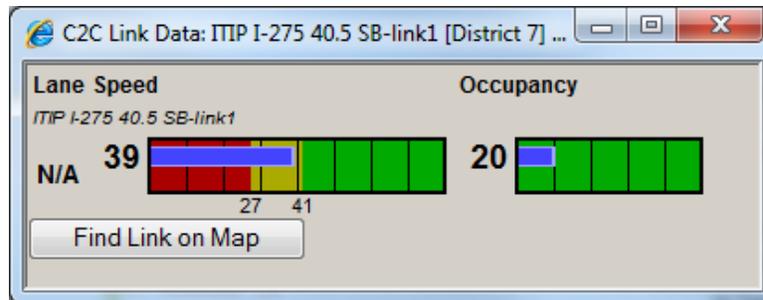
Figure 3–58 – C2C Link Status

Speed coloration thresholds are determined based on the speed limit of the link and the system-wide C2C threshold percentages. Options that can be selected from the C2C Link Status dialog include:

- **Find Link on Map:** Pressing this button will cause the graphical map to "re-center" on the selected link, and will highlight the link in an alternate color.

The status of events from other centers may be accessed via the Event List dialog, which can be accessed by selecting Event List from the Center-to-Center context menu. The Event List dialog is shown in Figure 3–59.
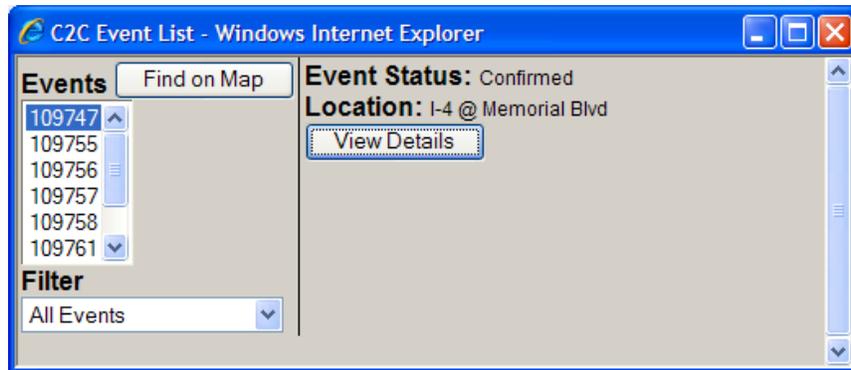
Figure 3–59 – C2C Incident List

Options that can be selected from the Incident Status dialog include:

- **Find on Map:** Pressing this button will cause the graphical map to "re-center" on the selected incident.

- **Filter**: Allows the list of incidents to be filtered, options include: **All Incidents, Status: Detected, Status: Verified, Status: Moved, Status: Cleared, Status: Queue Cleared** or by **Center** (the names of actively connected Centers will be displayed).

- **View Details:** Selecting this button will display a detailed status dialog that is shown in Figure 3–60.
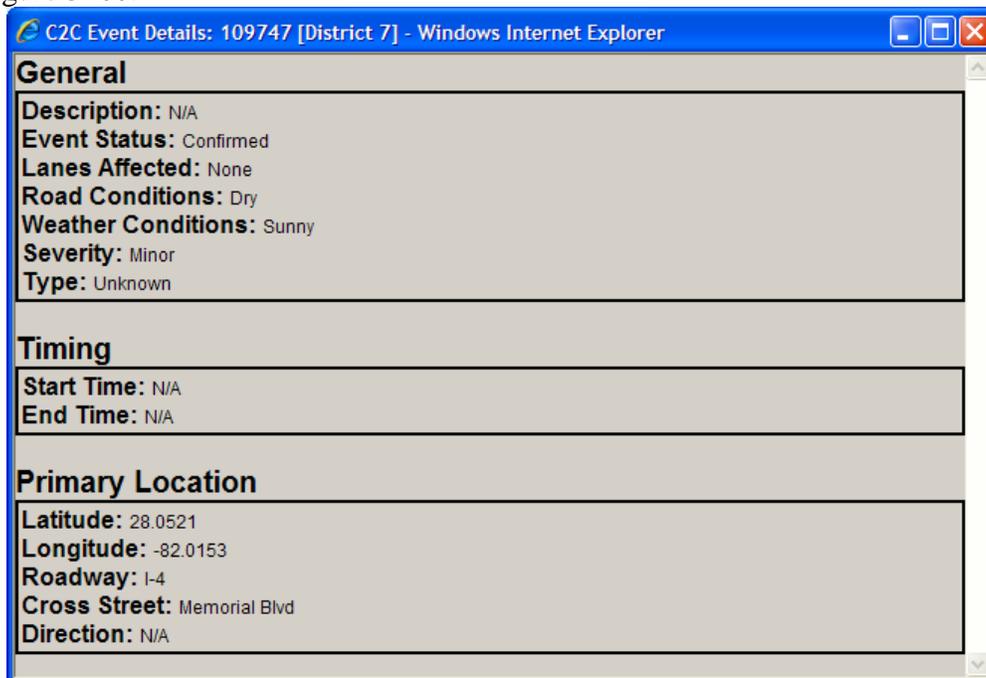
Figure 3–60 – C2C Event Details

A similar set of the Event Details screens are available for Lane Closures being published by the Center-to-Center software.

Activation or deactivation of local approval of remote DMS and HAR messages can be accomplished by selecting On or Off from the Center-to-Center->Operator Approval of Remote Messages context menu. This option is on available to users with the appropriate permissions. If local approval is currently required, the context menu will show an option to turn approval off. If local approval is not currently required, the context menu will show an option to turn approval on. Note that if local approval is not enabled, DMS and HAR messages sent from remote centers through C2C will be placed directly on the appropriate device's queue without intervention in the local center.

Center-to-Center Floodgate messages can be displayed by selecting Floodgate Messages from the Center-to-Center context menu. This software is discussed in detail in Section 3.3.10.

Display of Center-to-Center traffic condition data can be managed through the C2C Network Selection dialog, which is accessed by selecting Select Networks from the Center-to-Center context menu. The C2C Network Selection dialog is shown in Figure 3–61.
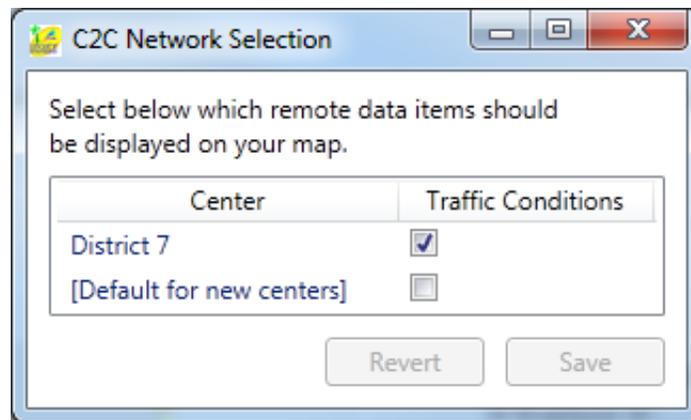
Figure 3–61 – C2C Network Selection

In the C2C Network Selection dialog, traffic condition links for individual centers may be displayed or hidden by toggling the Traffic Conditions checkbox for the district and pressing the Save button. For centers which are not currently known to the system, a default setting can be assigned using the Traffic Checkbox control labeled "Default for new centers". The Revert button allows any changes that have not yet been saved to be abandoned.

3.2.5 Cameras

The Cameras context menu displays several options.

- **Camera Blocking**: launches the tabbed GUI with the CCTV tab selected (see section 3.3.3)

- **Camera Control**: described in detail within this section

- **Scheduler**: available only when the SAS subsystem is connected. This software is discussed in detail in Section 3.2.15.

- **USB Joystick Configuration**: Camera Control: described at the end of this section

Cameras may be controlled via the Camera Control panel, which can be accessed by left clicking on a camera icon on the map, right-clicking on a camera and selecting Camera Control or

selecting Camera Control from the context menu. The Camera Control panel is shown in Figure 3–62.
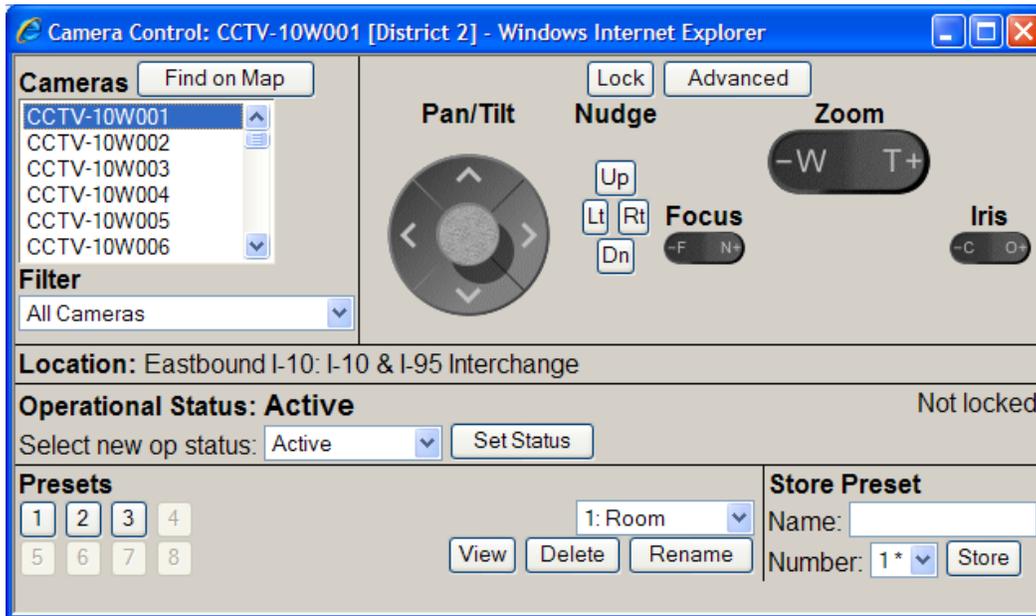
Figure 3–62 – Camera Control

Options that can be selected from the detailed status include:

- **Find on Map:** Pressing this button will cause the graphical map to "re-center" on the selected camera.

- **Cameras:** Presents a list of cameras configured within the SunGuide system that match the filter criteria.

- **Filter**: Allows the list of cameras to be filtered, options include: **All Cameras, Active, Error / Failed, Out of Service,** by **Group** or by **Center**.

- **Lock / Unlock:** If an operator wishes to lock a camera indefinitely the operator must "manually" acquire the lock (by selecting the 'Lock' button), this lock will not expire due to timeout. If an operator "automatically" acquires the lock by simply controlling the camera, this lock will timeout per configurable value in the system configuration file ("lockTimeout"). This lock may be released by selecting the 'Unlock' button which replaces the 'Lock' button when a requested lock is granted.

- **Pan/Tilt, Nudge, Zoom, Focus,** and **Iris**: The operator can push these simulated buttons using the mouse (left clicking) to change the position of the camera. The first time movement is attempted the camera will be "locked" and the **Lock** button will change to **Release.**

- **Advanced** (see Figure 3–63): Allows advanced commands to be sent to devices, this includes features like camera menu control and the ability to query various features of the device. Those values that may be queried are listed below; definitions for these can be found in NTCIP 1205 standard.

- o Absolute Position
- o Alarm Label Index
- o Alarm Latch Clear
- o Alarm Latch Status
- o Alarm Status
- o Camera Equipment Availability
- o Camera Feature Status
- o Camera Label Location Index
- o Current Camera Labels
- o Display Camera Labels
- o Input Label Index
- o Input Latch Clear
- o Input Latch Status
- o Input Status
- o Lens Equipment Availability
- o Lens Feature Status
- o Input Status
- o Maximum Number of Zones
- o Maximum Number of Labels
- o Output Control
- o Output Label Index
- o Output Status
- o Pressure Alarm Threshold
- o Pressure Alarm Value
- o Range Objects
- o Temperature Alarm Threshold
- o Temperature Alarm Value
- o Timeout Parameters
- o Washer Fluid Alarm Threshold
- o Washer Fluid Alarm Value
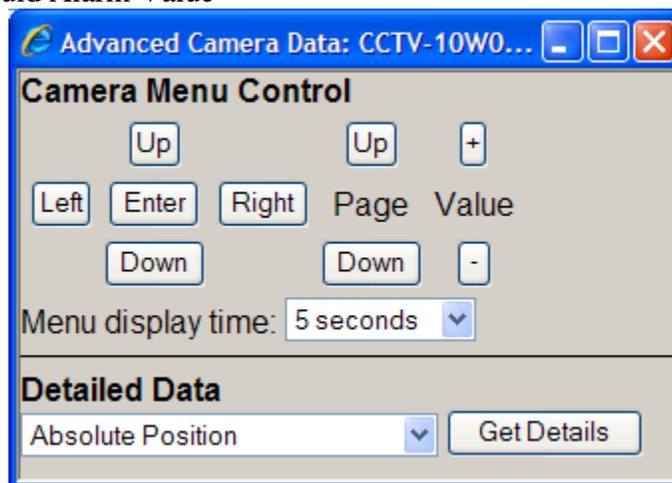
Figure 3–63 – Advanced Camera Dialog

- **Set Status**: Allows the status of the selected Camera to be set to either **Active** or **Out of Service**.

- **Presets**: These options allow the operator to access presets. This can occur in several ways, the first is to simply select one of the preset numbers (**1** through **8**); the other way is to select the name of the preset and press the **View** button. A preset can be deleted by selecting the **Delete** button and renamed by selecting the **Rename** button and entering a new name.

- **Store Presets**: This option allows the operator to save the current position of the camera as a preset (the preset is physically stored in the camera). The operator enters a name and number of the preset and presses the **Store** button.

Cameras may also be controlled through the use of a USB joystick compatible with the Microsoft USB joystick interface. Prior to use, the buttons on the joystick must be associated with camera control functions. This operation is performed by selecting USB Joystick Configuration from the Cameras context menu (see Figure 3–64).
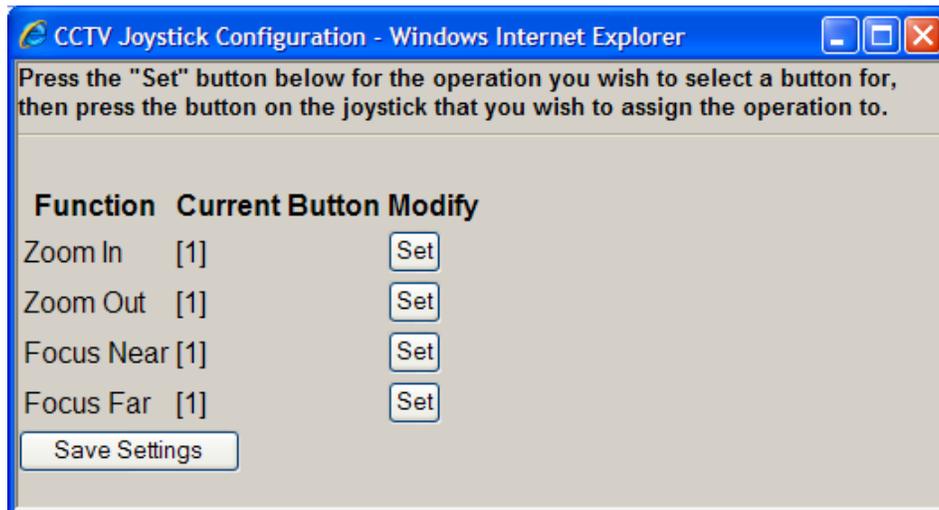
Figure 3–64 – Joystick Configuration

3.2.6 Connected Vehicles

Connected Vehicle Roadside Equipment (RSEs) can be configured, have their status viewed, and have Traveler Advisory Messages (TAMs) broadcast to them from the map, via various dialogs. These processes and their associated dialogs are described in the following sections.

3.2.6.1 RSE Configuration

By selecting RSE Configuration from the Connected Vehicle context menu, RSEs may be added, modified, and deleted. A list of all defined RSEs is presented at the top of the dialog with two tabs to view configuration and location information. RSEs may be modified by editing the entry in the table, or new RSEs added or deleted using the Add and Delete buttons. New RSEs are shown in a green row color, modified RSEs in yellow, and deleted RSEs in red. The RSE parameters are as follows:

- **Id**: Unique identifier of the RSE.

- **Driver**: The CVS driver used to communicate with the RSE.
- **TSS Driver**: The TSS driver which will transfer CVS speed data to matching TSS links.
- Host Name: The host or IP address of the RSE.
- **TAM Port (POC)**: The port number on which to send POC formatted TAMs to the RSE.
- **TAM Port (2009-11)**: The port number on which to send 2009-11 TAMs to the RSE.
- **Roadway, Direction, Latitude, Longitude, Description**: Standard equipment location data.

With an RSE selected, the lower Detection Zones section will display a list of all detection zones defined for the RSE. Parameters for each zone may be viewed using the Location and Limits tabs, and zones can be edited, added, and deleted as with RSEs. The Start Heading and End Heading fields for a detection zone are also represented by the graphical angle indicator to the right of the table. These angle controls may be directly adjusted to set the headings if desired. The Detection zone parameters are as follows:

- **Zone**: The numeric identifier of the zone. (This cannot be edited directly.)
- **Name**: A name for the zone.
- **Start Heading**: The minimum degree heading for vehicle speed reports to be included in the detection zone.
- **End Heading**: The maximum degree heading for vehicle speed reports to be included in the detection zone. (If the End Heading is lower than the Start Heading, the included heading range will wrap around from 359 degrees through 0 degrees.)
- **# Geom Points**: Number of points in the zone's bounding geometry. (This cannot be edited directly.)
- **Length**: Length of the detection zone, in miles.
- **# Lanes**: Number of lanes to display for the detection zone. (Though multiple lanes may be displayed, data is not calculated based on lane information.)
- **Alarm Threshold**: Speed below which TSS should trigger an alarm condition on the detection zone.
- **Recovery Threshold**: Speed the zone must return to following an alarm before triggering a new alarm.
- **Speed Limit**: Posted speed limit of the zone.
- **Arterial**: Whether the detection zone covers an arterial roadway (as opposed to a freeway).
- **FLATIS Publish**: Whether the detection zone should be published to FL-ATIS.

The geometric bounding region of the detection zone can be set using the Edit Zone Geometry button. Once pressed, this will shift the map into a mode where the detection zone boundaries can be created or edited. If no boundaries exist, simply clicking on the map will create a series of points to define the geometry. If the geometry previously existed, those points can be moved by dragging or deleted through the context menu, and new points can be added by opening the context menu on an existing line segment to add a new midpoint. Once all changes are complete in either mode, pressing the Done button on the map will accept the changes.

Once all desired changes have been made, pressing the Save button will commit the updates to the system, while pressing the Revert button will restore the dialog to the current configuration

of the system. If any values are invalid, a warning will be displayed at the bottom of the dialog and must be resolved before saving.
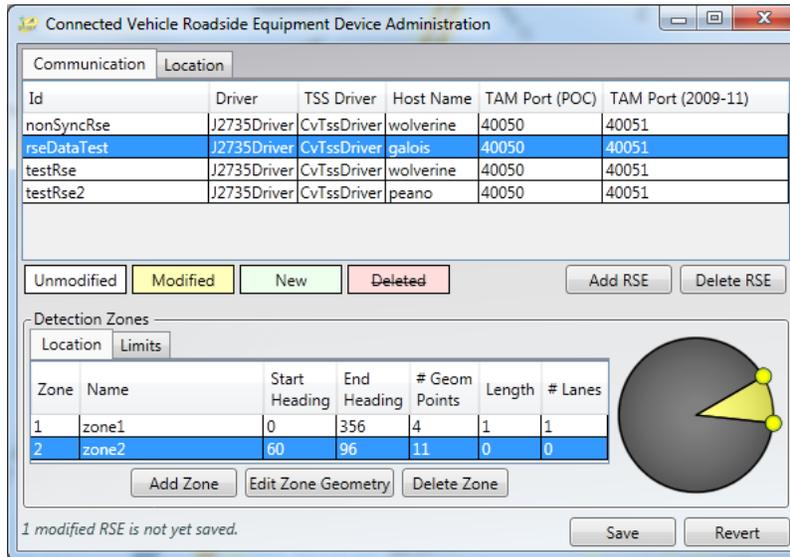
Figure 3–65 – RSE Configuration

To provide speed information to the rest of SunGuide, the configuration dialog will attempt to automatically create a TSS detector to pass the RSE's detection zone information through, and will create matching links and lanes for each zone. If any part of this process fails, the user will be warned, and the Configuration Inspector may be used to identify and correct problems.

3.2.6.2 RSE Configuration Inspector

To provide speed data from RSEs to the rest of SunGuide, specific configuration information must be synchronized between CVS and TSS. Specifically, each RSE should have a TSS detector with an identical ID, and each RSE detection zone should have a matching link and lane on the matching TSS detector. To resolve potential conflicts when this synchronization is lost, the Configuration Inspector, launched from the Connected Vehicle context menu, will highlight likely configuration errors.
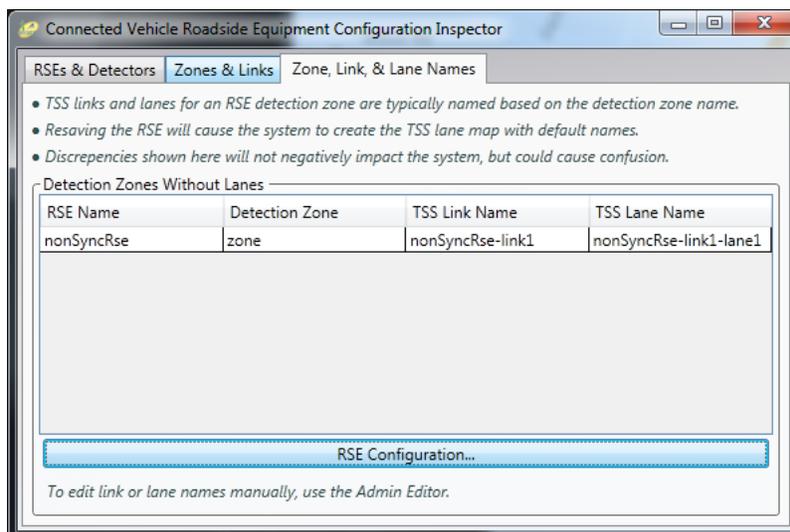
Figure 3–66 – RSE Configuration Inspector

The first tab of the Configuration Inspector identifies RSE and detector inconsistencies. It will identify the following conditions, which will likely cause data not to propagate through the system as expected:

- RSEs which have no TSS detector with a matching ID.
- TSS detectors which are configured to use a driver that reports CVS data but which have no RSE with a matching ID.

The second tab of the Configuration Inspector identifies RSE detection zone and TSS lane number inconsistencies. It will identify the following conditions, which will likely cause data not to propagate through the system as expected:

- RSEs which have a detection zone defined, but which do not have a TSS lane defined on the matching TSS detector using that detection zone's zone number.
- TSS lanes on an RSE's detector which are defined using a zone number that is not assigned to any detection zone on the RSE.

The final tab of the Configuration Inspector identifies RSE detection zone and TSS link and lane name inconsistencies. These issues will not cause a data throughput problem, but may cause confusion as the zones and lanes do not have matching names.

3.2.6.3 RSE Status

By selecting RSE Status from the Connected Vehicle context menu, the current state of each RSE may be reviewed, their operational status may be changed, and TAMs reviewed and updated. The top of the dialog provides a filter which allows the list of RSEs to be narrowed based on the selection. The number currently displayed out of the total number of RSEs is listed next to the filter option. The Find on Map button will recenter the map to the location of the currently selected RSE and highlight it.
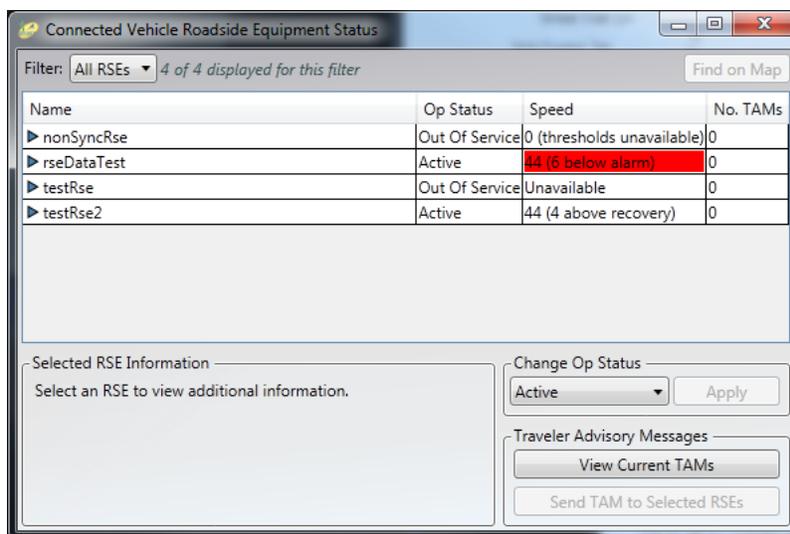
Figure 3–67 – RSE Status

The main table of the dialog summarizes the RSEs in the system, displaying the name, op status, most severe speed, and number of TAM messages being broadcast. An RSE may be expanded

using the arrow to the left of the name. This will cause additional rows to be added representing each detection zone of the RSE, and displaying the individual zone speed records.

For an individual RSE, the most severe speed is determined using the following rules:

- If any detection zone is reporting a speed lower than the alarm threshold for its matching TSS lane, the zone which is reporting the speed most below its alarm threshold is selected and colored red. (For instance, a zone with a speed of 25 and a threshold of 35 is more severe than a zone with a speed of 20 and a threshold of 25.)
- Otherwise, if any detection zone is reporting a speed lower than the recovery threshold for its matching TSS lane, the zone which is reporting the speed closest to its *alarm* threshold is selected (i.e., severity is based on how close the zone is to alarm status, not recovery status) and colored yellow.
- Otherwise, the detection zone reporting a speed closest to its recovery threshold is selected.
- If two lanes match the same severity, one is selected for display arbitrarily.

The lower portion of the dialog shows additional location information regarding the RSE(s) currently selected, provides a control to change the op status of the RSE, and provides controls to view the TAMs broadcasting on the selected RSE or send a new TAM to the selected RSE(s).

3.2.6.4 TAM Management

By selecting Traveler Advisories from the Connected Vehicle context menu or pressing the View Current TAMs button in the RSE status dialog, the list of TAMs being broadcast by the system may be reviewed and edited. The top of the dialog provides a filter which allows the list of TAMs to be narrowed based on the selection. The number currently displayed out of the total number of TAMs is listed next to the filter option.
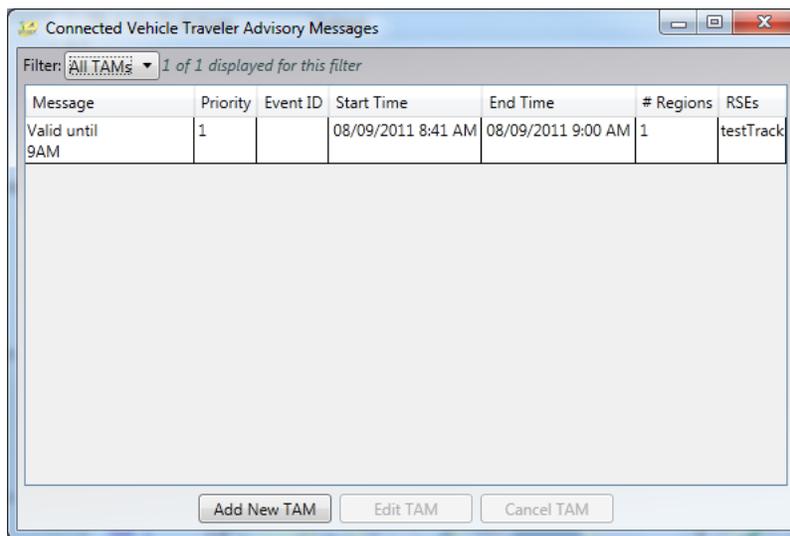
Figure 3–68 – TAM List

The main table of the dialog summarizes the TAMs in the system, displaying the message, priority, related event ID, start and end times, number of presentation regions, and RSEs broadcasting the TAM. If an event ID is present, it may be clicked to launch the event details dialog for the event. A new TAM may be created using the Add New TAM button, while

existing TAMs can be edited or deleted using the Edit TAM and Delete TAM buttons respectively.

3.2.6.5 TAM Editing

Whenever a TAM is being created or edited, the TAM edit dialog is displayed. This dialog allows the various attributes of a TAM to be modified, including RSEs broadcasting the message, the message text, priority, and timing, and the presentation regions in which to display the message.
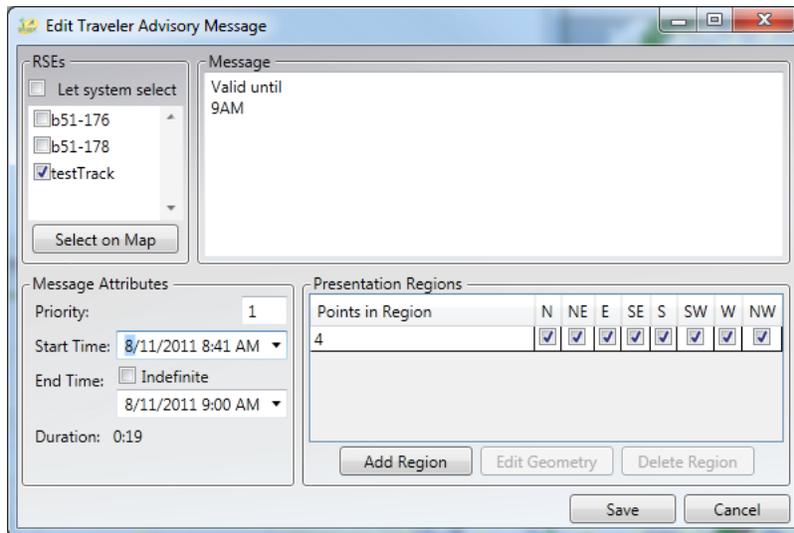
Figure 3–69 – Edit TAM

The upper left control allows a user to either have the system auto-select RSEs based on their proximity to the presentation regions, or manually select TAMs from a list. By pressing the Select on Map button, the user may instead click RSE icons on the map to toggle RSEs on or off for broadcast of the TAM. The text of the message may be entered in the upper right of the dialog, using multiple lines if necessary. The lower right of the dialog allows the priority to be set to a value between one and seven, and allows a start and end time to be selected. The resulting duration is displayed. If the message should be displayed for an indeterminate time, the Indefinite checkbox may be toggled on.

The lower right of the dialog allows configuration of presentation regions for the TAM. A region may be added or deleted using the Add Region and Delete Region buttons, respectively. Each region is represented by a line in the table, showing the number of points the region is composed of and which directions of travel the message should be restricted to. The geometric bound of the presentation region can be set using the Edit Geometry button. Once pressed, this will shift the map into a mode where the presentation region boundaries can be created or edited. If no boundaries exist, simply clicking on the map will create a series of points to define the geometry. If the geometry previously existed, those points can be moved by dragging or deleted through the context menu, and new points can be added by opening the context menu on an existing line segment to add a new midpoint. Once all changes are complete in either mode, pressing the Done button on the map will accept the changes.

When all appropriate modifications to the TAM are complete, pressing the Save button will commit the TAM to the system for broadcast, while pressing Cancel will abort any changes that were pending.

3.2.7 Dynamic Message Signs

Dynamic Message Signs may be controlled and checked from the map, via various dialogs. These processes and their associated panels are described in the following sections.

3.2.7.1 DMS Status and Control

The DMS Control Panel, shown in Figure 3–70, displays the current message on the sign, and the sign's current status. This panel is accessed by right clicking on a DMS icon on the map and selecting the Short Status option.
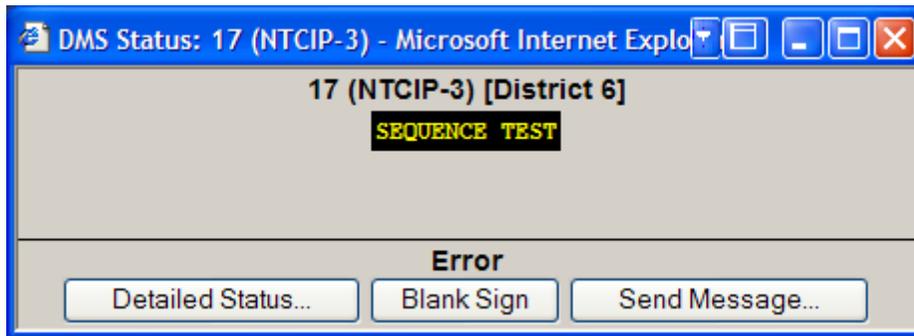
Figure 3–70 – DMS Short Status

From here, the operator may opt to display **Detailed Status** information, **Blank the Sign** or **Send a Message** to the sign. The Detailed Status can also be accessed by left clicking on a DMS icon on the map. The detailed status of a DMS sign is shown in Figure 3–71.
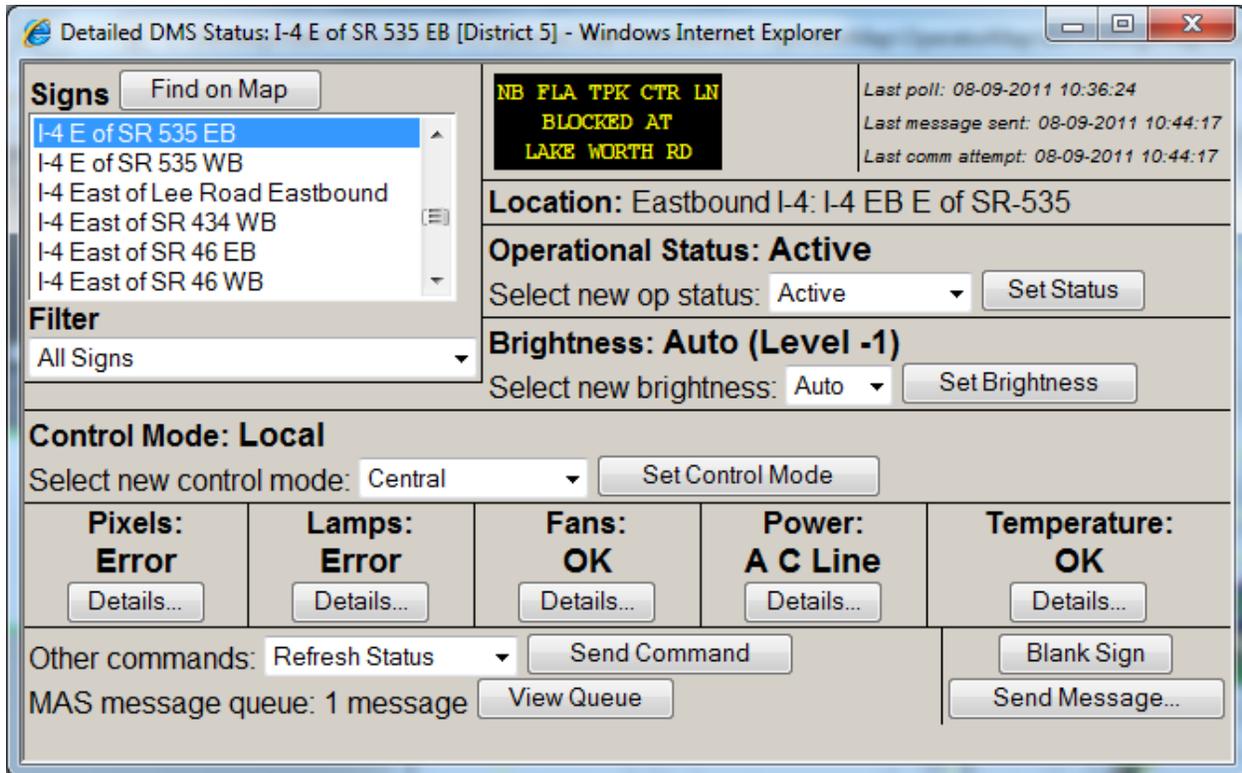
Figure 3–71 – Detailed DMS Status

Options that can be selected from the detailed status include:

- **Find on Map:** Pressing this button will cause the graphical map to "re-center" on the selected DMS.

- **Filter**: Allows the list of DMS devices to be filter, options include: **All Signs, Active, Error/Failed, Out of Service,** by group or by center (these last two options are variable based on system configuration).

- **Set Status**: Allows the status of the selected DMS to be set to either **Active** or **Out of Service**.

- **Set Brightness**: Allows the brightness of the selected DMS to be set to **Auto**, **Day,** or **Night**.

- **Detailed Pixel Status**: This option displays a graphical representation of the pixels for a sign, as shown in Figure 3–72. The display is used to display pixels in good working order (failed pixels will show up in red).
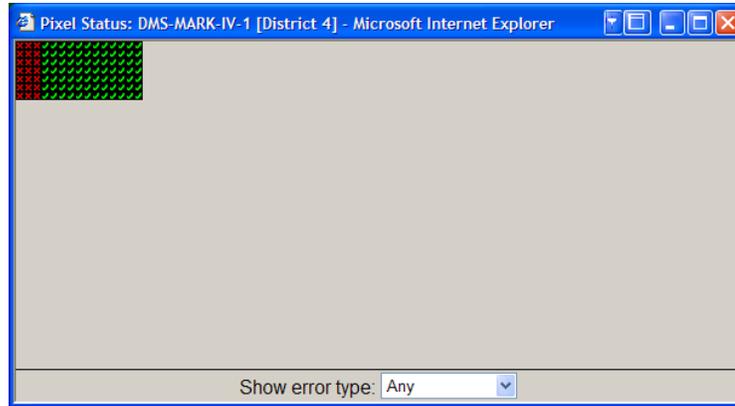
Figure 3–72 – Detailed Pixel Status

- **Detailed Lamp Status**: This option displays a graphical representation of the lamp status for a sign, as shown in Figure 3–73.
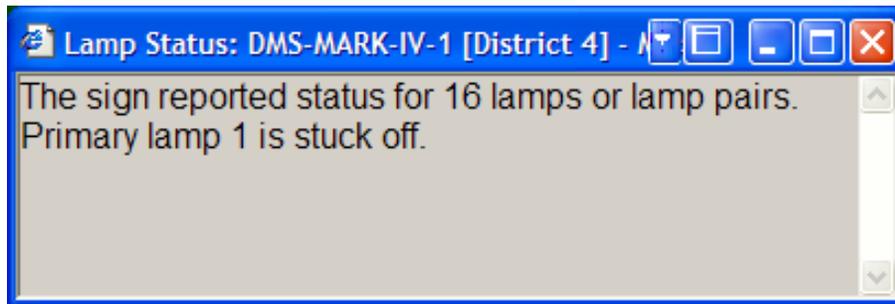
Figure 3–73 – Detailed Lamp Status

- **Detailed Fan Status**: Displays a status dialog stating the presence or lack of fan failures, as shown in Figure 3–74.
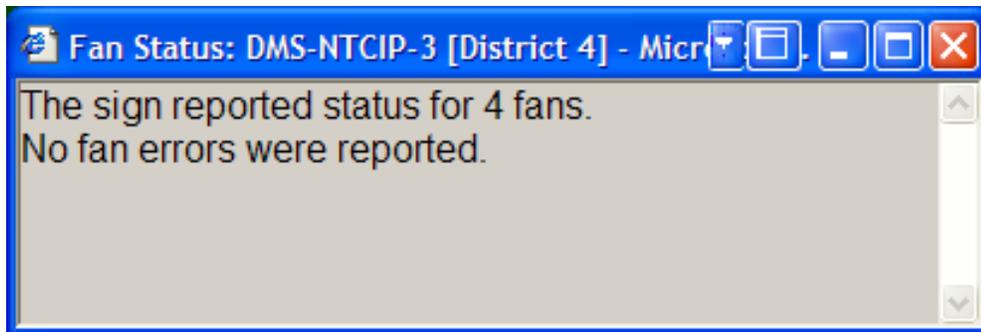
Figure 3–74 – Detailed Fan Status

- **Detailed Sign Power**: A status dialog stating the current power status is shown in Figure 3–75.
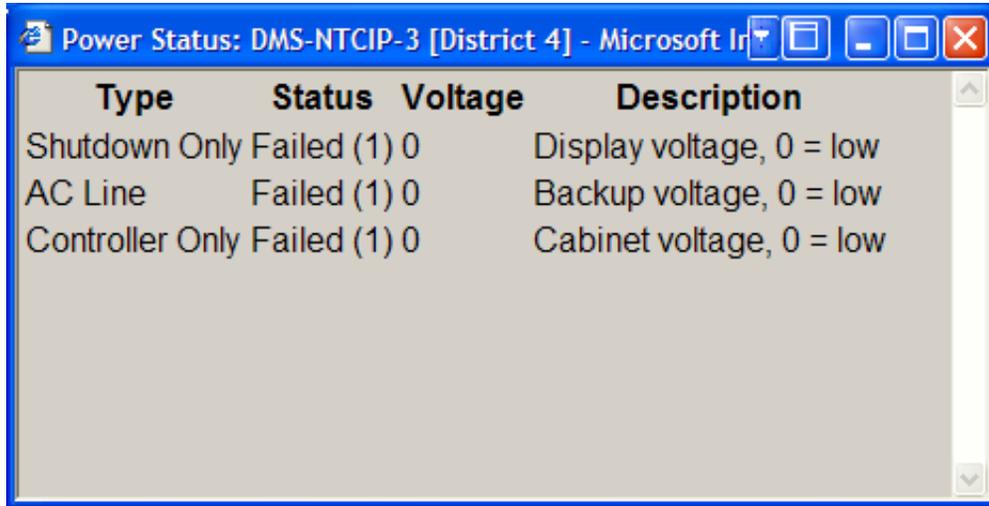
Figure 3–75 – Detailed Power Status

- **Detailed Temperature**: A status dialog showing the temperature status is shown in Figure 3–76.
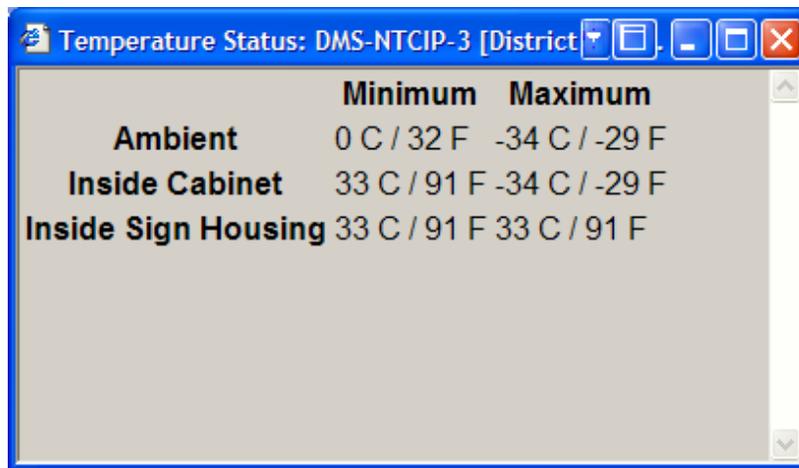
Figure 3–76 – Detailed Temperature Status

- **Send Command**: Allows the operator to send one of the following commands:
    - o **Echo Message:** resend the last message sent to the sign
    - o **Exercise Shutters:** exercise shutters on a sign by alternately opening and closing all the shutters
    - o **Refresh Status:** request the sign status (again)
    - o **Reset Controller:** reset the controller to its power on state
    - o **Synchronize Clock**: synchronize the clock in the controller the value provided
- **View Queue**: If a MAS queue exists for the device, it can be accessed by clicking this button.
- **Blank Sign**: Issues a command to blank the sign.

- **Send Message**: Selecting this option will cause the send DMS message dialog to be displayed. The send DMS message dialog is shown in Figure 3–77.
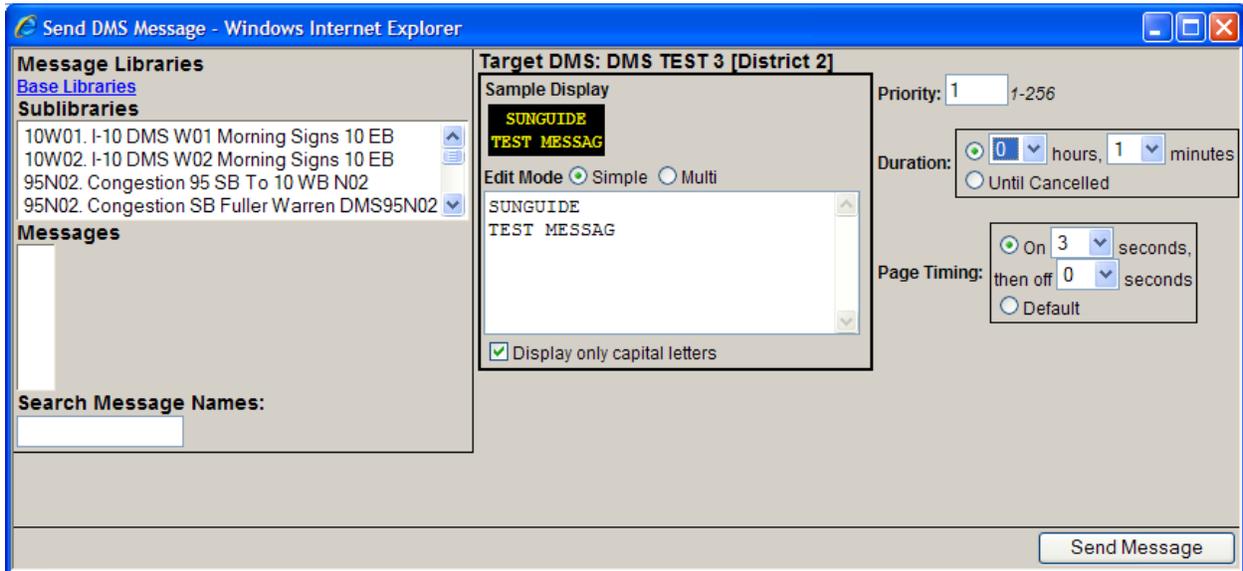
Figure 3–77 – Send DMS Message

Options that can be selected from the Send DMS Message dialog include:

- **Base Libraries:** Selecting this link will reset the list of libraries to the base libraries that have been defined within the DMS subsystem. An operator may then select a library from the list of **Sub-libraries** which will then provide a list of messages within that sub-library (from which the operator can select a message – the selected message will be moved to the edit field of the dialog). When a sub-library is selected, the operator may type in the **Search Message Names** field to locate messages that match the sequence of characters being typed.

- **Sample Display**: The **Sample Display** box is used to enter the text that should be displayed on the sign. The operator may type in either **Simple** text (the default) or in **MULTI** format (this is the NTCIP DMS formatting standard). As the numbers of characters exceed the size of the sign the dialog will automatically generate phases (pages) to be displayed.

- **Duration**: Allows the operator to specify how long the message should be displayed, a specific number of hours can be specified or the message can be displayed indefinitely.

- **Page Timing**: Allows the operator to select the page timing for the message.

- **Priority**: Depending on which subsystem or operator key stroke accessed the Send DMS Message dialog, the default priority will be different. The operator may select any valid priority for the message being composed.

- **Send Message**: When selected, the message (and its attributes) will be sent to the MAS subsystem for queuing (and eventual display to a sign).

The message will be queued on the MAS sign queues, when MAS attempts to display the message, it will go to the sign if no spelling conflicts arise and the message will be changed on

this sign. Note that no spell checking is performed before a message is placed in MAS (which implies MAS will show misspelled words) but DMS will perform spell checking before a message is sent to a sign. If spelling conflicts do arise, the dialog shown in Figure 3–78 will be displayed.
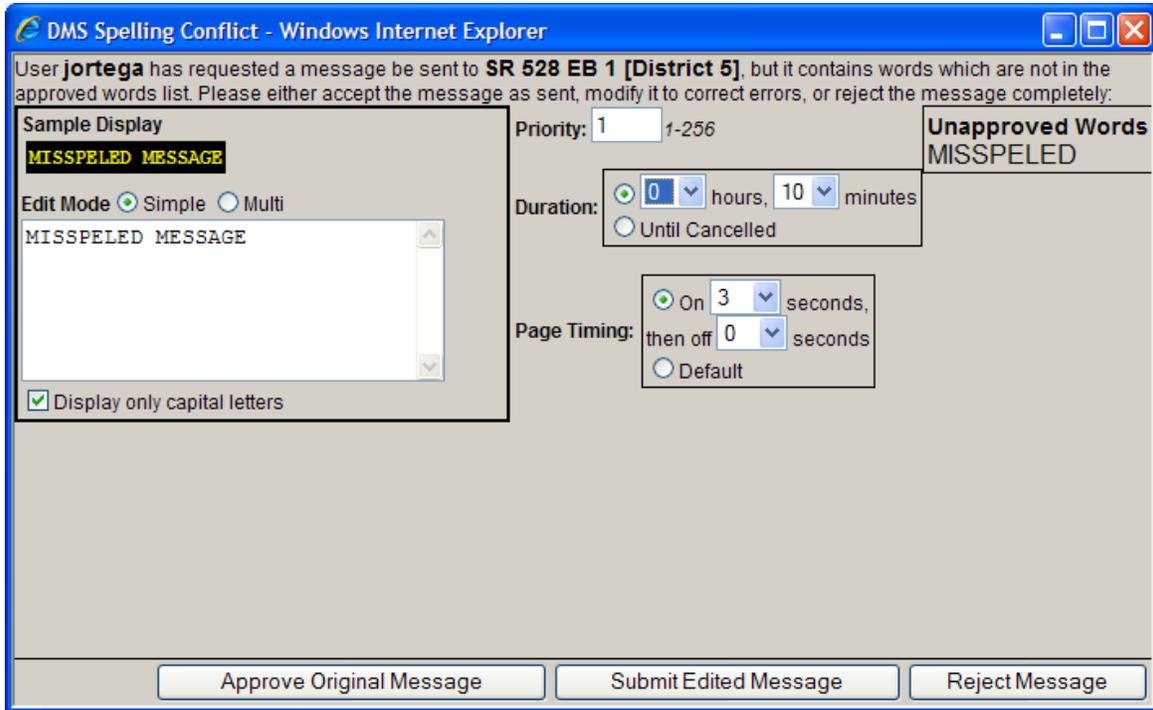
Figure 3–78 – Spelling Conflict

The spelling conflict dialog will display the proposed message (and for which sign) along with a list of unapproved words that generated the spelling conflict dialog. Options that can be selected from the spelling conflict dialog include:

- **Edit Mode**: The **Edit** box is used to enter the text that should be displayed on the sign. The operator may type in either **Simple** text (the default) or in **MULTI** format (this is the NTCIP DMS formatting standard). As the numbers of characters exceed the size of the sign the dialog will automatically generate phases (pages) to be displayed.

- **Duration**: Allows the operator to specify how long the message should be displayed, a specific number of hours can be specified or the message can be displayed indefinitely.

- **Page Timing**: Allows the operator to select the page timing for the message.

- **Priority**: Depending on which subsystem or operator key stroke access the send DMS status dialog, the default priority will be different. The operator may select any valid priority for the message being composed; priorities range in value from 1 to 256 (1 is the highest priority).

- **Approve Original Message**: If selected, it will send the message as originally composed to the MAS subsystem for queuing (and eventual display to a sign).

- **Submit Edited Message**: If selected, this will send the message as edited within the conflict dialog to the MAS subsystem for queuing (and eventual display to a sign).

- **Reject Message**: If selected, this will cancel the message request and not forward the message to MAS for queuing.

3.2.7.2 DMS Message Libraries

Message libraries are established to allow a common message to be displayed on a group of signs (for example, a Public Service Announcement can be prepared to be displayed on all signs and the SunGuide operators can decided when to activate the message – a single activation would generate messages for multiple signs. This dialog can be opened by selecting the Message Libraries option from the from the DMS context menu on the map. The dialog in Figure 3–79 displays when the option is selected.
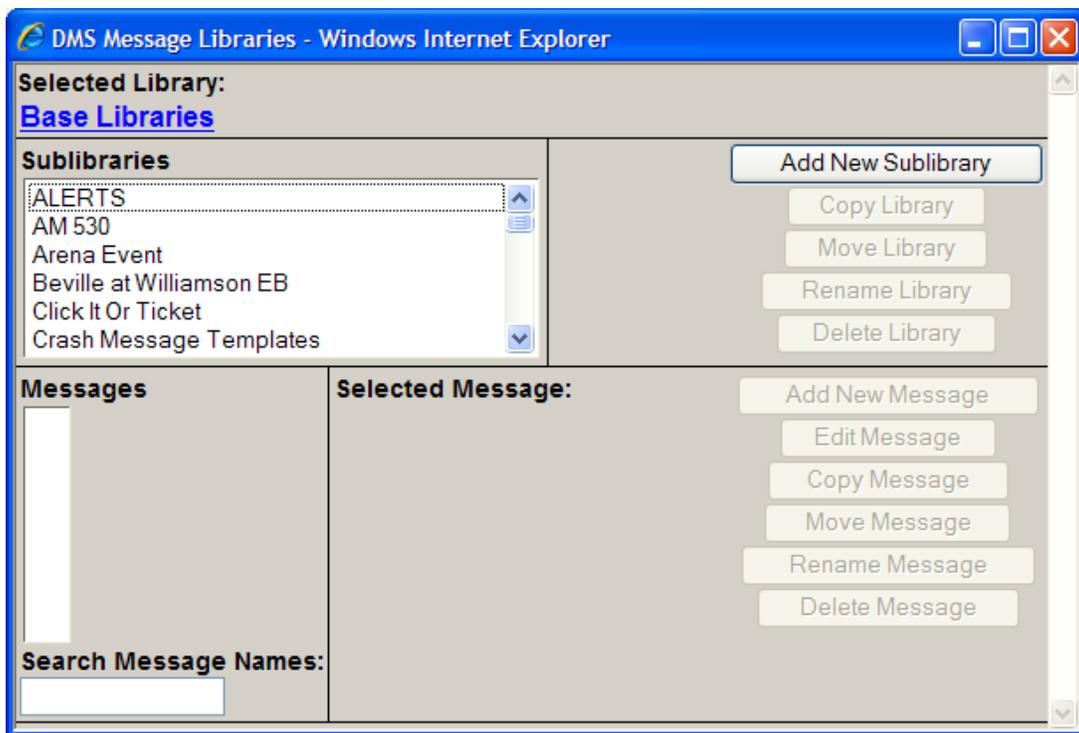
Figure 3–79 – DMS Message Library

Options that can be selected from the DMS Message Libraries dialog include:

- **Add New Sub-library:** Selecting this option will allow the operator to create a new library with the name of the operator's choice.

Once a sub-library is selected from the DMS Sequence library, the dialog in Figure 3–80 will be displayed.
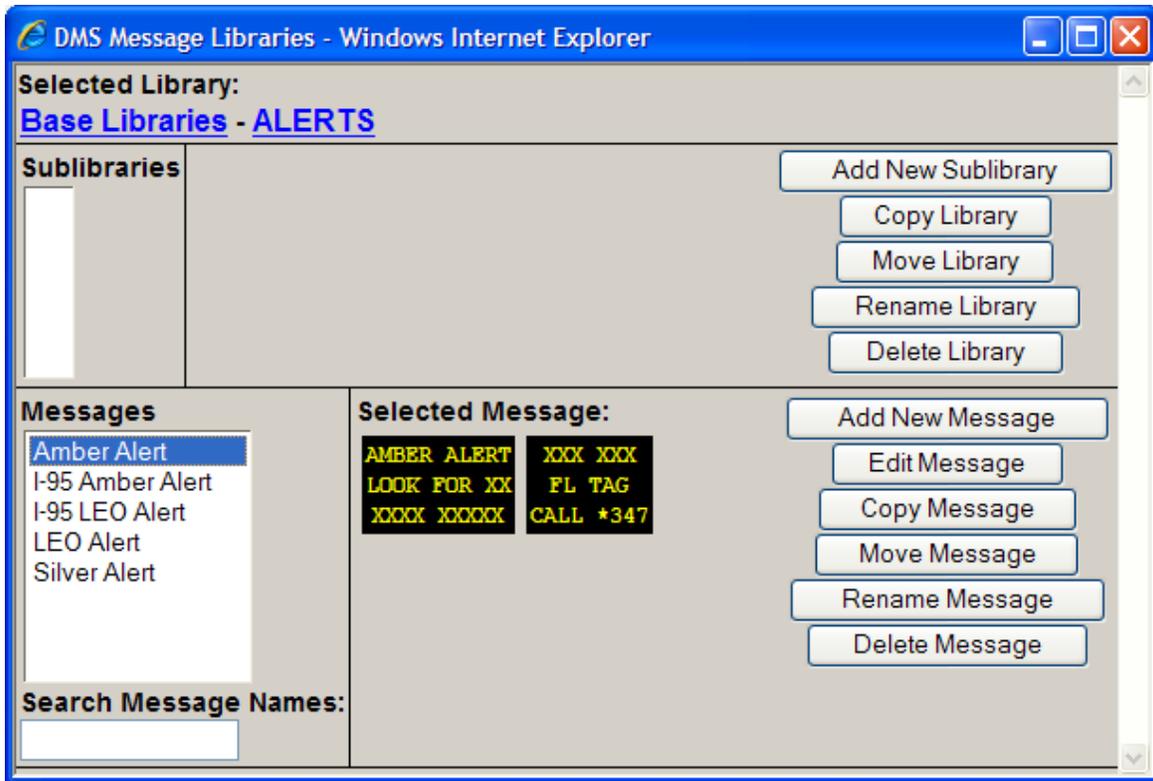
Figure 3–80 – DMS Message Library – Message Selected

Options that can be selected from the DMS Message Library dialog include:

- **Add New Sub-library:** Allows the operator to create a new library, the operator is prompted for a name.

- **Copy Library:** Allows the operator to create a copy of the selected library, the operator is prompted for a name of the new library and the name of the parent library.

- **Move Library:** Allows the operator to specify the name of the existing library to move the selected library to.

- **Rename Library:** Allows the operator to change the name of an existing library.

- **Delete Library:** Allows the operator to delete the selected library.

- **Search:** Allows the operator to type in the field to locate messages that match the sequence of characters being typed.

- **Add New Message**: Allows the operator to create a new message in the selected library, the operator is prompted for a name for the new message.

- **Edit Message**: Allows the operator to edit the selected message (see Figure 3–81).

- **Copy Message:** Allows the operator to create a copy of the selected message, the operator is prompted for a name of the new message and the name of the parent library.

- **Move Message:** Allows the operator to specify the name of the existing library to move the selected message to.

- **Rename Message:** Allows the operator to change the name of an existing message.

- **Delete Message:** Allows the operator to delete the selected message.

When the operator selects the **Edit Message** option, the dialog shown in Figure 3–81 is displayed.
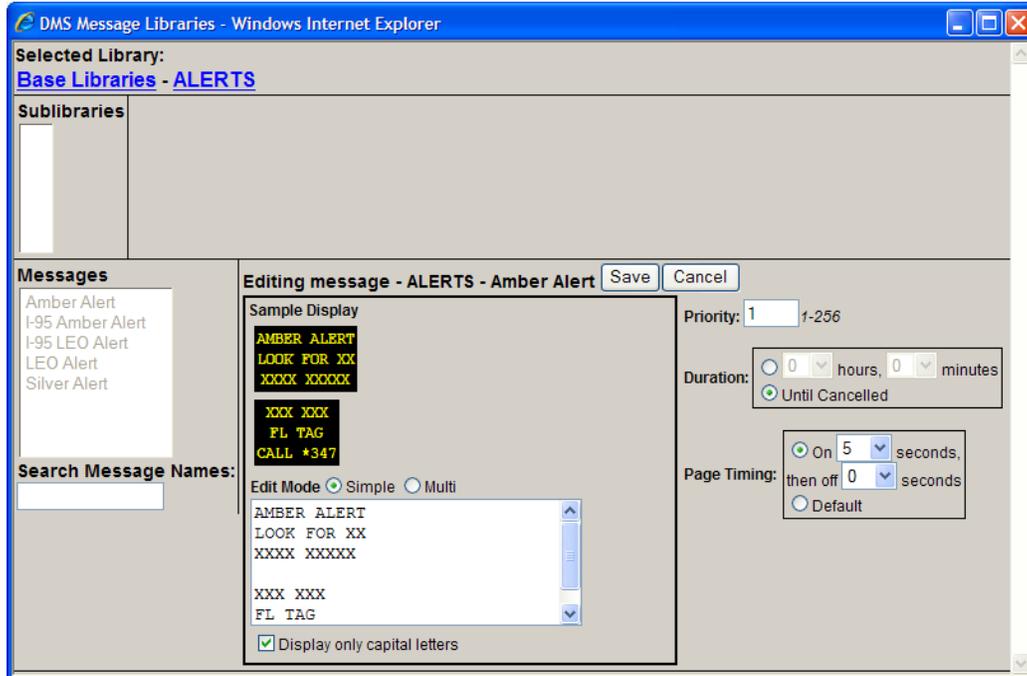
Figure 3–81 – DMS Message Library – Edit Message

Options that can be selected from the DMS Message Library dialog include:

- **Search:** Allows the operator to type in the field to locate messages that match the sequence of characters being typed.

- **Editing Message**: The **Edit** box is used to enter the text that should be displayed on the sign. The operator may type in either **Simple** text (the default) or in **MULTI** format (this is the NTCIP DMS formatting standard). As the numbers of characters exceed the size of the sign the dialog will automatically generate phases (pages) to be displayed.

- **Save:** Selecting this option will save changes made and return to the previous screen.

- **Cancel:** Selecting this option will discard changes made and return to the previous screen.

- **Priority**: Depending on which subsystem or operator key stroke access the send DMS status dialog, the default priority will be different. The operator may select any valid priority for the message being composed.

- **Duration**: Allows the operator to specify how long the message should be displayed, a specific number of hours can be specified or the message can be displayed indefinitely.

- **Page Timing**: Allows the operator to select the page timing for the message.DMS Sequences

Sequences allow the operator to establish a series of messages to display on a sign, and to establish the time and duration during which these messages will be displayed. This dialog may be opened by selecting the Sequence Libraries option from the DMS context menu on the map. The dialog in Figure 3–82 displays when the option is selected.
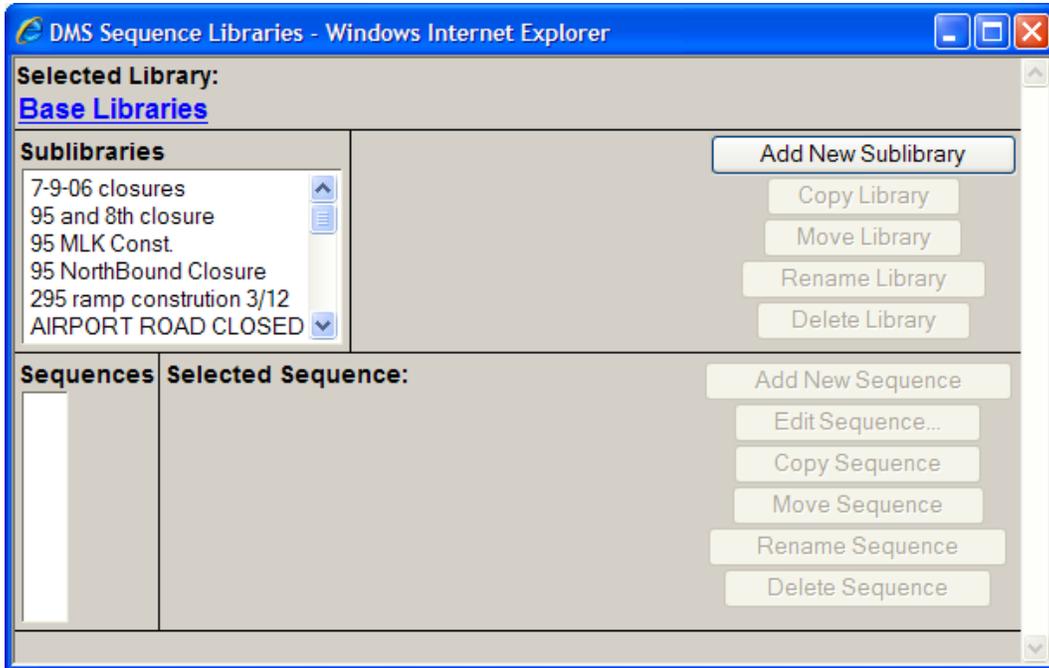
Figure 3–82 – DMS Sequence Library

Before selection of a library in the DMS Sequence Libraries dialog, the only available option is Add New Sub-library. Once a sub-library is selected from the DMS Sequence library, the dialog displayed in Figure 3–83 is displayed to the operator.
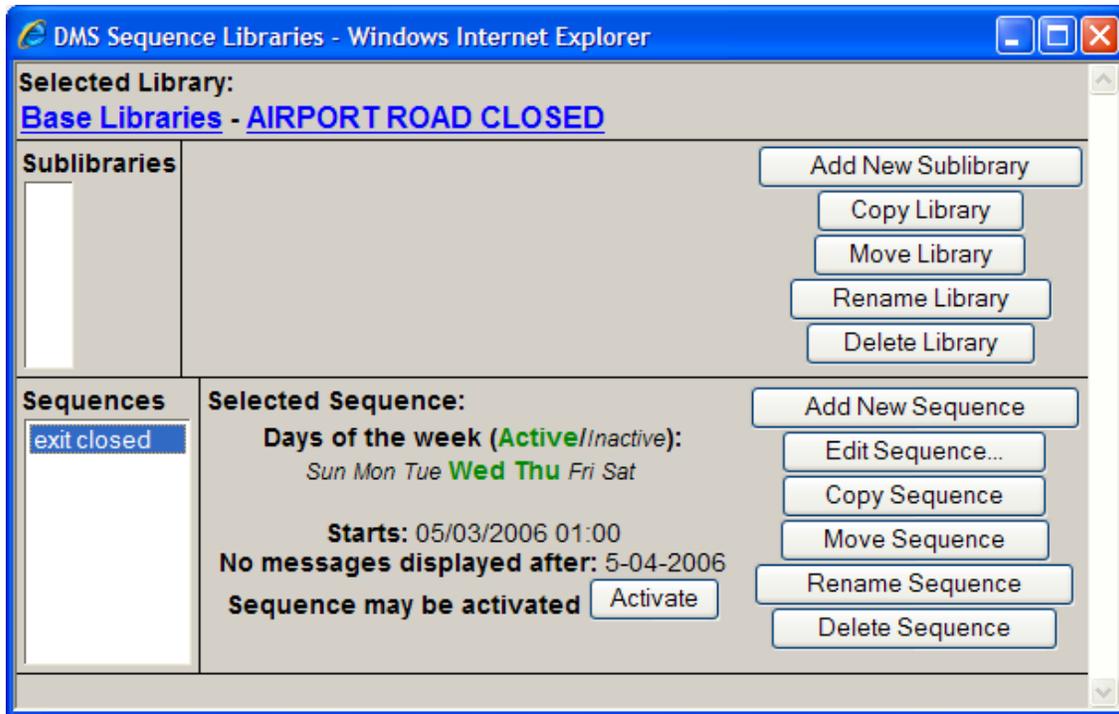
Figure 3–83 – Manage Sequence – Sequence Selected

Options that can be selected from the DMS Sequence Libraries dialog include:

- **Add New Sub-library:** Allows the operator to create a new library, the operator is prompted for a name.

- **Copy Library:** Allows the operator to create a copy of the selected library, the operator is prompted for a name of the new library and the name of the parent library.

- **Move Library:** Allows the operator to specify the name of the existing library to move the selected library to.

- **Rename Library:** Allows the operator to change the name of an existing library.

- **Delete Library:** Allows the operator to delete the selected library.

- **Add New Sequence**: Allows the operator to create a new sequence in the selected library, the operator is prompted for a name for the new sequence.

- **Edit Sequence**: Allows the operator to edit the selected sequence.

- **Copy Sequence:** Allows the operator to create a copy of the selected sequence, the operator is prompted for a name of the new sequence and the name of the parent library.

- **Move Sequence:** Allows the operator to specify the name of the existing library to move the selected sequence to.

- **Rename Sequence:** Allows the operator to change the name of an existing sequence.

- **Delete Sequence:** Allows the operator to delete the selected sequence.

When the operator selects the Edit Sequence option the dialog shown in Figure 3–84 will be displayed.
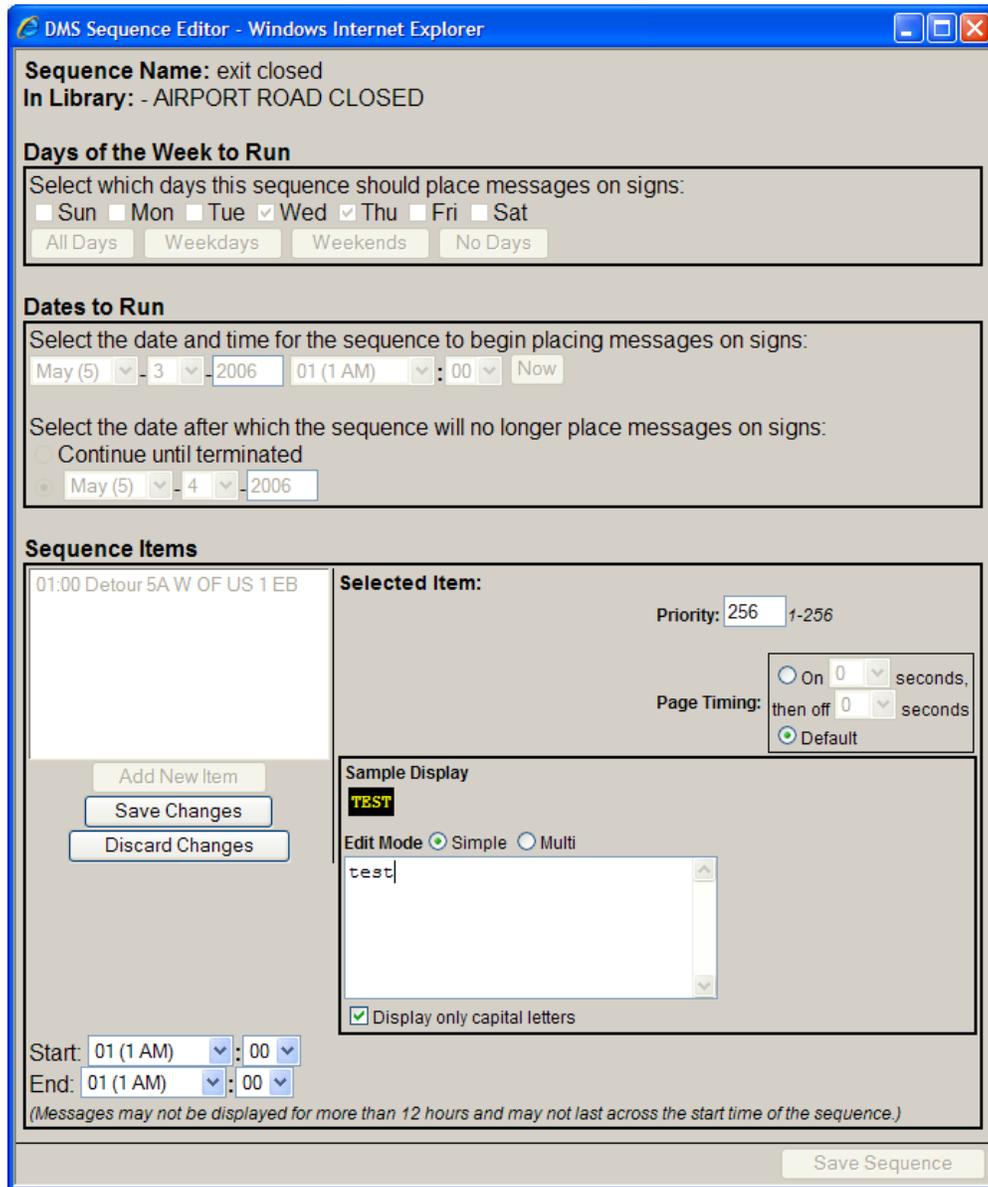
Figure 3–84 – Edit DMS Sequence

Options that can be selected from the Active Sequences dialog include:

- **Days of the Week to Run:** Allows the operator to select on which days of the week the sequence should execute. Convenience buttons such as **All Days, Weekdays, Weekends,** and **No Days** are provided to facilitate selecting days of the week.

- **Dates to Run**: Allows the operators to select the time of day that the sequence should be active. A convenience button of **Now** is provided to simplify entering the current time.

- **Sequence Items**: The current items (messages) in the sequence are displayed, if the operator selects to **Add a New Item** the dialog will change and provide a list of signs and

groups that can be added. If the operator selects a sequence item and then pressed **Edit Item** a dialog to edit the DMS message (and attributes) will be displayed. Selecting the **Remove Item** will remove the selected sequence item from the sequence.

- **Save Sequence**: Selecting this option will save the sequence (and changes made from within this dialog) and close the dialog.

When the operator selects **Active Sequence** from the SunGuide context menu the dialog in Figure 3–85 is displayed.
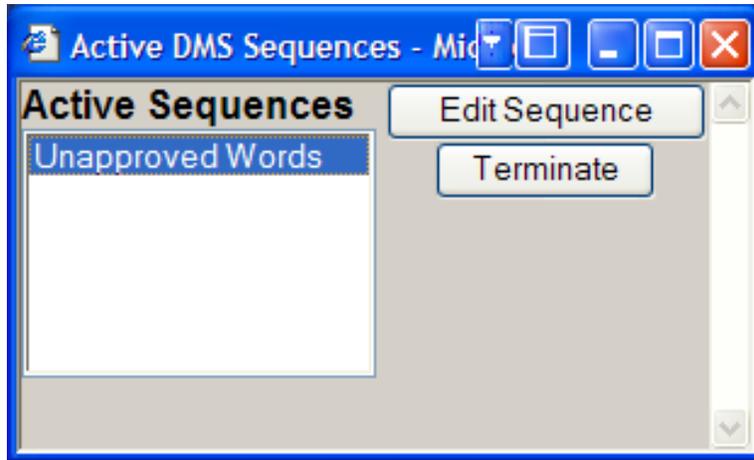
Figure 3–85 – Active Sequences Dialog

Options that can be selected from the Active Sequences dialog include:

- **Edit Sequence:** Selecting this option will allow the operator to edit the details of the sequence (uses the dialog shown in Figure 3–84).

- **Terminate**: Selecting this button will terminate the sequence.

3.2.7.3 DMS Groups

To display the status information for a group of signs, the Device Groups option should be selected from the DMS context menu on the map. The DMS group editor is shown in Figure 3–86.
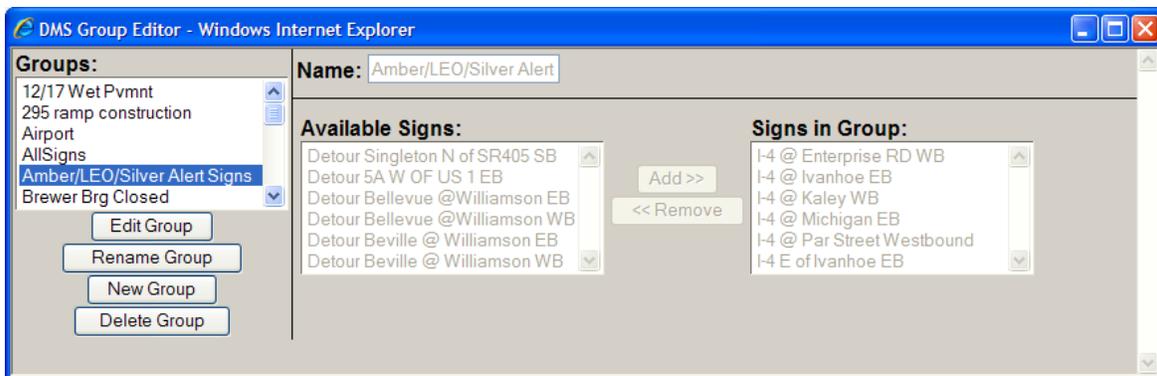
Figure 3–86 – DMS Group Editor

Options that can be selected from the DMS Group Editor Sequences dialog include:

- **Edit Group:** Allows an operator to edit the selected group, the operator is allowed to add/delete signs into/out of the group.

- **Rename Group:** Allows the operator to rename the selected group.

- **New Group:** Allows the operator to create a new group, the operator provides a name, and then is allowed to add/delete signs into/out of the group.

- **Delete Group:** Allows the operator to delete the selected group.

- **Available Signs/Signs in Group**: Allows an operator to edit the contents of a group. The **Add >>** and **<< Remove** buttons become active, the operator selects the sign they wish to add/delete, and then presses the Edit Group button.

3.2.7.4 Trailblazer Status and Control

The Trailblazer Status dialog, shown in Figure 3–87, displays the current display on the sign, and the sign's current status. This dialog is accessed by left clicking on a Trailblazer icon on the map, right clicking on a Trailblazer icon and selecting Sign Status, or by selecting Trailblazer DMS Status from the DMS context menu.
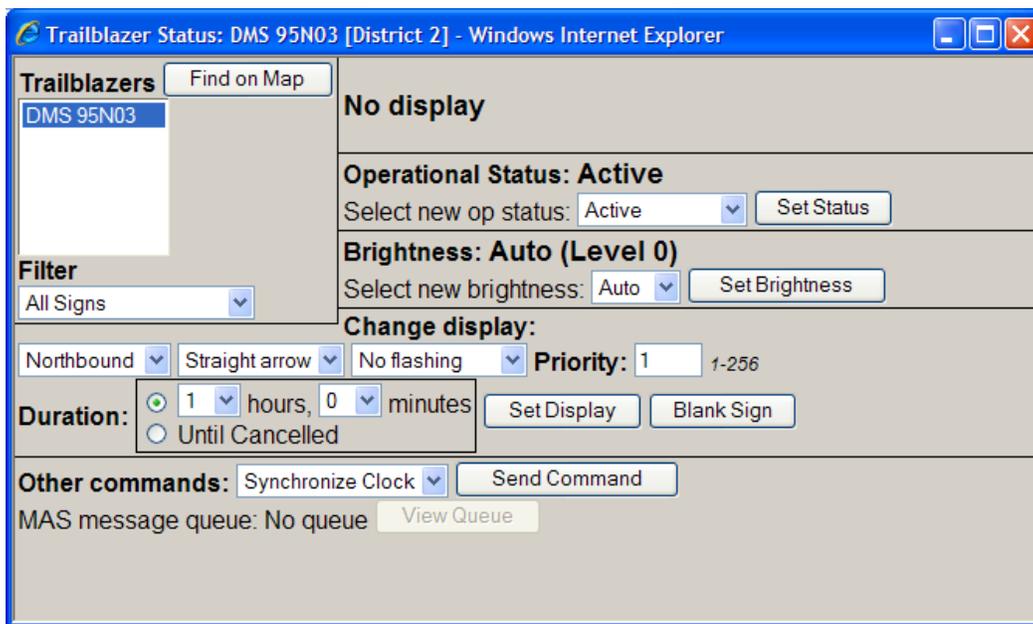
Figure 3–87 – Trailblazer Status and Control

Options that can be selected from the detailed status include:

- **Find on Map:** Pressing this button will cause the graphical map to "re-center" on the selected Trailblazer.

- **Filter**: Allows the list of Trailblazer devices to be filter, options include: **All Signs, Active, Error/Failed, Out of Service,** by group or by center (these last two options are variable based on system configuration).

- **Set Status**: Allows the status of the selected Trailblazer to be set to either **Active** or **Out of Service**.

- **Set Brightness**: Allows the brightness of the selected D Trailblazer MS to be set to **Auto**, **Day,** or **Night**.

- **Set Display**: After the operator selects the direction, arrow, flash, priority and duration; the **Set** Display can be selected to send the command to the Trailblazer device.

- **Blank Sign**: Issues a command to blank the sign.

- **Send Command**: Allows the operator to send one of the following commands: **Echo Message, Refresh Status,** or **Synchronize Clock**.

- **View Queue**: Allows the operator to view the message queue for this device.

3.2.8 HAR

The HAR status display panel, shown in Figure 3–88 displays the current message being played on the HAR, and the HAR's current status. This panel is accessed by left clicking on a HAR icon on the map, right clicking on a HAR icon on the map and selecting Device Status, or selecting HAR Status from the HAR context menu.
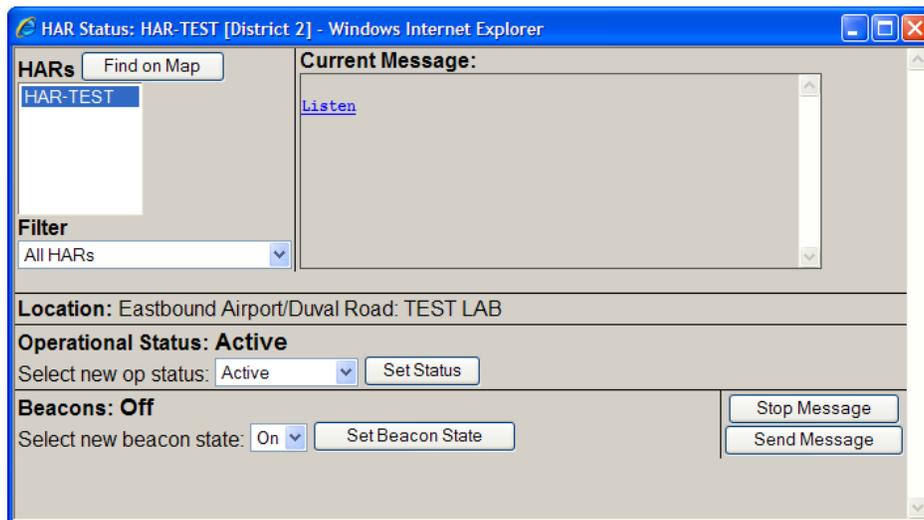
Figure 3–88 – HAR Status

Options that can be selected from the HAR Status dialog include:

- **Find on Map:** Pressing this button will cause the graphical map to "re-center" on the selected HAR.

- **Filter**: Allows the list of Trailblazer devices to be filter, options include: **All HARs, Active, Error/Failed, Out of Service,** by group or by center (these last two options are variable based on system configuration).

- **Set Status**: Allows the status of the selected HAR to be set to either **Active** or **Out of Service**.

- **Set Beacon State**: Allows the beacons to be turned on or off.

- **Stop Message**: Allows the operator to remove a message from the MAS queue.

- **Send Message**: Selecting this option will display the command dialog showing in Figure 3–89.
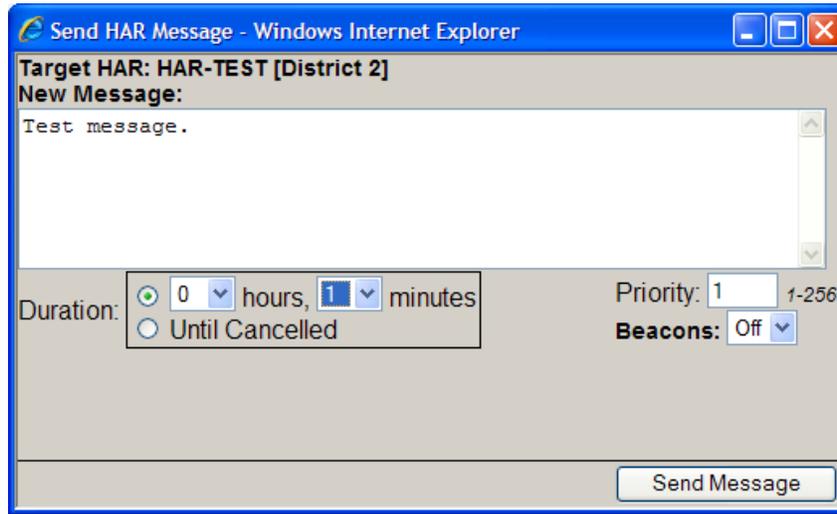
Figure 3–89 – HAR Send Message

Options that can be selected from the Send HAR Message dialog include:

- **Target HAR**: The **Target HAR** box is used to enter the text that should be played on the HAR device.

- **Duration**: Specifies how long the HAR message will be played.

- **Priority**: Allows the operator to set the priority of the message (the Message Queuing subsystem will play the lowest priority message on the queue for the device).

- **Beacons**: Indicates whether or not beacons should be turned on when the message is being played.

- **Send Message**: Will transmit the message and the parameters entered in the dialog to the Message Queuing subsystem.

3.2.9 Inventory Maintenance Subsystem

The Inventory Maintenance Subsystem (IMS) main dialog, shown in Figure 3–90, displays the equipment known by SunGuide and the current status of the equipment. The dialog is accessed by selecting "Inventory" from the IMS context menu.
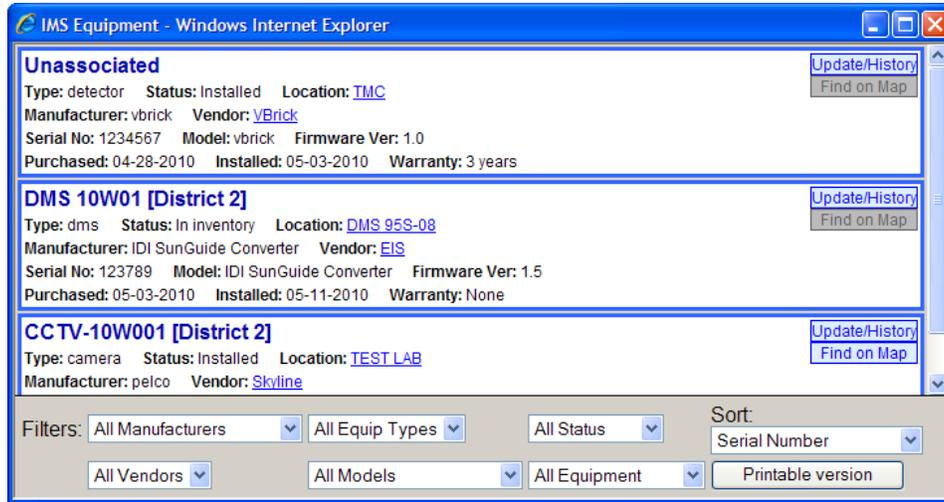
Figure 3–90 – IMS Inventory Screen

Options that can be selected from the IMS Inventory status include:

- **Update History**: selecting this option will display the dialog shown in Figure 3–91.
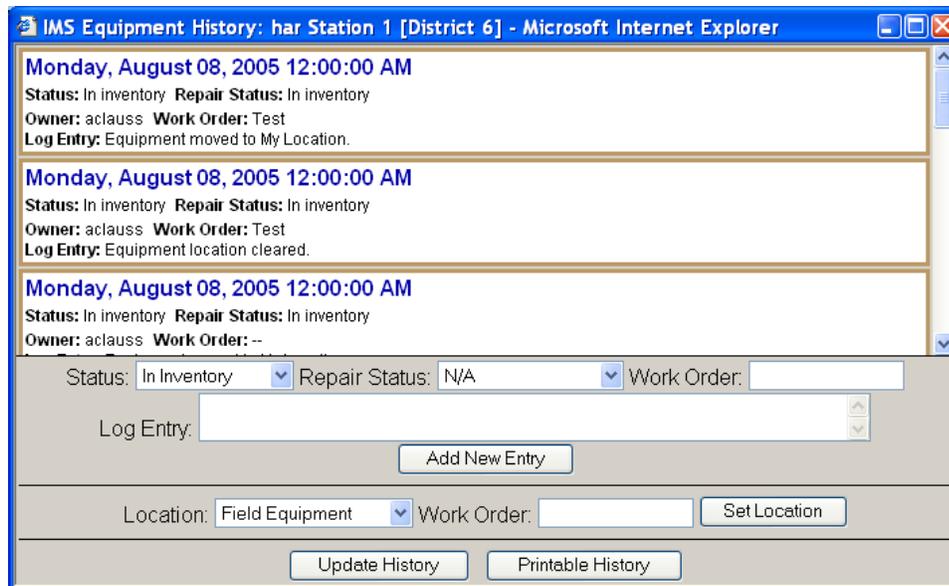
Figure 3–91 – IMS Update History Screen

- **Find on Map:** Pressing this button will cause the graphical map to "re-center" on the selected piece of equipment.

- **Filters**: Allows the list of devices to be filtered, options include:

  o **Manufacturers:** a list of manufacturers that have been entered into the database (using the administrative editor) will be provided.

  o **Equipment Types:** a list of equipment types that have been entered into the database (using the administrative editor) will be provided.

  o **Status**: can be set to: **In Inventory, Installed,** or **Repair/Test.**

o **Vendors:** a list of vendors that have been entered into the database (using the administrative editor) will be provided.

o **Models:** a list of equipment models that have been entered into the database (using the administrative editor) will be provided.

o **Equipment:** can be set to: **All Equipment, Associated to Field,** or **Not Associated.**

- **Sort:**

  o **Serial Number:** can be set to: **Serial Number, Status, Equipment Association, Manufacturer, Model Number, Vendor, Install Date,** or **Purchase Date.**

- **Printable Version:** A report will be provided in a separate Internet Explorer window will be displayed; the operator can then select "print" to generate a hard copy of the data.

Options that can be selected from the IMS Update History status include:

- **Status**: can be set to: **In Inventory, Installed,** or **In Repair/Test.**

- **Repair Status**: can be set to: **N/A**, **In Inventory, In Testing at Depot, Installed at Site, In Testing at Site, Failed at Site, At Report Depot,** or **In Repair at Deport.**

- **Add New Entry**: will save the data entered in the **Log Entry** field into the database.

- **Location**: can be set to: **Field Equipment, Installed,** or **In Repair/Test.**

- **Set Location**: a list of locations that have been entered into the database (using the administrative editor) will be provided.

- **Update History**: the history of the selected device will be refreshed from what has been previously stored to the database.

- **Printable Version:** A report will be provided in a separate Internet Explorer window will be displayed; the operator can then select "print" to generate a hard copy of the data.

The IMS Vendors dialog, shown in Figure 3–92, displays the currently defined vendors and their associated contact information. The dialog is accessed by selecting Vendor from the Inventory and Maintenance context menu on the map.
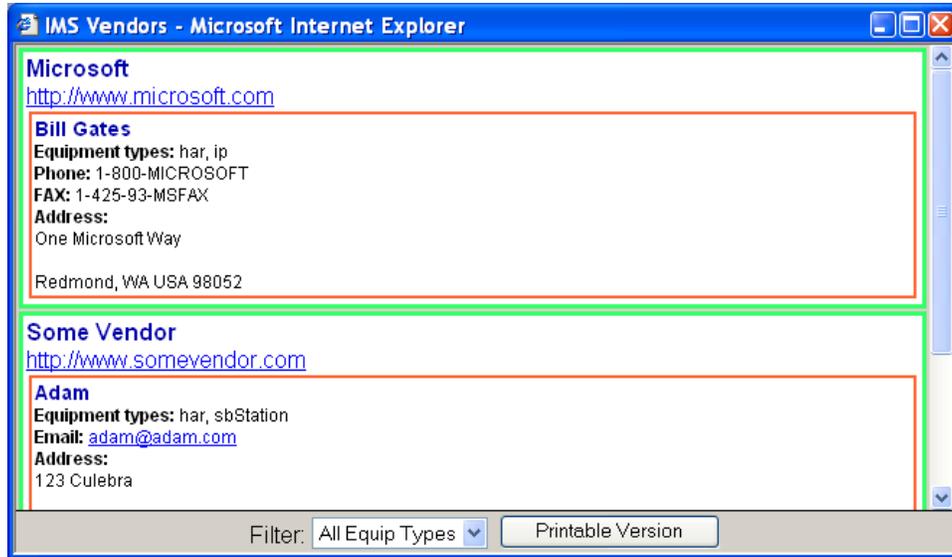
Figure 3–92 – Inventory and Maintenance Vendors Screen

Options that can be selected from the IMS Vendors dialog include:

- **Filter**: a list of equipment types that have been entered into the database (using the administrative editor) will be provided.

- **Printable Version:** A report will be provided in a separate Internet Explorer window will be displayed; the operator can then select "print" to generate a hard copy of the data.

3.2.10 Message Queuing

The Message Arbitration Subsystem (MAS) is used to process all DMS and HAR message requests within the SunGuide system. Messages are sent to MAS for queuing and MAS will always display the highest priority (1 is high) message on the queue for a device. If more than one message is received with the same priority the messages of identical priority are displayed in first-in, first-out order. The Queue Manager dialog, which is accessed by selecting Message Queue Manager from the DMS context menu, is shown in Figure 3–93.

Figure 3–93 – MAS Queue Dialog

Options that can be selected from the dialog include:

- **Filter**: Allows the list of devices to be filtered, options include: **All, No Messages, With Messages, QueueState: Complete, QueueState: Failed,** and **Roadway/Direction.**

- Options that can be selected for each device in the MAS queue include:
  - **Find on Map:** Pressing this button will cause the graphical map to "re-center" on the selected device (either DMS or HAR).
  - **Resend**: The highest priority message will be resent to the device (this might be performed if a device had been off-line for maintenance).

o **Show Queue**: Selecting this button will cause a detailed status of the queue contents for the specified device. Figure 3–94, Figure 3–101, and Figure 3–102 show the detailed views for different devices.

A detailed view of a MAS queue for a DMS is shown in Figure 3–94.
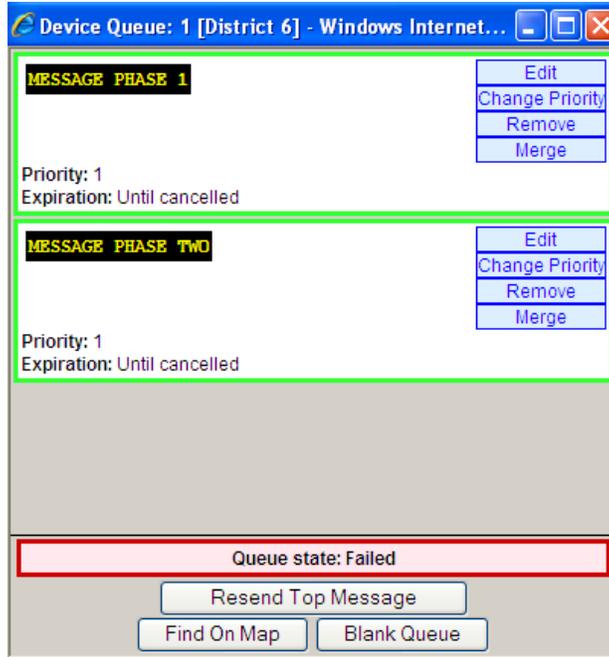
Figure 3–94 – DMS Detailed Status for a Device

A detailed view of a MAS queue for a Trailblazer is shown in Figure 3–95.

Figure 3–95 – Trailblazer Detailed Status for a Device

A detailed view of a MAS queue for a HAR is shown in Figure 3–96.
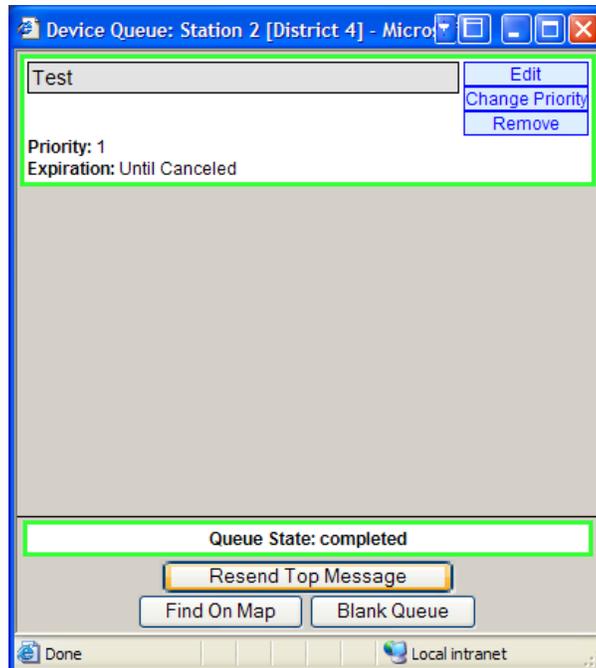
Figure 3–96 – HAR Detailed Status for a Device

From each detailed status device dialog, the following options are available:

- Options that can be selected for each device in the MAS queue include:

- o **Edit**: Selecting this option will open an editing dialog.

- o **Change Priority**: Selecting this option will display a dialog (see Figure 3–97) that will allow the message priority to be changed. Note that once the priority is changed MAS will determine the highest priority message and display that message.

- o **Remove:** Pressing this button will cause the graphical map to "re-center" on the selected device (one of DMS, Trailblazer, or HAR).

- o **Merge:** By selecting multiple messages, and selecting merge, the messages are merged into a multi-phase message; each message in a separate phase; a multi-phase message will still have multiple phases in a merged message.

- **Resend Top Message:** Selecting this button will cause the highest priority message to be resent to the device.

- **Find On Map:** Selecting this button will cause the graphical map to "re-center" on the device (either DMS or HAR).

- **Blank Queue:** Selecting this button will remove all entries from the device queue and blank the device.

The Change Priority dialog is shown in Figure 3–97.
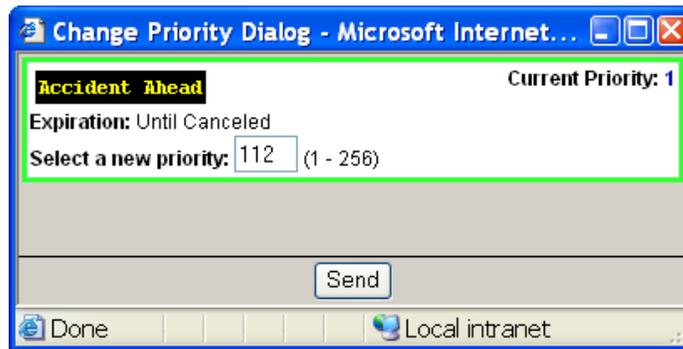
Figure 3–97 – MAS Change Priority

Options that can be selected from the MAS Change Priority dialog include:

- **Select a new priority:** The operator can enter a numeric value for the new priority that should be assigned to the message.
- **Send:** Selecting this button will **Send** the new priority to MAS for the message.

3.2.11 Response Plans

RPG is used by EM to generate suggestions for response plans, using specific event and device linking information. Response plan suggestions can include DMS, HAR, predefined plan, and email message suggestions. (Relevant detailed information is further discussed in the EM section.)

The RPG subsystem is also responsible for allowing operators to manage predefined plans configured in the system and displays the current predefined plans. The dialog is accessed by selecting Predefined Response Plans from the Event Management context menu.
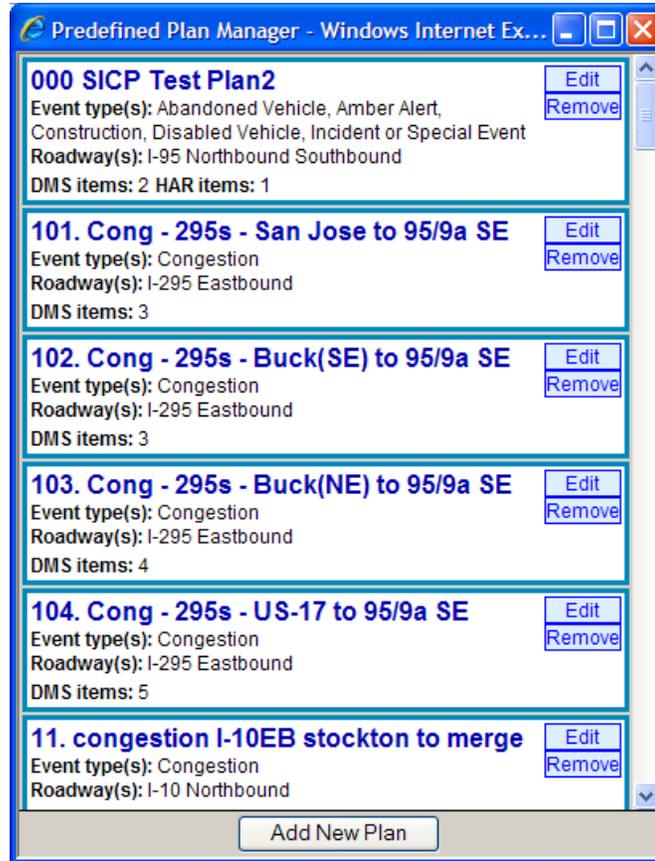
Figure 3–98 – Predefined Plan Manager

Options that can be selected from the Predefined Plan Manager dialog include:

- **Add New Plan**: Selecting this option will display the dialog shown in Figure 3–99.

- **Edit:** Selecting this option will display the dialog shown in Figure 3–101.

- **Remove**: Selecting this option will remove the selected plan item.
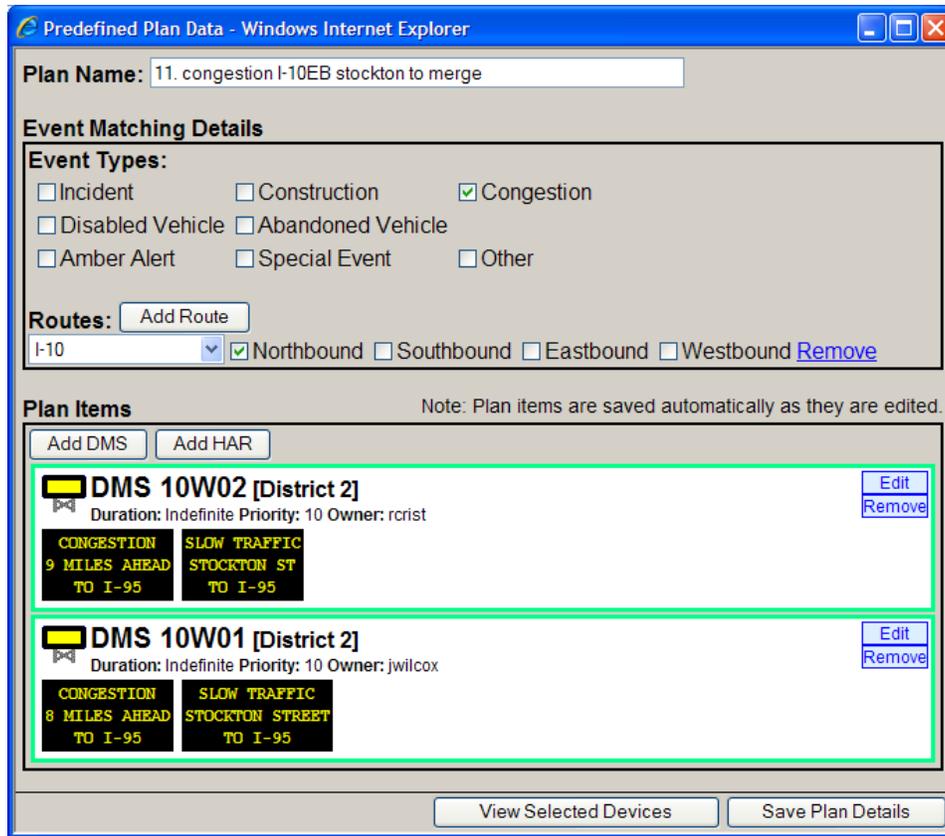
Figure 3–99 – Predefined Plan Data

Options that can be selected from the Predefined Plan Data dialog include:

- **Event Types**: Operator checks event type that applies.

- **Add Route**: Selecting this option enables operator to click appropriate route and check associated route direction.

- **Remove Route**: Selecting this option will remove the selected route from the plan.

- **Add DMS/HAR:** Selecting this option will display a dialog to allow the operator to select a device. Figure 3–100 shows the Select a DMS dialog.

- **View Selected Devices:** Selecting this button will cause each of the devices listed in the response plan to be highlighted on the map (see Figure 3–100); this can be cleared by selecting the **Clear Highlighted Devices** option in the main context menu.

- **Save Plan Details:** When the operator clicks to save plan details, the updated plan items are saved in the system database.
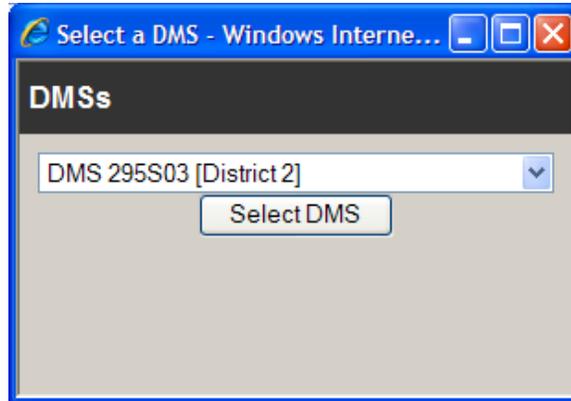
Figure 3–100 – Select a DMS

Options that can be selected from the Select a DMS dialog include:

- **Select**: An operator selects a DMS, clicking the 'Select' option will display the dialog shown in Figure 3–101.
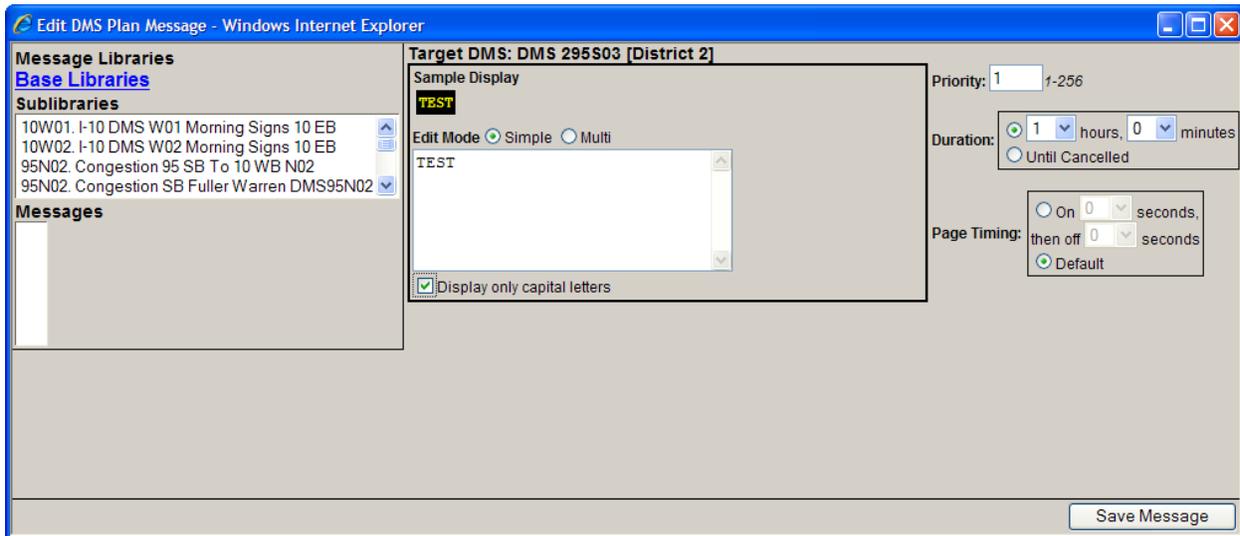
Figure 3–101 – Edit DMS Plan Message

Options that can be selected from the Edit DMS Plan Message dialog are explained in the DMS portion of this document.
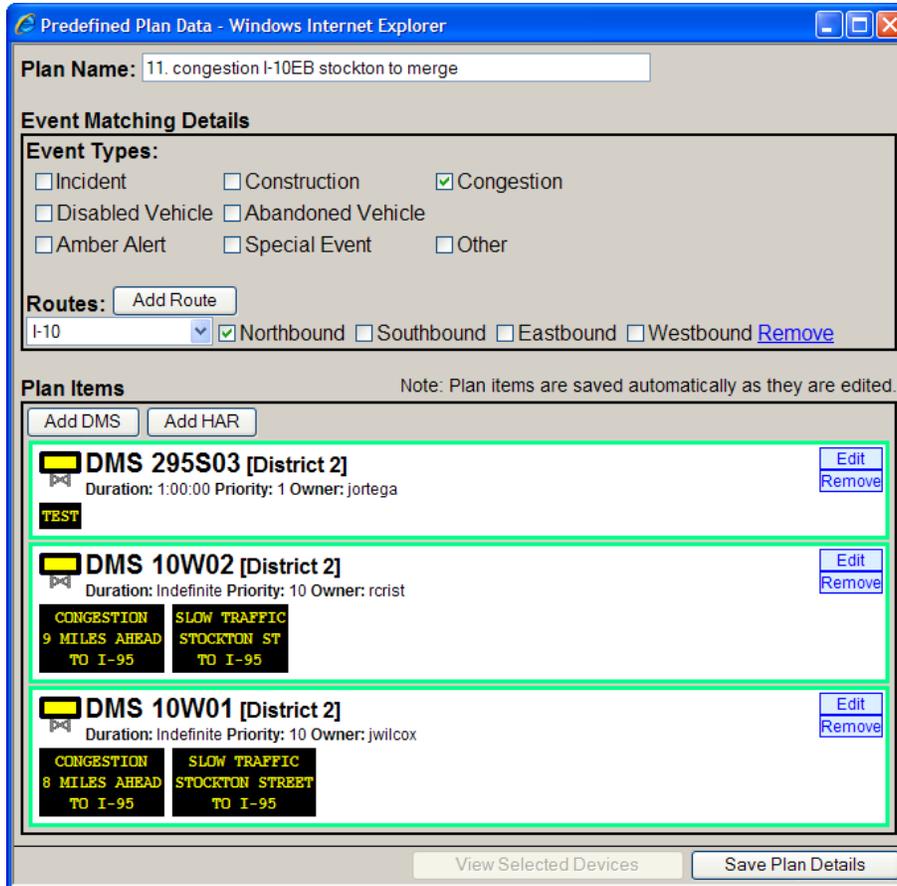
Figure 3–102 – Predefined Plan Data with a DMS

The Predefined Plan Data dialog above displays the result of a plan with a newly added DMS item. Operators may choose to add additional devices to the plan and save their plan updates.

In addition to editing device sequencing and predefined response plans, the Operator has the ability to add new events, access the event list, remove events, and republish events through the Event Management context menu. This software is discussed in further detail in Section 3.3.1

3.2.12 Ramp Metering

There are three ways of accessing Ramp Meter Controller (RMC) dialogs.

- The Ramp Meter Controller (RMC) Context Menu provides the following options:
    - Alarms: displays and activates the RMC Alarms dialog (see Section 3.2.12.2)
    - Control: displays and activates the RMC Control dialog (see Section 3.2.12.3)
    - Reset Ramp Meters: displays the Reset RMC dialog (see Section 3.2.12.6)
    - Status Overview: displays the RMC Status dialog (see Section 3.2.12.1)
- Right clicking on a RMC Icon provides the following options:
    - Alarms: displays and activates the RMC Alarms dialog (see Section 3.2.12.2)
    - Central Time of Day (see Section 3.2.12.4)

> o   Control: displays and activates the RMC dialog (see Section 3.2.12.3)
>
> o   Firmware Parameters (see Section 3.2.12.5)
>
> o   Reset: displays the Reset RMC dialog (see Section 3.2.12.6)

- Left clicking on an RMC Icon displays and activates the RMC Control dialog (see Section 3.2.12.3)

3.2.12.1 RMC Status Dialog

The Ramp Meter Controller (RMC) Status dialog, shown in Figure 3–103, displays the current operational status of the Ramp Meter controller. The dialog can be accessed by selecting Status Overview from the Ramp Metering context menu.

Note: The Ramp Queue and Advanced Queue occupancy values for each lane may be viewed in columns RQOcc and AQOcc respectively.

Figure 3–103 – Detailed RMC Status

Options that can be selected from the detailed status include:

- **Filter**: Allows the list of devices to be filtered, options include: **All, Out of Service, Active, by Roadway or by Group.**

- **Alarms:** Selecting this option will display the Alarms dialog shown in Figure 3–104.

- **Control**: Selecting this option will display the Control dialog shown in Figure 3–105.

3.2.12.2 RMC Alarms Dialog

The Alarms dialog displays a listing of alarms reported by the controller. Access to this dialog is from right-clicking on the map and selecting RMC Alarms or pressing the Alarms button in the RMC Status or RMC Control Manager dialogs.
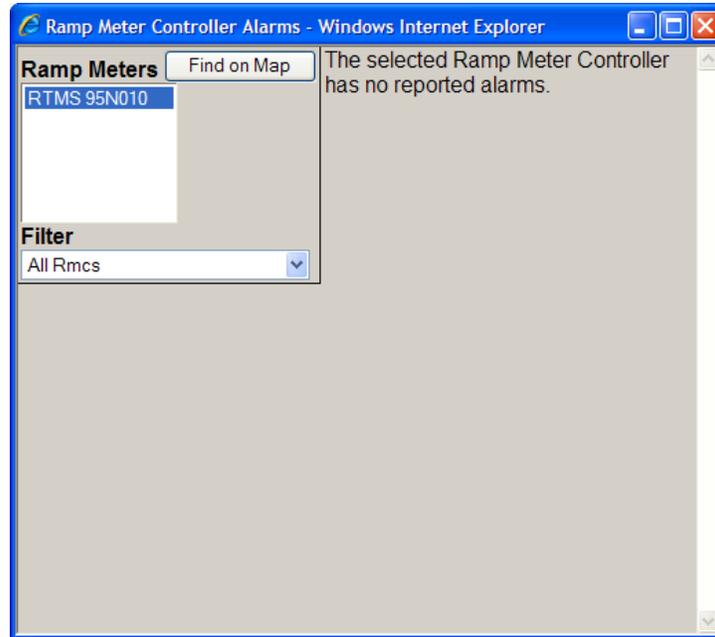
Figure 3–104 – RMC Alarms

Options on this dialog include:

- **Find on Map:** Pressing this button will cause the graphical map to "re-center" on the selected RMC.

- **Filter**: Allows the list of RMC devices to be filtered, options include **All, Out of Service, Active, by Roadway or by Group.**

3.2.12.3 RMC Control Dialog

The RMC Control Manager dialog (see Figure 3–105) displays location and metering information of the metering ramp and allows for control of the 170 controller. This dialog can be accessed by selecting Control from the Ramp Metering context menu or by right clicking a Ramp Metering device and selecting Control.

Note: The Ramp Queue and Advanced Queue occupancy values for each lane may be viewed in columns Ramp Occupancy and Advanced Occupancy respectively.
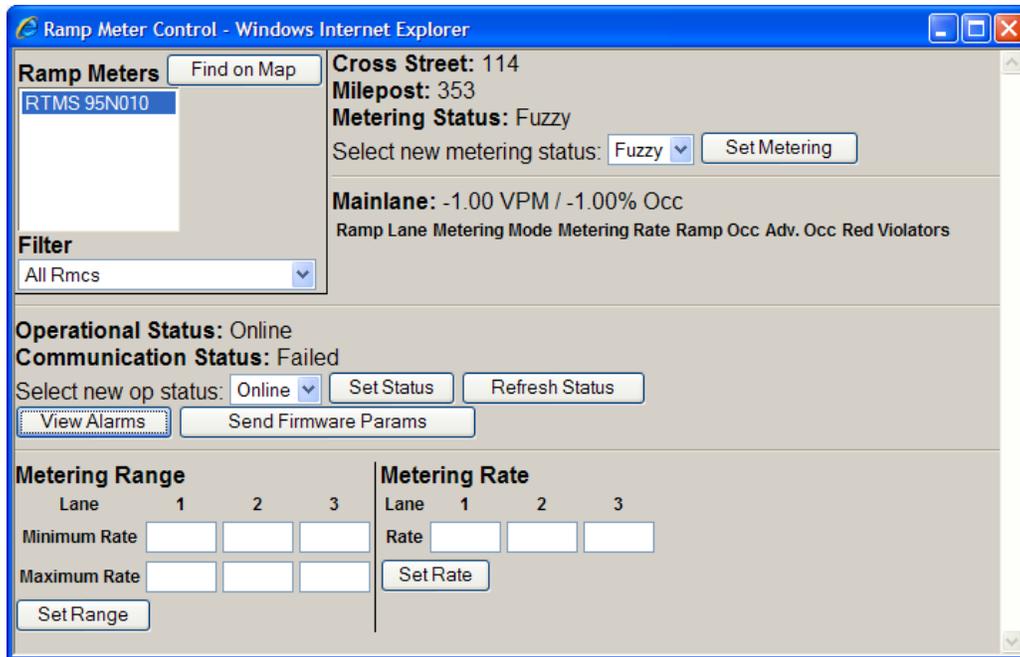
Figure 3–105 – RMC Control Dialog

Options on this dialog include:

- **Set Status**: Allows the status of the selected RMC controller to be set to either **Online** or **Offline**.

- **Refresh Status**: Sends a request to the subsystem to poll the driver.

- **Send Firmware Params:** Sends the current parameter set to the controller. **Note**: Modifying controllers parameters may have undetermined effects to the operation of the controller. Changes to the lane geometry, loop assignments, or trap designations should be accomplished off-line. This action may cause the controller to stop metering and turn off the controller head assembly.

- **View Alarms:** Selecting this option will display the Alarms dialog shown in Figure 3–104.

- **Set Range**: Allows the minimum and maximum metering of the selected RMC controller to be set.

- **Set Rate**: Allows a metering rate to be set for the selected RMC controller.

- **Set Metering**: Allows the metering status of the RMC controller to be set, options include: **Off, Fuzzy or Local.**

- **Find on Map:** Pressing this button will cause the graphical map to "re-center" on the selected RMC.

- **Filter**: Allows the list of RMS devices to be filtered, options include: **All, Out of Service, Active, by Roadway or by Group.**

3.2.12.4 RMC Central TOD Dialog

The RMC Central TOD dialog, shown in Figure 3–106, allows the operator to define a Central time of Day configuration. This dialog can be accessed by right clicking a Ramp Metering device and selecting Central Time of Day.
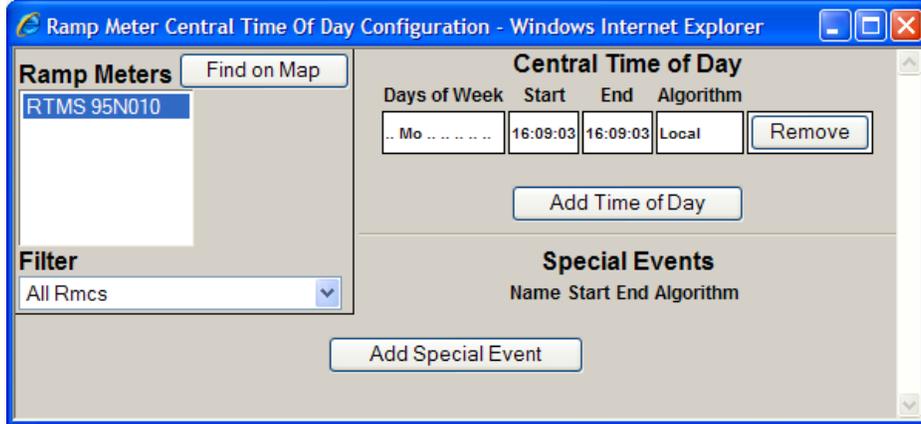
Figure 3–106 – RMC Central TOD Dialog

Options on this dialog include:

- **Remove**: Pressing this link will send a request to remove the corresponding TOD configuration.

- **Filter**: Allows the list of RMS devices to be filtered, options include: **All, Out of Service, Active, by Roadway or by Group.**

- **Find on Map:** Pressing this button will cause the graphical map to "re-center" on the selected RMC.

- **Add TOD**: Pressing this button will display the Add TOD dialog.

- **Add Special Event**: Pressing this button will display the Add Special Event dialog.

The Add TOD Configuration dialog (see Figure 3–107) allows for the entry of central time of day configuration.
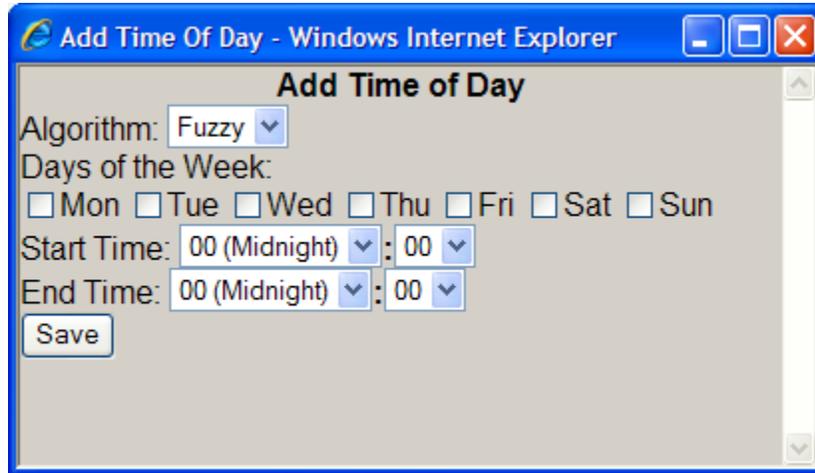
Figure 3–107 – Add Time of Day Configuration dialog

Options for this dialog include;

- **Day of the Week:** Allows the selection of days for the configuration.

- **Start Time:** Allows the selection of start hour and minute for day(s) selected.

- **End Time:** Allows the selection of end hour and minute for day(s) selected.

- **Algorithm:** Allows the selection of the algorithm to use in the configuration. Options include: **Fuzzy and Local.**

- **Save:** Pressing this button sends an Add TOD request to the RMS subsystem based on the selected settings.

The Add Special Event dialog (see Figure 3–108) allows the entry of a metering configuration based on a pre-defined event configuration.
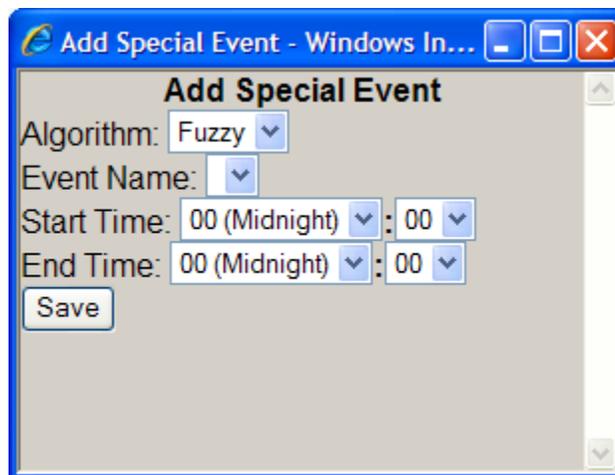
Figure 3–108 – Add Special Event Dialog

Options for this dialog include;

- **Event Name:** Allows the selection of the desired event configuration.

- **Start Time:** Allows the selection of start hour and minute for day(s) selected.

- **End Time:** Allows the selection of end hour and minute for day(s) selected.

- **Algorithm:** Allows the selection of the algorithm to use in the configuration. Options include: **Fuzzy and Local.**

- **Save:** Pressing this button sends an Add Special Event request to the RMS subsystem based on the selected settings.

3.2.12.5 RMC Firmware Parameters Dialog

The Ramp Meter Controller Firmware Parameters (see Figure 3–109) dialog allows for the modification of the ramp meter controller firmware. This dialog can be accessed by right clicking a Ramp Metering device and selecting Firmware Parameters. Options that can be selected from the dialog include:

- **Save Parameters**: Pressing this button saves the modified parameters to the controller.

- **Save and Send to Controller**: Pressing this button saves any modified parameters and sends to the controller. Following this action, the system downloads the entire current firmware parameter set to the ramp meter controller. **Note**: Modifying controllers parameters may have undetermined effects to the operation of the controller. Changes to the lane geometry, loop assignments, or trap designations should be accomplished off-line. This action may cause the controller to stop metering and turn off the controller head assembly.

- **Parameter Category**: Allows the selection of firmware categories based on the protocol being used by the driver of the controller. Currently, the WSDOT BiTran-170 protocol is being used. Options for the Bitran-170 protocol include: **Ramp Lane Parameters, TOD Table, Loop Function Codes, Speed Trap Table, Data Validity Parameters, 170 Global Parameters.**

Ramp Lane Parameters (selected from the dropdown by default when RMC firmware parameters dialog is first opened. See Figure 3–109) allows the operator to modify the controller firmware parameters associated with a metering ramp used by the Ramp Meter controller to meter traffic flow on a ramp.

Figure 3–109 – Ramp Lane Parameters

The **Time of Day Table**, shown in Figure 3–110, allows the operator to set local time of day configurations and metering rates.
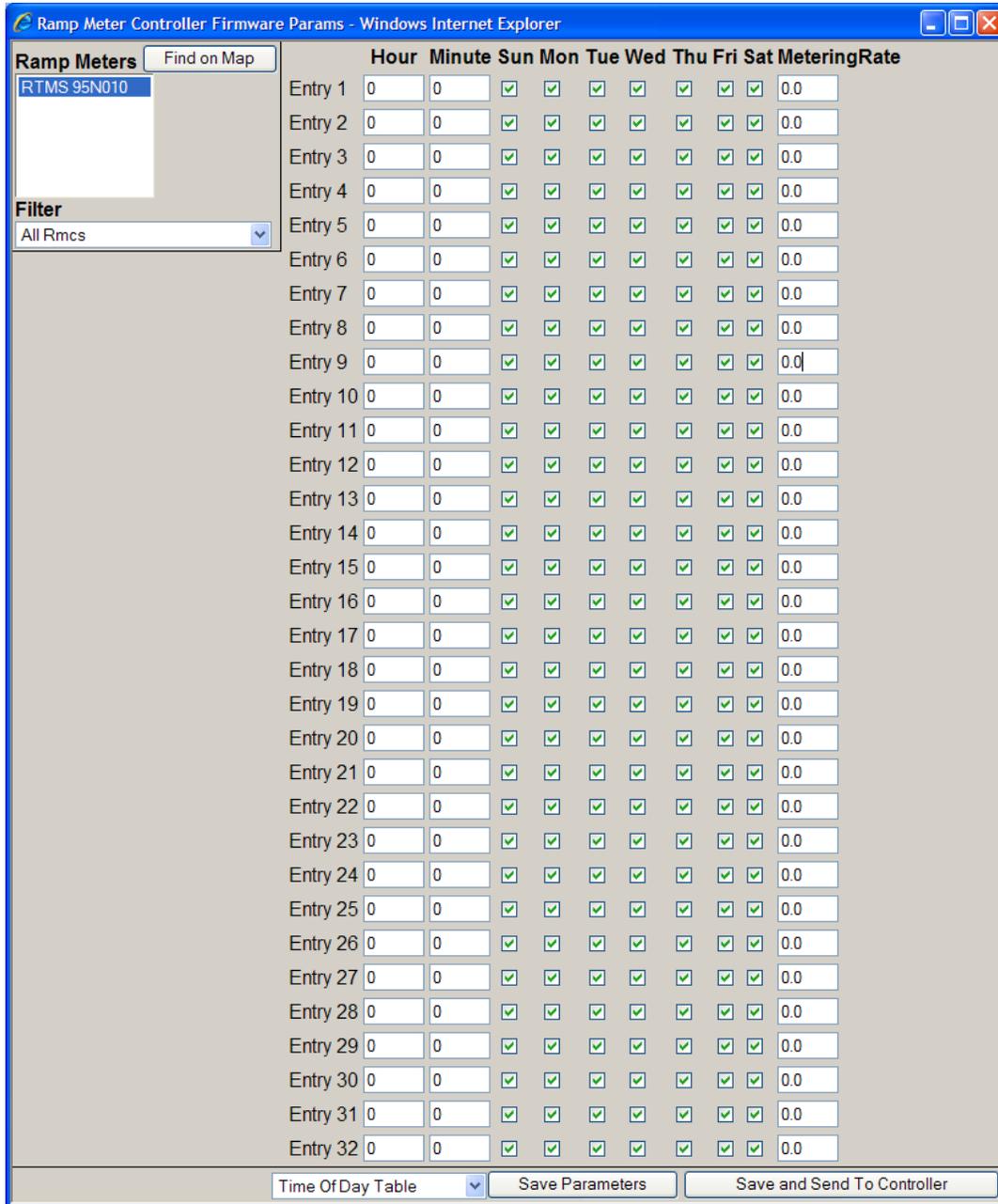
Figure 3–110 – Time of Day Table

Options that can be selected from the dialog include:

- **Save Parameters**: Pressing this button saves the modified parameters to the controller.

- **Save and Send to Controller**: Pressing this button saves any modified parameters and sends to the controller. Following this action, the system downloads the entire current firmware parameter set to the ramp meter controller. **Note**: Modifying controllers parameters may have undetermined effects to the operation of the controller. Changes to the lane geometry, loop assignments, or trap designations should be accomplished off-

line. This action may cause the controller to stop metering and turn off the controller head assembly.

The **Loop Function Codes**, shown in Figure 3–111, allows the operator to assign inputs from the current lane configuration.
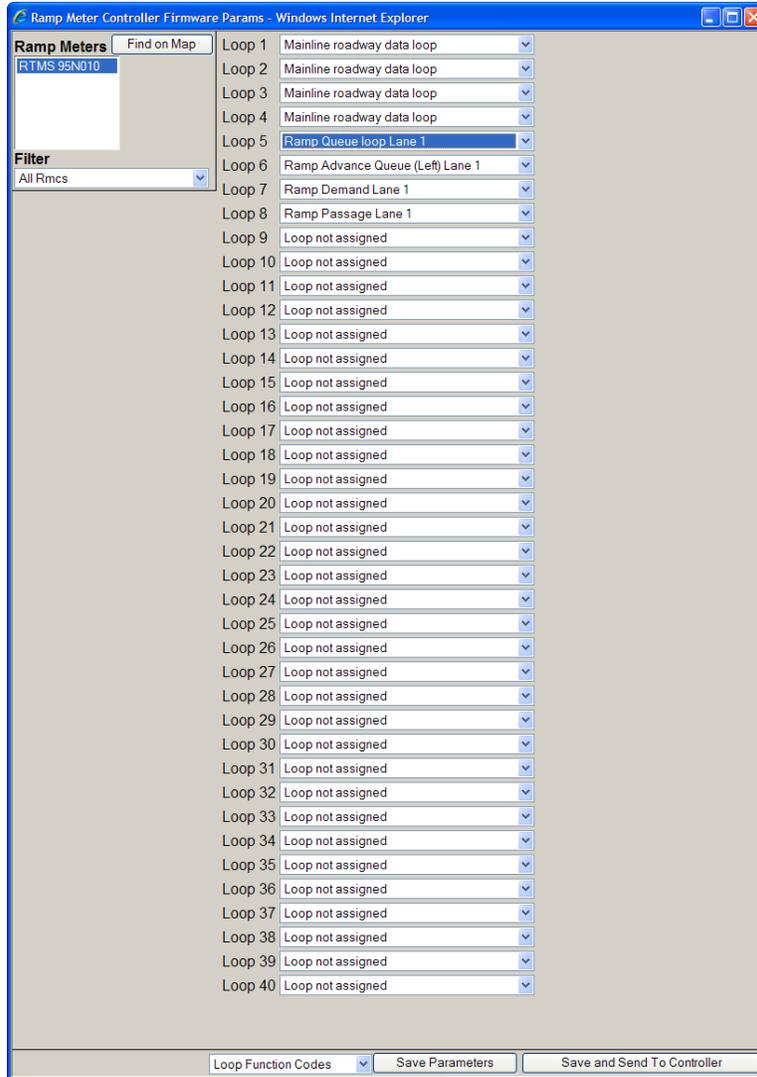
Figure 3–111 – Loop Function Codes

Options that can be selected from the dialog include:

- **Save Parameters**: Pressing this button saves the modified parameters to the controller.

- **Save and Send to Controller**: Pressing this button saves any modified parameters and sends to the controller. Following this action, the system downloads the entire current firmware parameter set to the ramp meter controller. **Note**: Modifying controllers parameters may have undetermined effects to the operation of the controller. Changes to the lane geometry, loop assignments, or trap designations should be accomplished off-line. This action may cause the controller to stop metering and turn off the controller head assembly.

The **Speed Trap Table** , shown in Figure 3–112, allows the operator to configure (loop) speed traps for the selected controller.
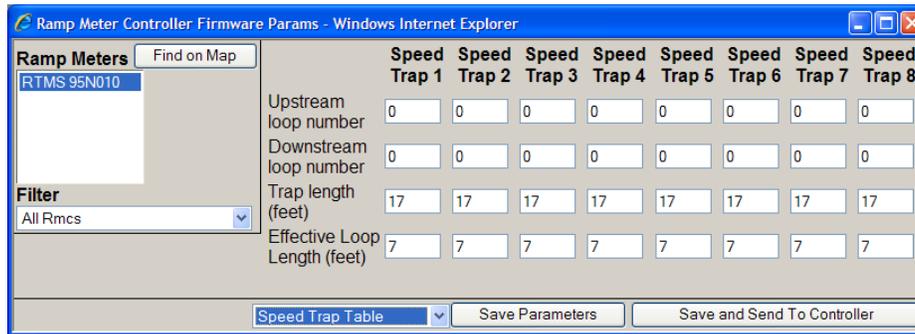
Figure 3–112 – Speed Trap Table

Options that can be selected from the dialog include:

- **Save Parameters**: Pressing this button saves the modified parameters to the controller.

- **Save and Send to Controller**: Pressing this button saves any modified parameters and sends to the controller. Following this action, the system downloads the entire current firmware parameter set to the ramp meter controller. **Note**: Modifying controllers parameters may have undetermined effects to the operation of the controller. Changes to the lane geometry, loop assignments, or trap designations should be accomplished off-line. This action may cause the controller to stop metering and turn off the controller head assembly.

The **Data Validity Parameters**, shown in Figure 3–113, allows the operator to set the parameters for occupancy and volume breakpoints.
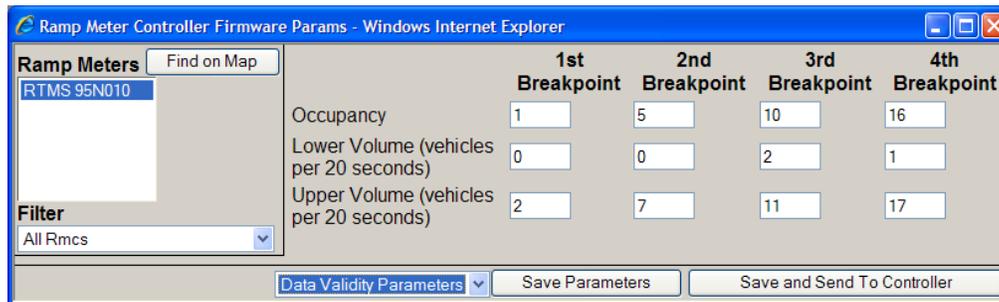
Figure 3–113 – Data Validity Parameters

Options that can be selected from the dialog include:

- **Save Parameters**: Pressing this button saves the modified parameters to the controller.

- **Save and Send to Controller**: Pressing this button saves any modified parameters and sends to the controller. Following this action, the system downloads the entire current firmware parameter set to the ramp meter controller. **Note**: Modifying controllers parameters may have undetermined effects to the operation of the controller. Changes to the lane geometry, loop assignments, or trap designations should be accomplished off-line. This action may cause the controller to stop metering and turn off the controller head assembly.

The RMC **170 Global Firmware Parameters**, shown in Figure 3–114, allows the operator to set the global firmware parameters for the controller.
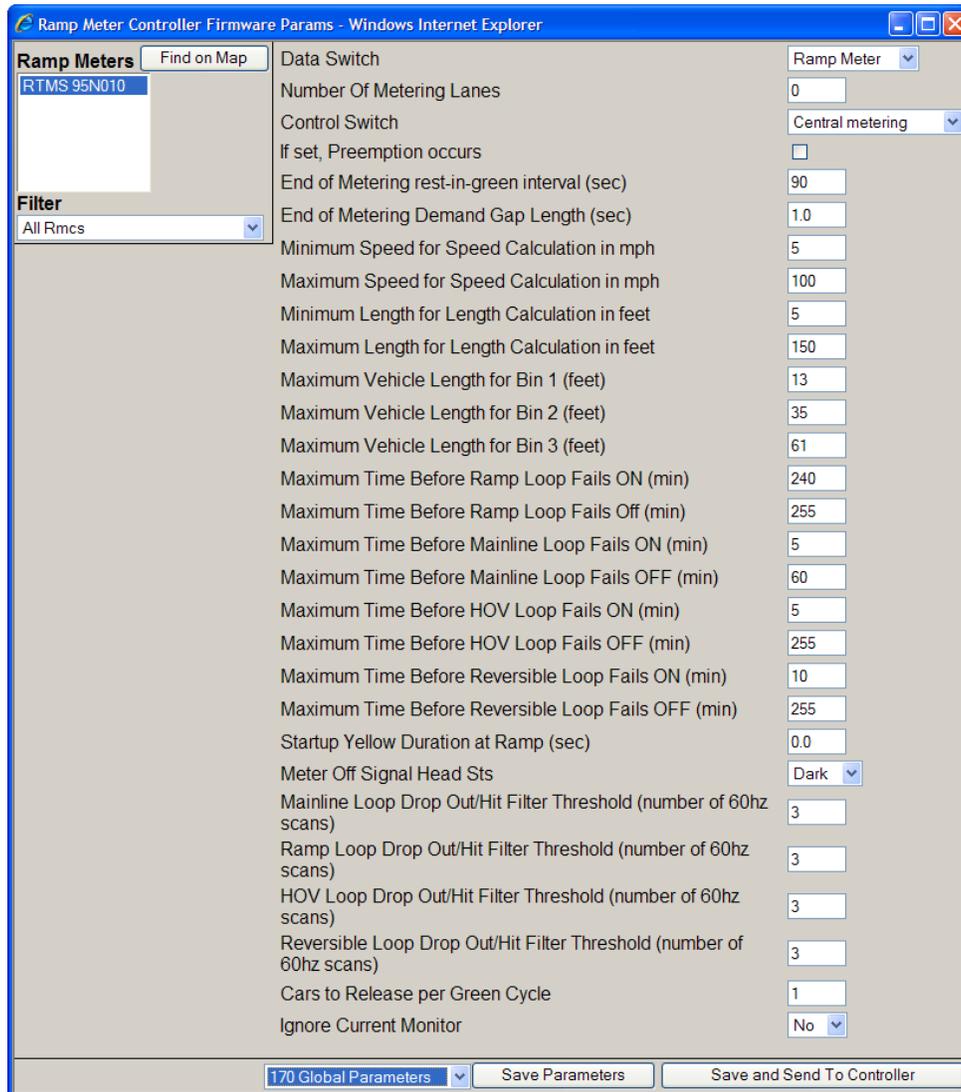
Figure 3–114 – 170 Global Parameters

Options that can be selected from the dialog include:

- **Save Parameters**: Pressing this button saves the modified parameters to the controller.

- **Save and Send to Controller**: Pressing this button saves any modified parameters and sends to the controller. Following this action, the system downloads the entire current firmware parameter set to the ramp meter controller. **Note**: Modifying controllers parameters may have undetermined effects to the operation of the controller. Changes to the lane geometry, loop assignments, or trap designations should be accomplished off-line. This action may cause the controller to stop metering and turn off the controller head assembly.

3.2.12.6 Reset RMC Dialog

The RMC Reset dialog, shown in Figure 3–115, allows the operator to reset the 170 controller.
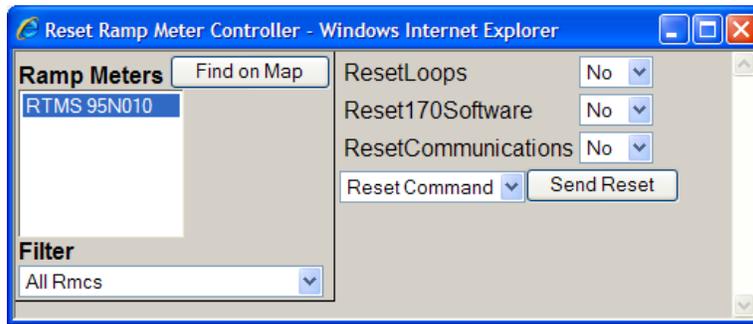
Figure 3–115 – RMC Controller Reset Dialog

Options that can be selected from the dialog include:

- **ResetLoops**: Allows the selection to reset the loops and detectors of the controller. Options include: **Yes or No.**

- **Reset170Software**: Allows the selection to reset the software of the controller. Options include: **Yes or No.**

- **ResetCommunications**: Allows the selection to reset the communications to the controller. Options include: **Yes or No.**

- **Filter**: Allows the list of RMC devices to be filtered, options include: **All, Out of Service, Active, by Roadway or by Group.**

- **Find on Map:** Pressing this button will cause the graphical map to "re-center" on the selected RMC.

- **Send Reset**: Pressing this button sends the reset request to the controller based on the desired selection.

3.2.13 RWIS

The RWIS status display panel, shown in Figure 3–116 displays the current values being returned from the device and its sensors. This panel is accessed from the Roadside Weather Systems context menu, left clicking on a RWIS icon on the map or right clicking on a RWIS icon on the map and choosing Station Status.
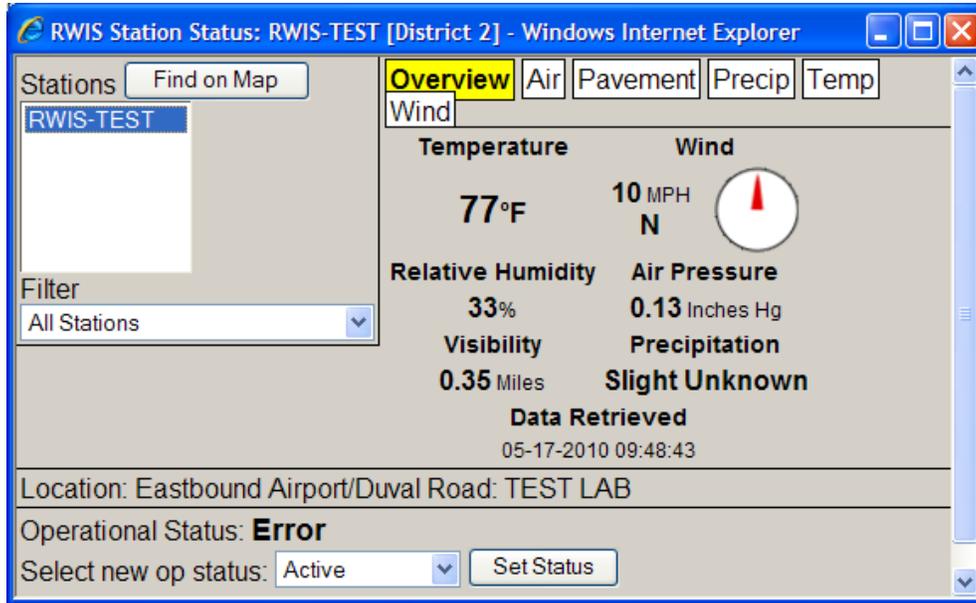
Figure 3–116 – RWIS Status

Options that can be selected from the detailed status include:

- **Filter:** Selecting this option will display only those stations meeting the filter criteria; filter criteria include: **Status: Active, Status: Error/Failed, Status: Out of Service, Roadway/Direction.**

- **Set Status**: Selecting this option will change the operational status of the RWIS station to either **Active** or **Out of Service**.

- **Overview** (see Figure 3–116): Selecting this tab will change the display to show an overview of the selected RWIS.

- **Air** (see Figure 3–117): Selecting this tab will change the display to show the details of the air sensors.
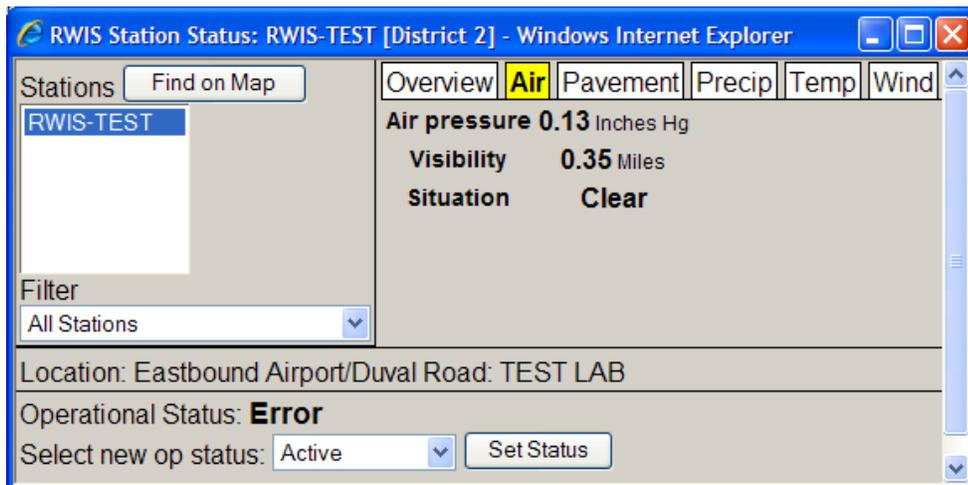
Figure 3–117 – RWIS Air Status

- **Pavement** (see Figure 3–118): Selecting this tab will change the display to show the details of the pavement sensors.
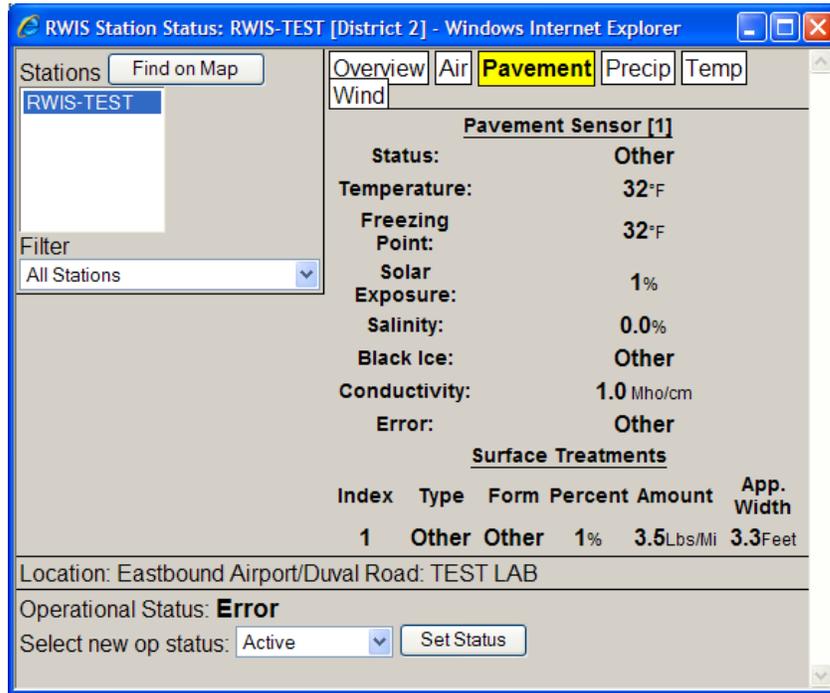
Figure 3–118 – RWIS Pavement Status

- **Precipitation** (see Figure 3–119): Selecting this tab will change the display to show the details of the precipitation sensors.
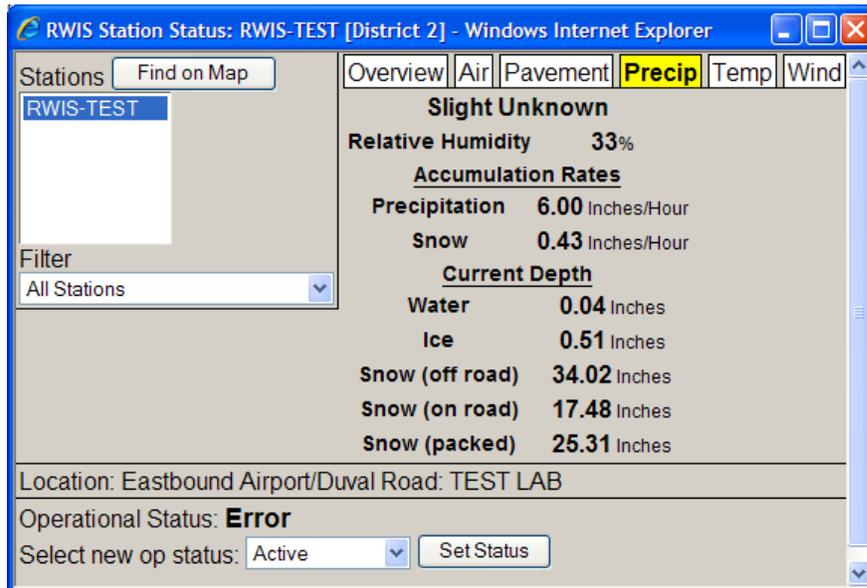
Figure 3–119 – RWIS Precipitation Status

- **Temperature** (see Figure 3–120): Selecting this tab will change the display to show the details of the temperature sensors.
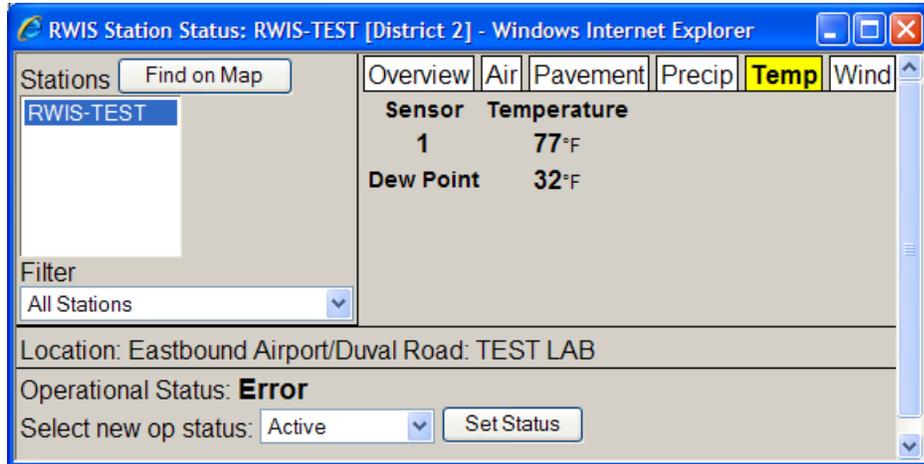
Figure 3–120 – RWIS Temperature Status

- **Wind** (see Figure 3–121): Selecting this tab will change the display to show the details of the wind sensors.
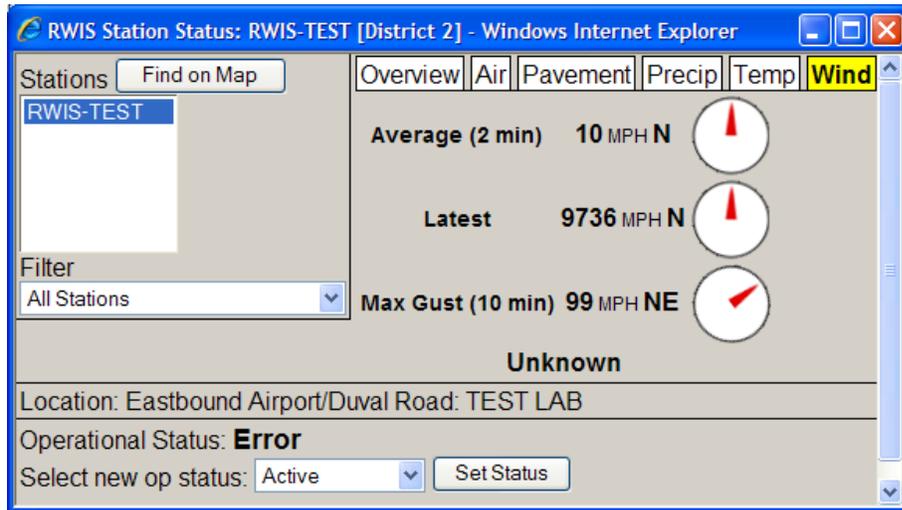
Figure 3–121 – RWIS Wind Status

3.2.14 Safety Barrier

The Safety Barrier display panel shown in Figure 3–122, displays the current status of the Safety Barrier controller. This panel is accessed from the Safety Barrier context menu, by left clicking on a Safety Barrier icon on the map or by right clicking on a Safety Barrier icon and choosing Device Status.
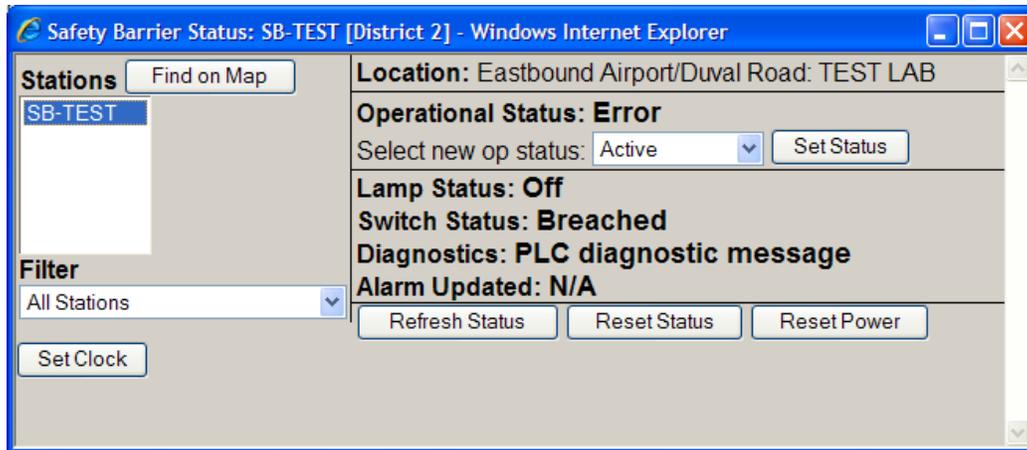
Figure 3–122 – Safety Barrier Status Control

Other than the status information displayed to the operator, options that can be selected from the detailed status includes:

- **Find on Map:** Pressing this button will cause the graphical map to "re-center" on the selected device (either DMS or HAR).

- **Filter:** Selecting this option will display only those stations meeting the filter criteria; filter criteria include: **Status: Active, Status: Error/Failed, Status: Out of Service, Roadway/Direction.**

- **Set Status**: Allows the status of the selected Safety Barrier station to be set to either **Active** or **Out of Service**.

- **Refresh Status**: Selecting this option will cause a refresh status command to be sent to the Safety Barrier controller (the GUI will be updated when the response is received).

- **Reset Status**: Selecting this option will cause a command to be sent to the Safety Barrier station to reset the status of the station.

- **Reset Power**: Selecting this option will cause a command to be sent to the Safety Barrier station to reset itself.

- **Set Clock**: Selecting this option will cause a command to be sent to the Safety Barrier station reset the clock to the current time of the server running the Safety Barrier driver

3.2.15 Scheduled Actions

The Scheduled Actions Subsystem (SAS) GUIs allow operators to manage sequences and schedules that have been previously created. The dialog shown in Figure 3–123 shows the entry dialog when Scheduler is selected from the Cameras context menu then Devices is clicked on.
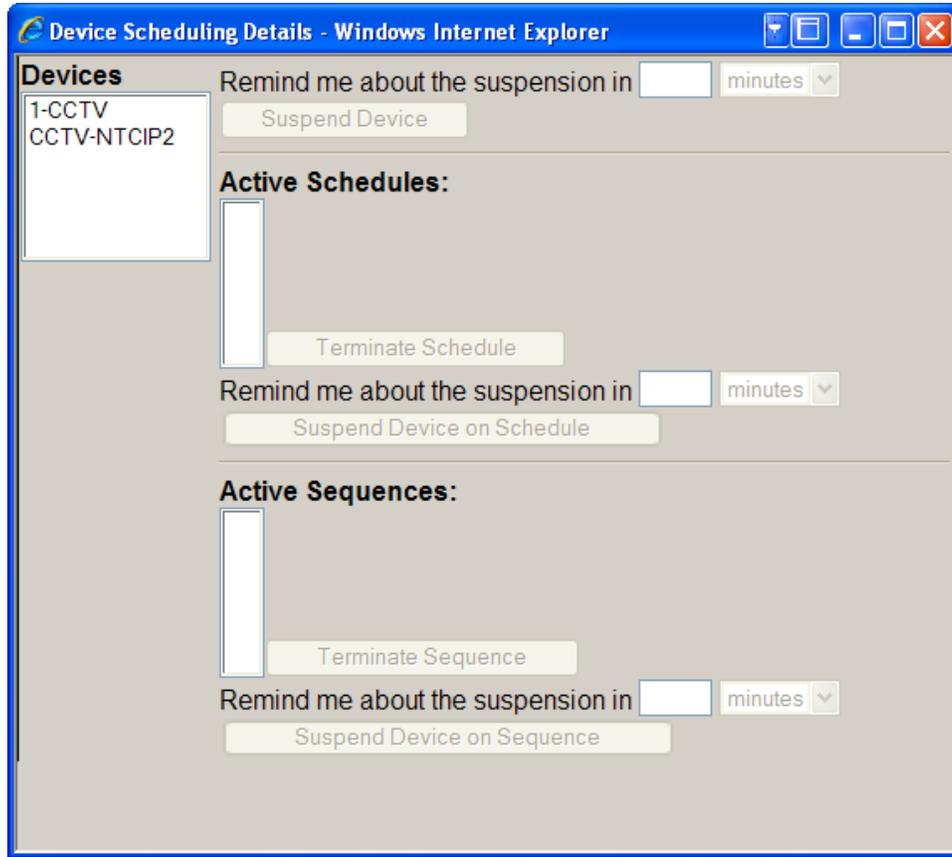
Figure 3–123 – SAS Scheduling Details

Other than the status information displayed to the operator, options that can be entered on the GUI includes:

- **Remind me about the suspension in:** operator can enter a time value to remind them when they have specified a suspension of a device, schedule or sequence.

- **Suspend Device**: allows an operator to temporarily remove the specified device from any type of scheduled operations (e.g. it takes the device out of the sequence/schedule).

- **Terminate Schedule**: allows the operator to terminate the selected schedule.

- **Terminate Sequence**: allows the operator to terminate the selected sequence.

The dialog displayed in Figure 3–124 is displayed when the operator selects Scheduler from the Cameras context menu then clicks on Schedules.
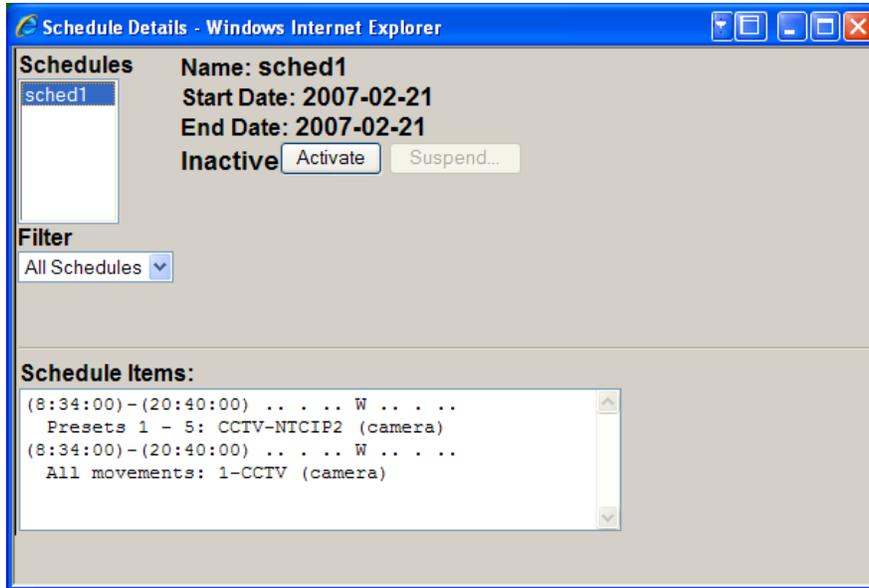
Figure 3–124 – SAS Schedule Details

Other than the status information displayed to the operator, options that can be selected from the detailed status includes:

- **Activate:** Selecting this option will activate (start) the selected schedule.

- **Suspend:** Selecting this option will suspend (stop) the selected schedule.

- **Filter**: Allows the filtering of which schedules are displayed in the status box of the dialog.

The dialog displayed in Figure 3–125 is displayed when the operator selects Schedules from the Cameras context menu and then clicks on Sequences.
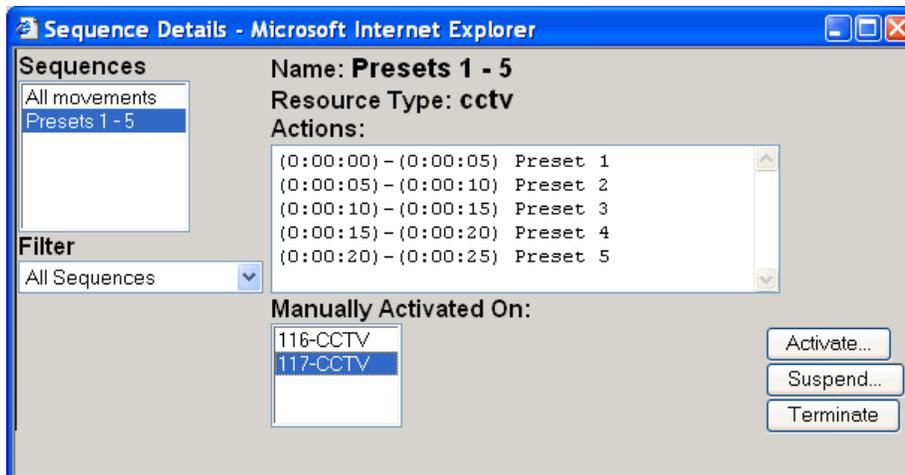
Figure 3–125 – SAS Sequence Details

Other than the status information displayed to the operator, options that can be selected from the detailed status includes:

- **Activate:** Selecting this option will activate (start) the selected sequence.

- **Suspend:** Selecting this option will suspend (stop) the selected sequence.

- **Terminate:** Selecting this option will terminate (remove) the selected sequence.

- **Filter**: Allows the filtering of which sequences are displayed in the status box of the dialog.

If a CCTV device has been suspended (which might be done if a CCTV was being used to monitor an accident and the operational staff did not want the CCTV moving as the result of a sequence), a warning will be displayed as shown in Figure 3–126.
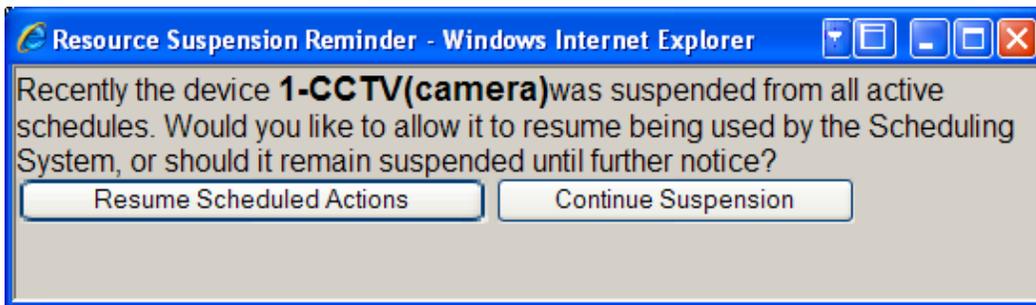
Figure 3–126 – SAS Suspension Reminder

Depending on the configuration setting (of the variable broadcastSuspendTimeouts in the system configuration file), the suspension reminder will be sent to either all operators logged in (if the variable is set to true) or only to the operator who suspended the device (if the variable is set to false). The operator has the following options:

- **Resume Scheduled Actions:** selecting this option will remove the CCTV from "suspended" mode and allow the CCTV to have scheduled actions executed against it.

- **Continue Suspension:** Selecting this option will allow the CCTV to remain in suspended mode.

When a CCTV device is included in an active schedule/sequence, the icon representing the CCTV will have a small "timer" displayed as part of the icon (see Figure 3–127).
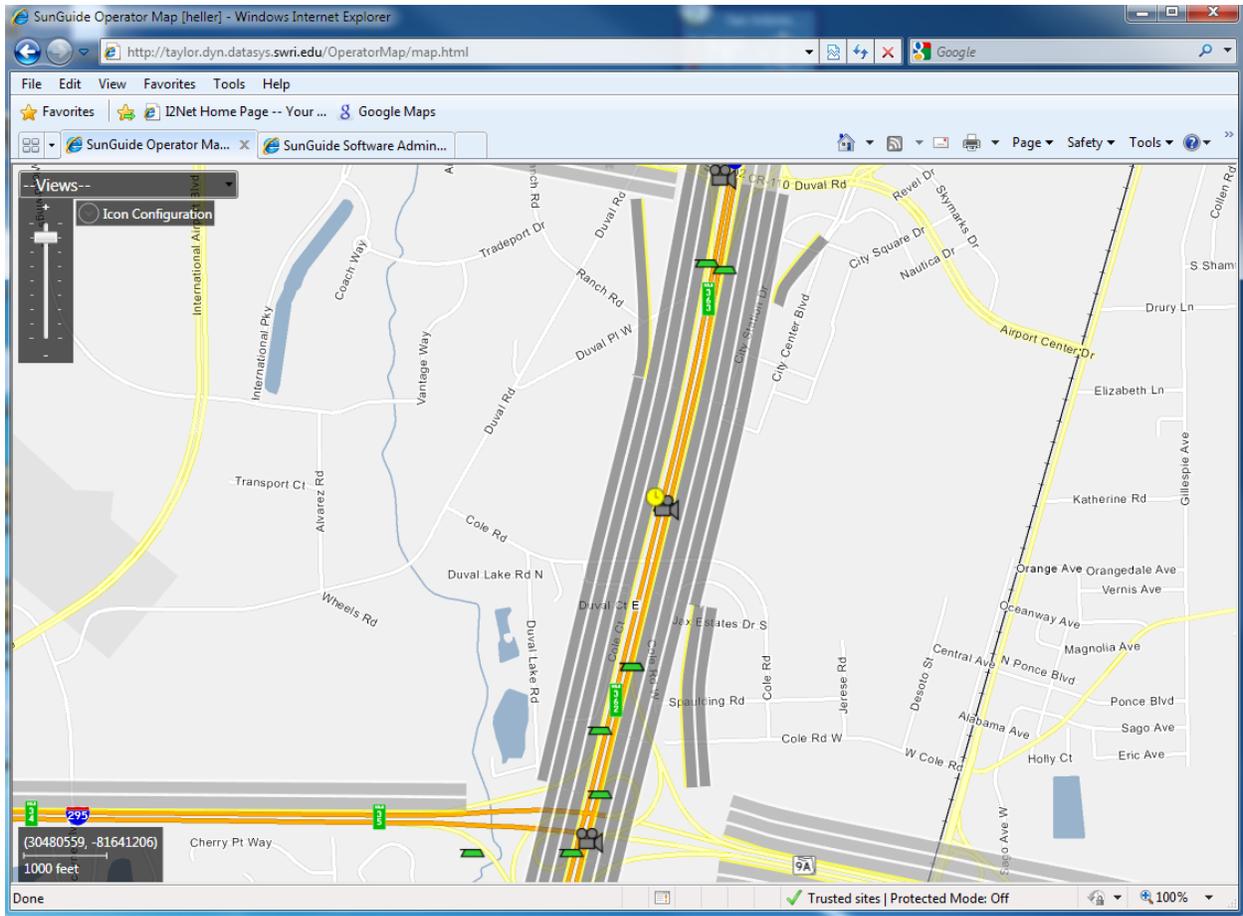
Figure 3–127 -- CCTV Icon with Active Schedule / Sequence

3.2.16 System Options

An operator can change their password by selecting Change Password from the System context menu. The dialog shown in Figure 3–128 is displayed and the user must enter the fields and then select **Change Password** to cause the new password to be saved to the database.

Figure 3–128 – Change Password

An Operator has the ability to edit map shields. To edit shields, select Edit Map Shields from the System context menu. This will bring up the Edit Shield Placement dialog (see 3-119). In this dialog, select the type of shield (several highway shields are listed, along with non-shield roadway names and mile markers), enter the number or name to display on the shield, and select the zoom level to display the shield. Once shield type, name/number, and zoom level are

selected, press the **Place Shields on Map** button, and then click on the background map to place a shield. Shields will appear only on the selected level and any higher magnifications; this keeps the zoomed-out views from appearing cluttered with shields.
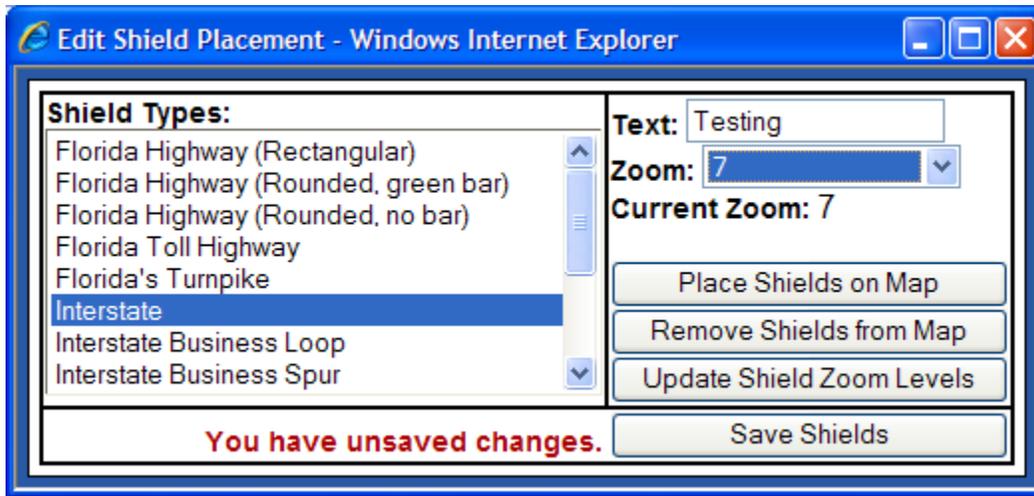
Figure 3–129 – Edit Shield Placement

Once placed, a shield may be moved by pressing the left mouse button on it and dragging it to a new location. To remove a shield, right click on it and select **Remove Shield** from the context menu or press the **Remove Shields from Map** button and click on the shields to be removed on the map. Shield zoom levels can be updated from the Edit Shield Placement dialog by selecting the appropriate zoom level and pressing the **Update Shield Zoom Levels** button. Once shield placement is complete, press the **Save Shields** button in this dialog to save them to the server. Note that this save is a distinct operation from the Save Map discussed above; Save Map will not save shields, Save Shields will not save TSS map links.

To edit a shield right click on it and select Edit Shield from the context menu. This will launch the Edit Shield dialog shown in Figure 3–130 which allows the Operator to modify the shield type, text, zoom level, latitude, and longitude.
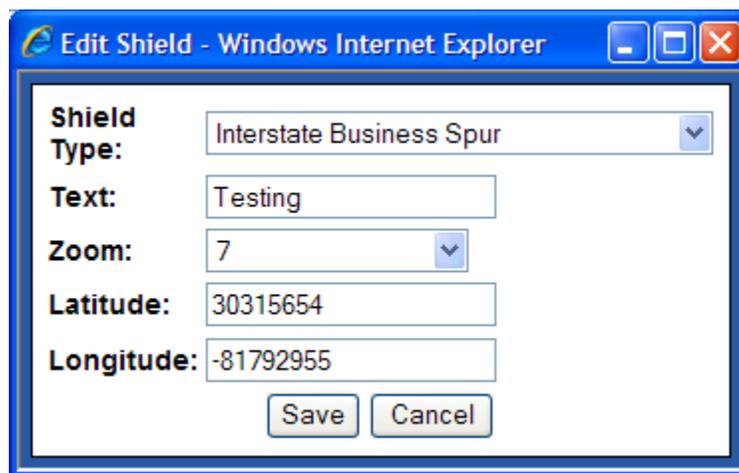
Figure 3–130 – Edit Shield Dialog

After the edits are complete, they should automatically display on the operator map with no restarts required.

An Operator (with appropriate permissions) has the ability to alter some system settings that affect the look and feel of the GUI along with the options provided to all users of the system. The drop down box in the upper left hand corner of the map has different views that can be selected by an operator. If an operator has permission to change these settings, they can select the Map Views from the System context menu and the dialog presented in Figure 3–131 will be displayed.
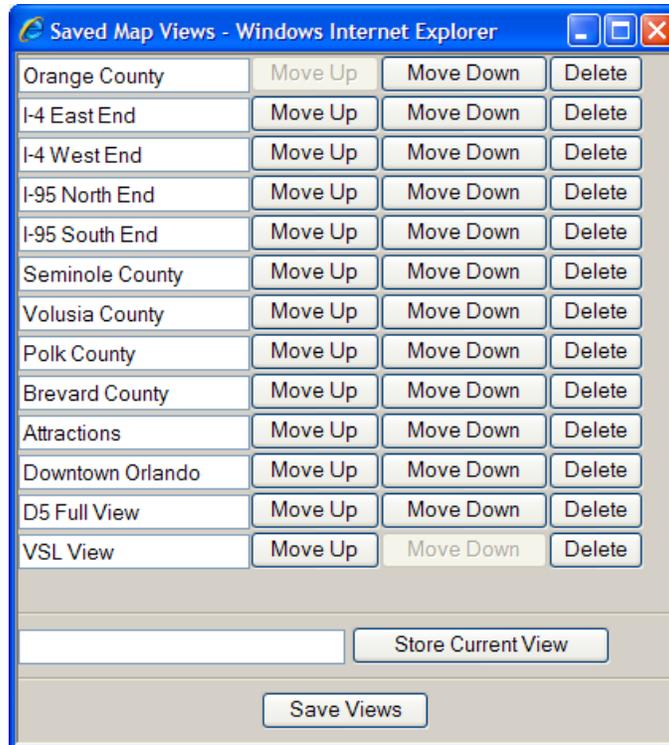
Figure 3–131 – Change Map Views

Options that can be selected include:

- **Move Up:** selecting will move the corresponding map view higher in the list that is displayed.

- **Move Down:** selecting will move the corresponding map view lower in the list that is displayed.

- **Delete:** selecting will delete the corresponding map view higher from the list that is displayed.

- **Store Current View:** a name is entered and when this option is selected the current map view will be saved (for later display in the list of map views).

- **Save Views:** selecting this option will save the "order" selections that were made by the operator using this dialog.

Note that once the changes are made, the user who entered the changes will see them right away, other users will not see them until they log in.

An Operator can set the log level to Info, Debug or Detail by selecting the appropriate option from Set Log Level in the System context menu.

An Operator can change the display characteristics of various features by selecting Systems Settings from the System context menu (see Figure 3–132). Note that this can only be displayed by operators with the appropriate permissions.
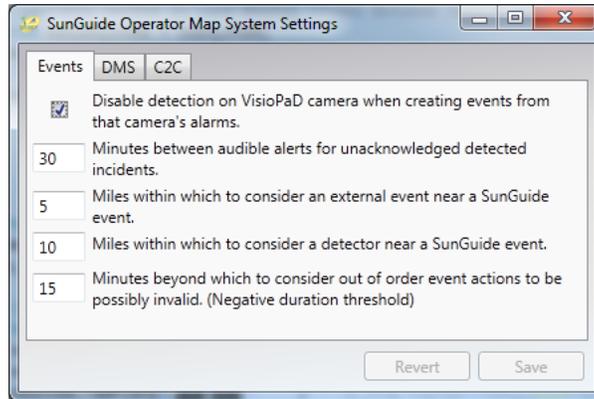
Figure 3–132 – System Settings

Options are grouped into Event, DMS, and C2C collections and include:

- **Disable Detection on VisioPaD camera when creating events from that camera's alarms:** specifies whether, by default, further detection on a VisioPaD camera should be disabled for the duration of an event detected by that camera. Operators with appropriate permissions may override this default setting on a case-by-case basis.

- **Minutes between audible alarms for unacknowledged detected incidents:** specifies the number of minutes between successive playing of WAV file that is played when IDS has generated alarms and an operator has not yet acknowledged the alarm.

- **Miles within which to consider an external event near a SunGuide event:** distance measured in miles (tenth of mile precision is allowed) that specifies what radius should be examined for existing events when a new external event is presented to the operator. This setting is used to determine which events are presented in a list of nearby events when resolving alerts caused by external events.

- **Miles within which to consider a detector near a SunGuide event:** distance measured in miles (tenth of mile precision is allowed) that specifies what radius should be examined to determine how close a detector is to an existing event. This setting is used to determine which events are presented in a list of nearby events when resolving alerts detected by field devices.

- **Minutes beyond which to consider out of order event actions to be possibly invalid (Negative duration threshold):** specifies the number of minutes to use when determining whether an event may not be included in Performance Measures reports due to event clearance activities taking place out of order.

- **Default all DMS messages to uppercase:** specifies if DMS messages should be forced to all upper case letters or left in the case typed by the operator.

- **Percent of speed limit below which to consider C2C links near congested:** specifies the percent of the speed limit below which C2C links should be displayed in the color used for near congested local TSS links. Typically this will be a yellow color unless changed by user preference.

- **Percent of speed limit below which to consider C2C links congested:** specifies the percent of the speed limit below which C2C links should be displayed in the color used for congested local TSS links. Typically this will be a red color unless changed by user preference.

Updates are committed to the system using the Save button. Pressing Revert will restore settings to the state they were in when the dialog was opened. Note that these settings may not take effect for other operators until they log out then log back in to the system.

3.2.17 Traffic Detection

The operator may hover (i.e., move the cursor to a location on the map and leave it in place for a period of time) over a link on the map to view the link's test center, name, and associated lane information. This data will display in a popup window as shown in Figure 3–133 after a short time. The popup is intended to display after two or three seconds, however, if the system is processing a large amount of data, it is possible this could be delayed several seconds. Note that the mouse needs to hover over a colored lane segment to get the popup to display; if the mouse happens to land on one of the non-colored stripes between lanes, the diagram may not appear.
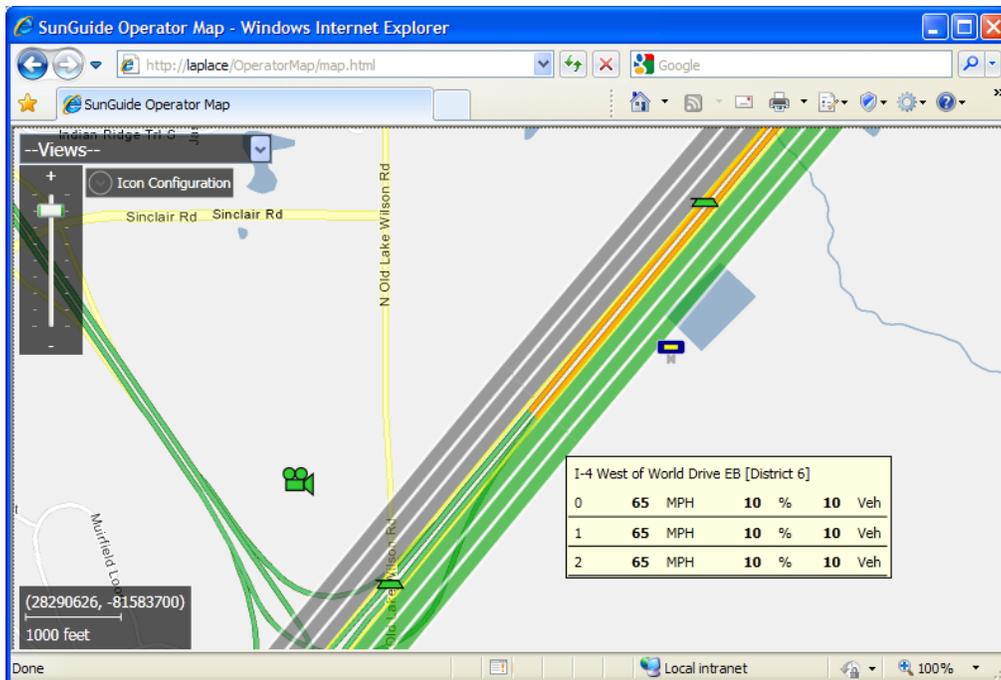
Figure 3–133 – Link and Lane Name

The operator may view the current traffic conditions for a specific link by double-clicking on that link, and viewing the TSS Details panel that is opened. The panel will display speed,

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occupancy, and volume information by lane, for a particular link. Examples of these detail panels may be viewed in Figure 3–134. In the speed and occupancy graphic, the top number (in a larger font) represents the "rolling average" and the bottom number (in a smaller font) represents the most recent value from the detector. The rolling average timeframe is a configuration item and the polling cycle is a configuration item so the number of polls included in the rolling average can be computed by dividing the rolling average value by the polling cycle. Pressing the **Find Link on Map** button will cause the map to re-center the current view on the TSS link segment and the link will be highlighted. Pressing the **Detector Status** button will display the TSS Detector Status dialog with the detector of the link preselected.
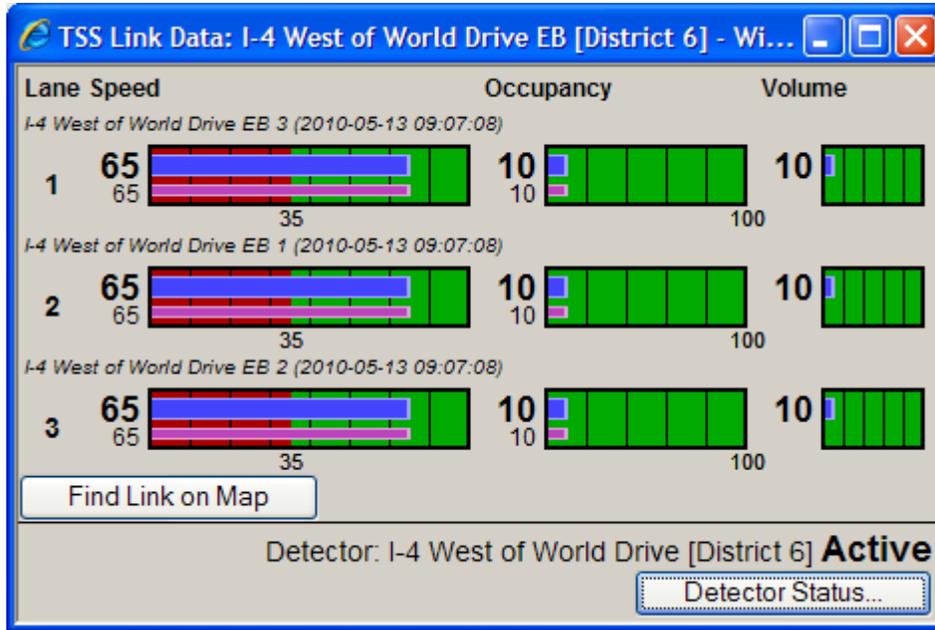
Figure 3–134 – Point Link Detail on Map

For probe based detection links, a slightly different version of the dialog is displayed. Rather than showing speed, volume, and occupancy, speed and current link traversal time are displayed, using the same rolling average and most recent display methods. Additionally, the count of vehicle matches over the last detection period and over the last four hours is displayed, along with the current delay over free flow time and whether dynamic linking across the link is currently allowed. To enable or disable dynamic linking for the link, the operator may press the toggle button marked **Enable** or **Disable** as appropriate. Dynamic linking, if enabled, will compensate for a failed probe detector in the middle of other operational probe detectors of the same type by creating a longer (dynamic) TSS link around the failed probe detector.
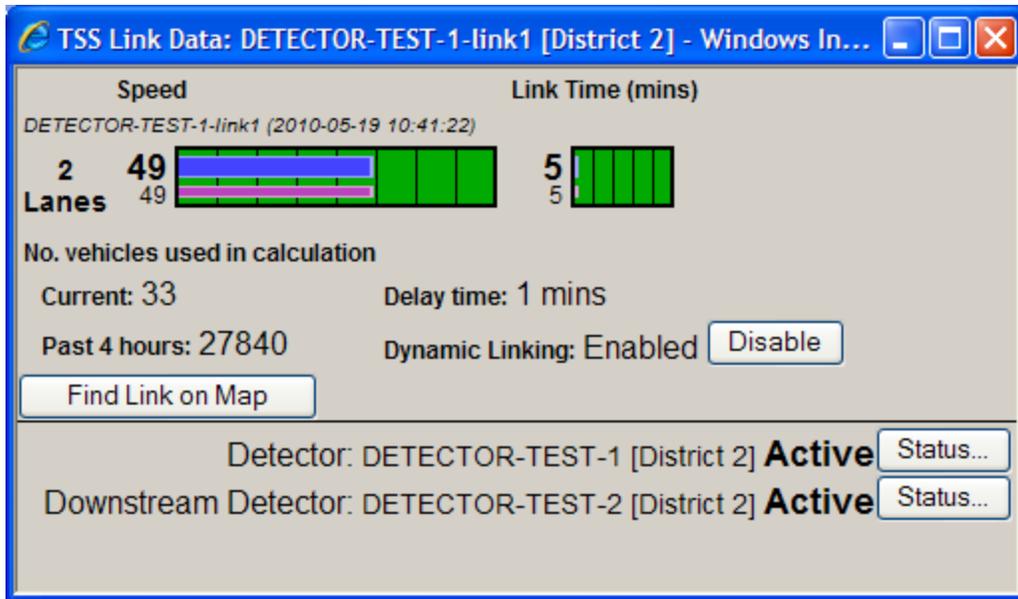
Figure 3–135 – Probe Link Detail on Map

Pressing the **Detector Status…** button will pull up a status dialog that is displayed in Figure 3–136. Pressing the **Find on Map** button will cause the map to re-center the current view on the TSS detector, pressing the **Set Status** button will display a dialog that allows the status of the device to be changed to **Active** or **Out of Service**. For detectors which support clock synchronization, pressing the **Synchronize Clock** button will send that command to the detector.
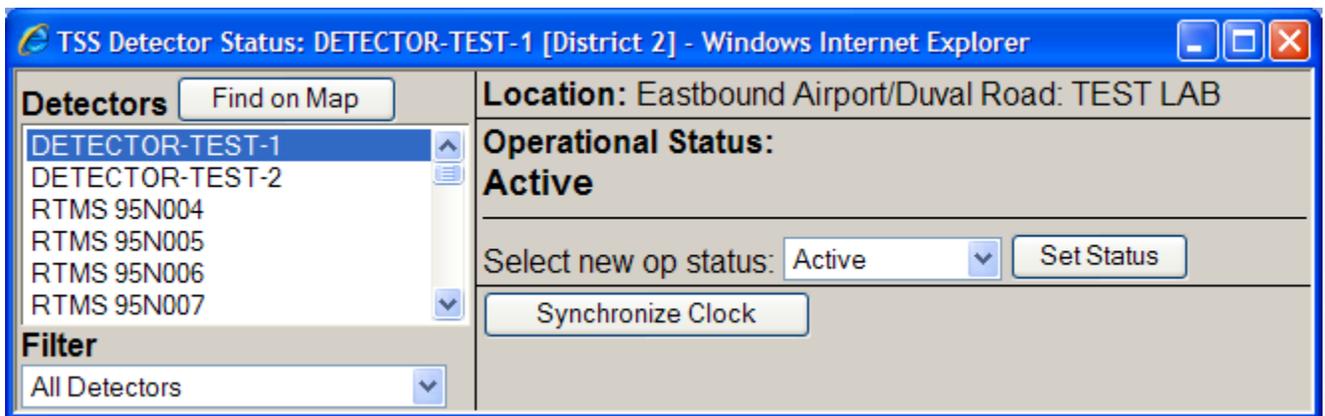
Figure 3–136 – Detector Status

3.2.18 Responders

The Operator can edit Geo-fences, get vehicle location information, and utilize the Vehicle Location Replay utility by selecting the appropriate option from the Responders context menu on the map.

An Operator may also view responder status by selecting Responder Status from the Responders context menu. This software is discussed in detail in Section 3.3.5.

An Operator may also select Vehicle Location Replay from the Responders context menu. This will cause the SunGuide AVL/RR Replay dialog to be shown.

Figure 3–137 – SunGuide AVL/RR Replay Dialog

3.2.19 Video Switching

Video Switching allows the operator to define and modify video tours, and to designate which local monitors to use to view the output from selected cameras, video tours. This functionality is accessible by selecting Switching Control from the Video Switching context menu. An example of the video switching panel is shown in Figure 3–138. Note that the number of monitors displayed in this GUI is configured by the SunGuide administrator (the number of monitors for each workstation is configured in the SunGuide Administrator editor). The dialog has a radio button for **Local Displays** or **Shared Displays**; these are configured by the system to either be displays next to the workstation (local) that are designed for single operator viewing or displays that are to be viewed by multiple operators (shared displays).

The output from cameras and video tours may be directed to specific monitors by dragging the camera and video tour icons from their respective lists (by clicking the **left mouse** button) and dropping them on the desired viewer image (by clicking the **left mouse** button while pointing to the desired monitor). The title of the camera or video tour will display on the selected monitor image.
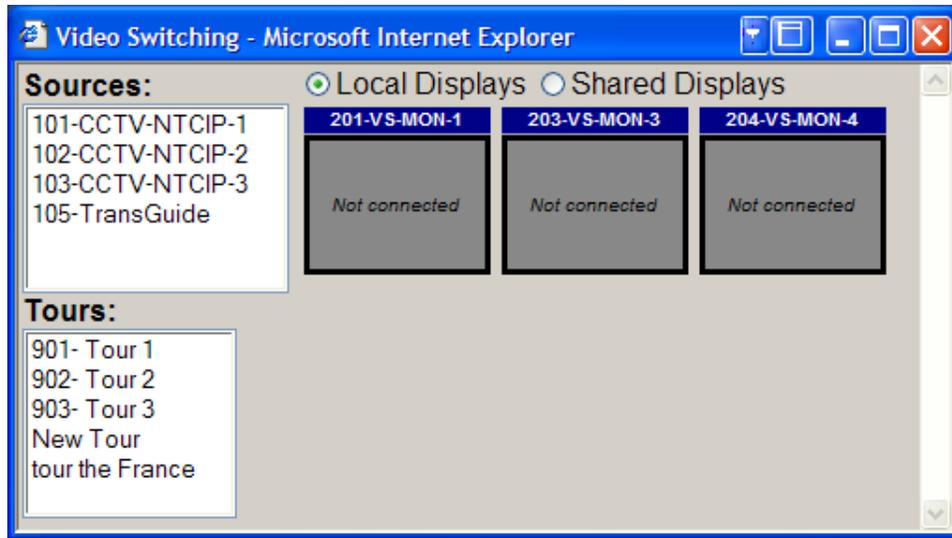
Figure 3–138 – Video Switching - Local

When viewing shared displays, the displays will appear in a virtual video wall configuration as specified by a user with permission to configure the video destinations. Multiple virtual walls may be configured in the system and can be selected using the Wall drop down list. The display of shared monitors in a virtual wall configuration is shown in Figure 3–139.
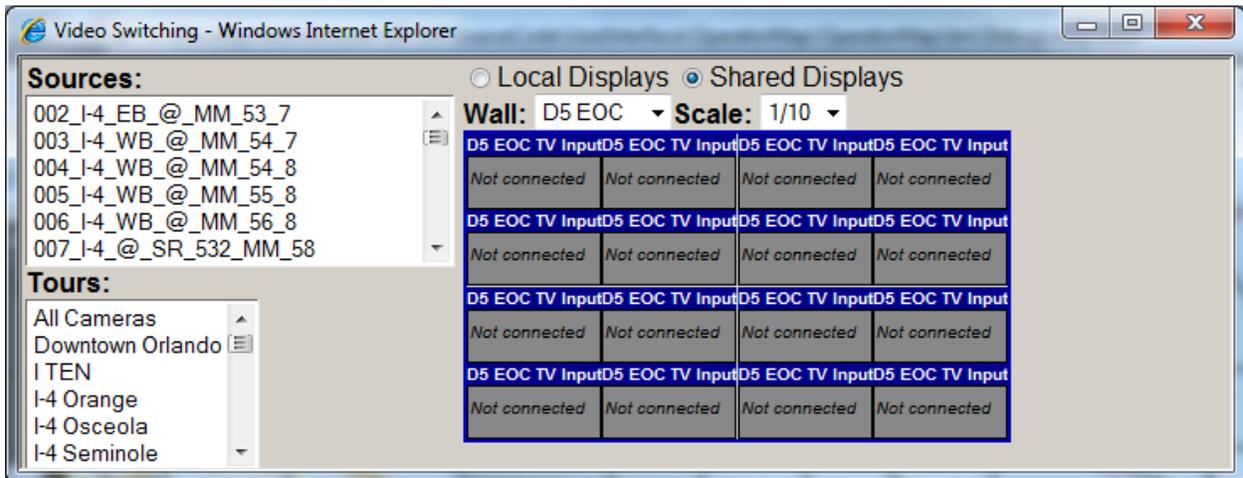
Figure 3–139 – Video Switching – Shared (Virtual Wall)

The arrangement of destinations in this dialog is configured using the Destination Layout Manager, which is accessed by selecting Virtual Wall Layout from the Video Switching context menu. The layout information cannot be dynamically retrieved, and must be manually configured. The Layout Manager which can be accessed by selecting Virtual Wall Layout from the Video Switching context menu is shown in Figure 3–140.
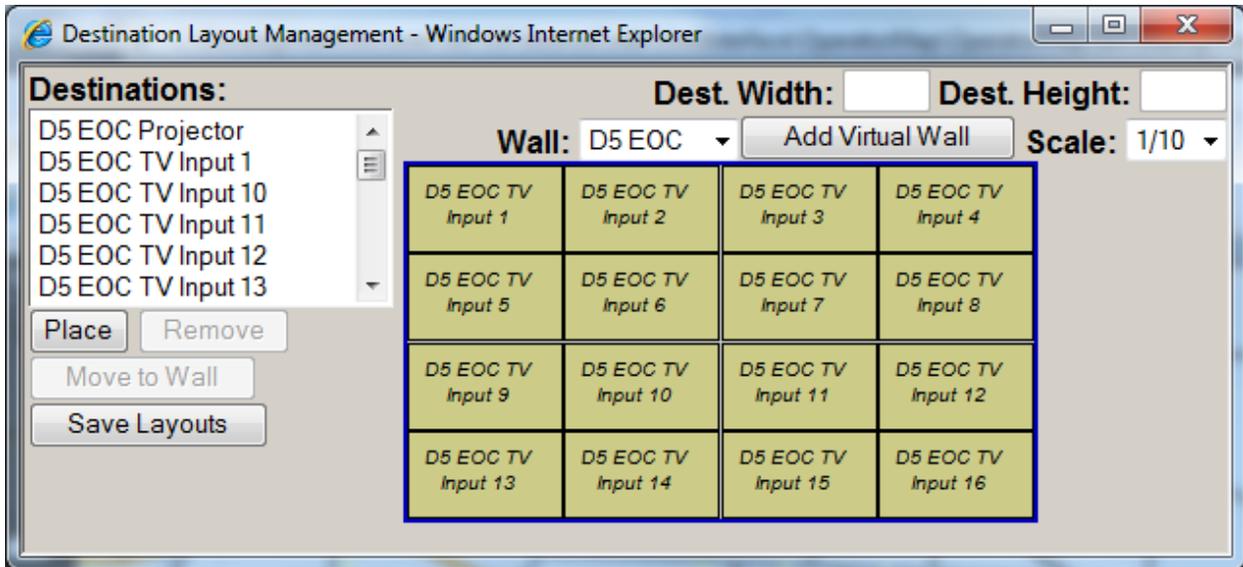
Figure 3–140 – Layout Manager

A shared destination may be added to the virtual wall by selecting it from the list and pressing the Place button. Once placed, the size may be altered by changing the values in the Destination list. Destination Width and Destination Height fields and the destination may be moved by clicking and dragging the appropriate box. The boundary of the virtual wall will automatically adjust to accommodate the size and position of all assigned destinations. To remove a destination from the virtual wall, select it from the list and press the Remove button. Once all layouts are assigned correctly, press the Save Layouts button to store the layout information and update all user interfaces to the new configuration.

Multiple virtual walls may be configured in the system. The current wall to edit may be selected using the Wall drop down list. New walls may be added by using the Add Virtual Wall. When the layouts are saved, any walls which have no destinations assigned to them will be automatically removed. A destination may only be present on one virtual wall at a time.

Selecting Video Tours from the Video Switching context menu opens the Video Tour Editor as shown in Figure 3–141.
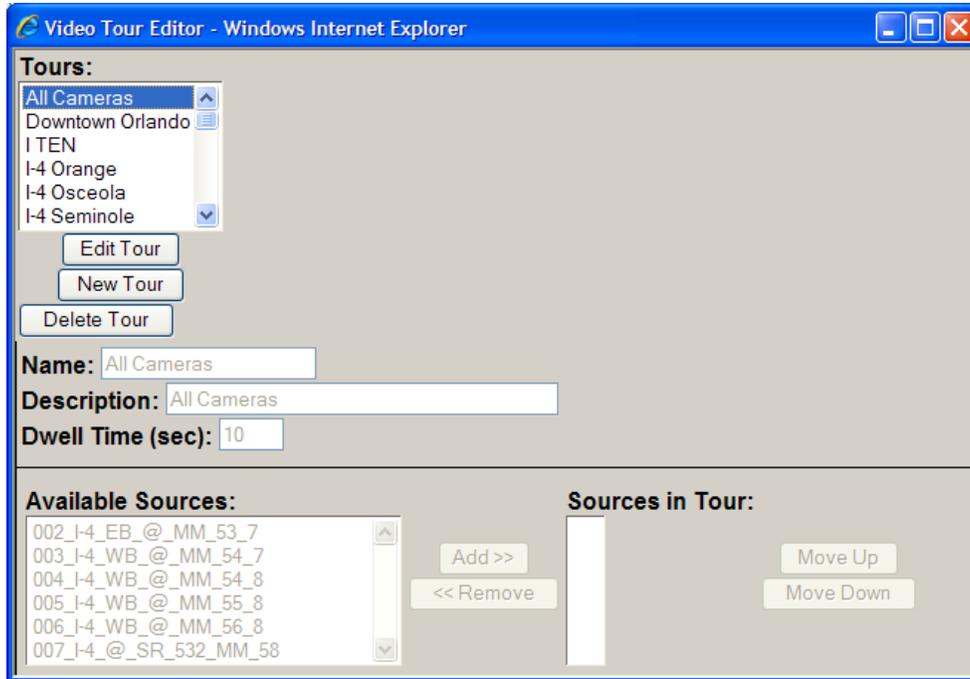
Figure 3–141 – Video Tour Editor with Tour Selected

Options that can be selected from the Video Tour Editor include:

- **Edit Tour:** Selecting this option will allow the user to edit the selected tour; Cameras may be added by selecting the **Add** button or removed from the tour by selecting the **Remove** button. The order in which the cameras are displayed in the tour may be rearranged by pressing the **Move Up** and **Move Down** buttons.

- **New Tour**: To create a new tour, enter the appropriate information on the panel then click on Save. If you have been viewing other pre-existing tours, clicking on the New Tour button will clear out the fields on the display so that data for the new tour may be entered. The same functionality as **Edit Tour** will be provided.

- **Delete Tour**: Selecting this option will delete the selected tour.

- **Name:** Is name of selected tour or tour to be added.

- **Description**: More descriptive than the name

- **Dwell Time:** Amount of time a "source" is to be displayed in a tour

- **Add**: Add the selected "Available Source" to a tour

- **Remove**: Remove the selected "Sources in Tour:" from the tour

- **Move Up:** Move the selected "Sources in Tour" above the one immediately preceding it.

- **Move Down:** Move the selected "Sources in Tour" below the one immediately following it.

- **Available Sources:** Sources that can be included in a tour (a source may occur more than once in a tour)

- **Sources in Tour**: Sources that have already been selected to be in the tour

Video Wall Control allows the operator to designate which cameras and video tours should be displayed on the video wall (note that a video wall display is made up of a series of objects called "viewers." This functionality is accessible by selecting Video Wall Control from the Video Switching context menu. An example of the video wall dialog is shown in Figure 3–142. The layout of the viewers displayed relates to the current video wall layout that has been programmed on the video wall controller.
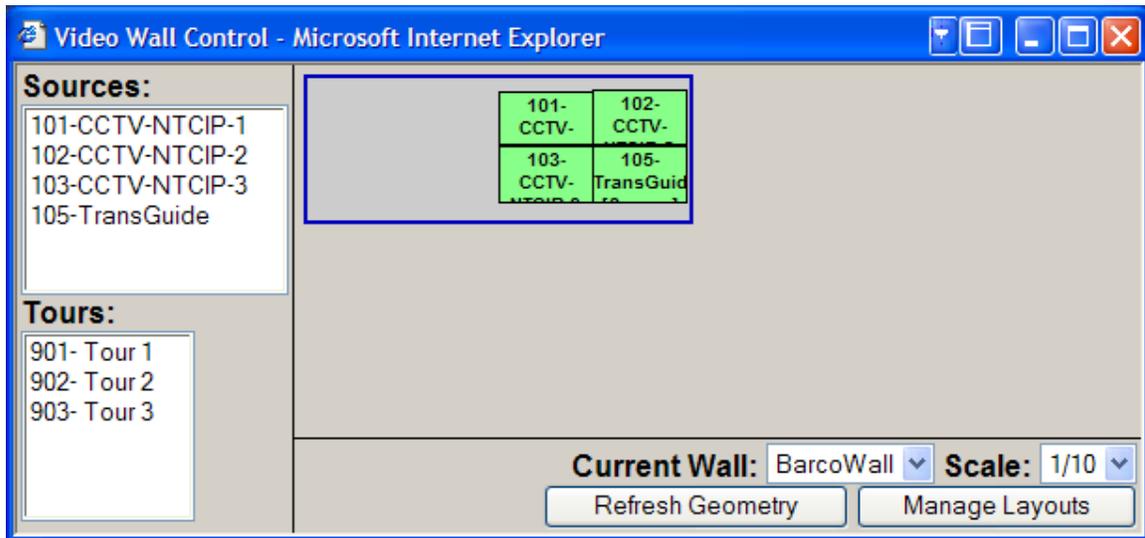
Figure 3–142 – Video Wall Switching

The output from cameras and video tours may be directed to specific viewers by selecting the camera and video tour icons from their respective lists (by clicking the **left mouse** button) and dropping them on the desired viewer image (by clicking the **left mouse** button while pointing to the desired viewer). An icon representing either a camera or video tour, whichever is appropriate, will display on the selected viewer image. The operator also has two options available from this GUI:

- **Refresh Geometry**: instructs the SunGuide software to communicate with the video wall controller to retrieve the most current video wall settings that have been established (this button should be used when the video wall controller software has been used to modify the video wall layout).
- **Layout Management**: The video wall software allows the operator to select which layouts (that are configured using the video wall control software and not the SunGuide software) are displayed. The SunGuide communicates with the video wall control software and presents a list of layouts to the operator, an example of the layouts is presented in Figure 3–143.
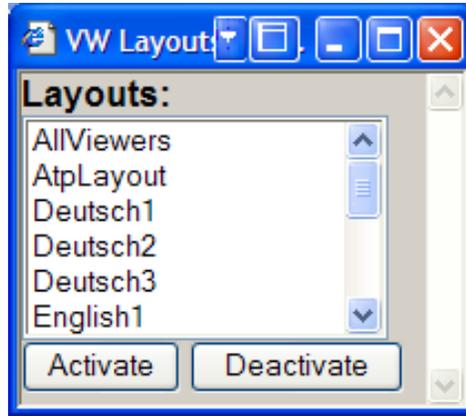
Figure 3–143 – Manage Video Wall Layouts

The operator can select a wall layout (only one layout may be active at a time) and then select one of the following options to change the layout of the wall:

- **Activate**: will instruct the video wall controller to switch to the specified layout
- **Deactivate**: will instruct the video wall controller to disable the specified layout

3.3 Tabbed GUI

The Tabbed GUI was introduced in Release 3.0, as new functionality is being introduced into SunGuide a transition is being made to this approach of displaying information to operators. As earlier generations of SunGuide systems are reworked they will be added to the tabbed GUI as directed by FDOT.

The following sections describe each of the tabs.

3.3.1 Event Tab

The Event List tab is described in the following sections. An overview of the tab is displayed in Figure 3–144.
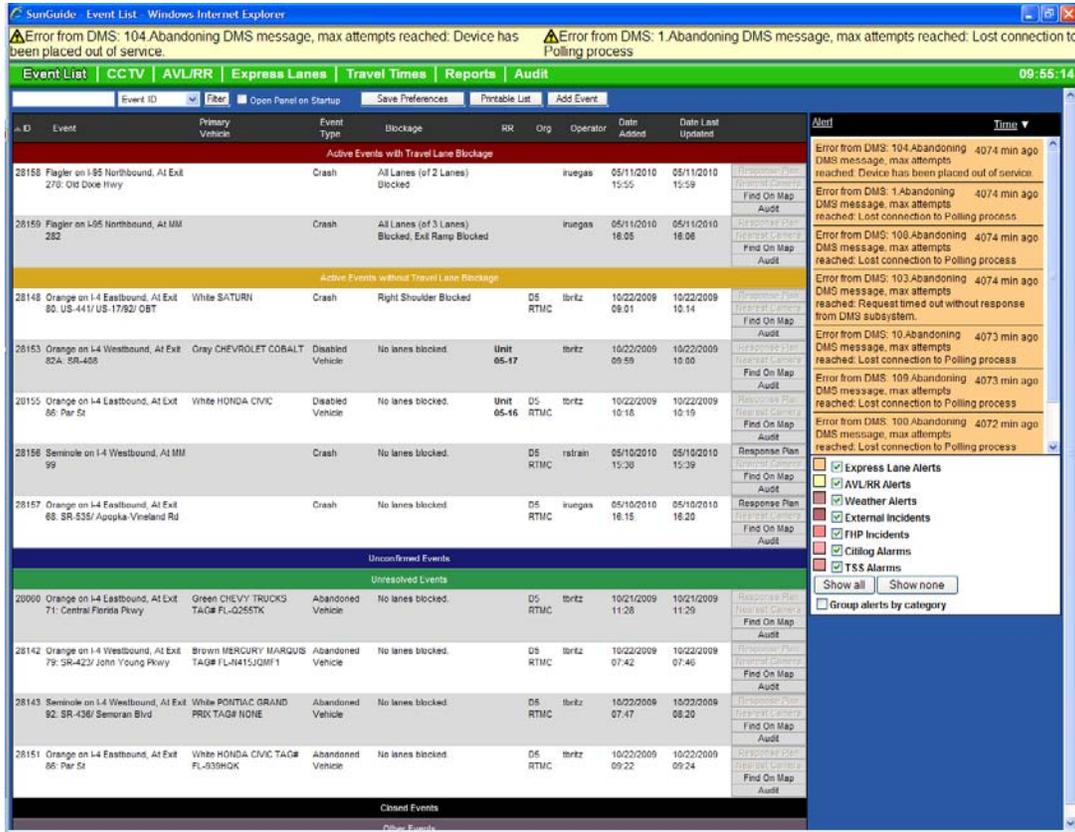
Figure 3–144 – Event List Tab

3.3.1.1 Event List Tab Section

The Event List provides a list of all events currently in the system broken down by:

- Active Events with Travel Lane Blockage
- Active Events with No Travel Lane Blockage
- Unconfirmed Events
- Unresolved Events
- Closed Events
- Other Events

Each event is summarized as follows:

- ID (Number)
- Event (Description)
- Primary (Involved) Vehicle
- Event Type
- Blockage
- Road Ranger/SIRV
- Originating Organization
- Operator

- Date/Time Entered
- Date/Time of Last Update
- Quick links to Response Plan, Nearest Camera, Find on Map and Audit

The Event List tab allows the user to the following options:

- Sorting – the list can be sorted by any of the fields in the event list by pressing the column header. The arrows are used to indicate the sort order (descending or ascending)

- Filtering – the list can be filtered by using the Filter Textbox/Combobox. Once the list is filtered, the column header turns green indicating that a filter is applied to the field

- Open Panel on startup – allows the operator to automatically open the Event List upon logging into the EM subsystem. This preference along with the sort order and filter option can be saved using the Save Preferences Button

- Open Event Details – by clicking on the event record, the Event Details GUI automatically opens

- Find On Map – the find on map button centers the selected event on the map

- Response Plan – opens the response plan for the selected record

- Nearest Camera – centers the map on the camera associated with the event

- Audit – launches the audit screen for the selected record

- Printable List – opens a printable version of the event list.

Comments about the event list:

- Events over an hour old no longer appear in the "Closed Events" list. Events that no longer appear in the events list can only be modified through the "Audit" function. However, typically only supervisors would have access to this, not every operator. Supervisors would click "Audit" on the green bar at the top of the events list window, search for the desired event by event ID, and make any necessary edits.

- The duration for which events are displayed in the alert box is "until closed". Some alerts can close themselves automatically without operator action – for example: TSS alerts will close themselves if traffic conditions return to normal before an operator otherwise responds to the alert.

The operator can also create an event by pressing the Add Event Button from the Event List window. This action will launch the Add New Event window. In order to create a new event the following fields must be populated:

- Event Type – select one of the configured event types
- Notifying Agency
- Notifying Contact
- Event Status
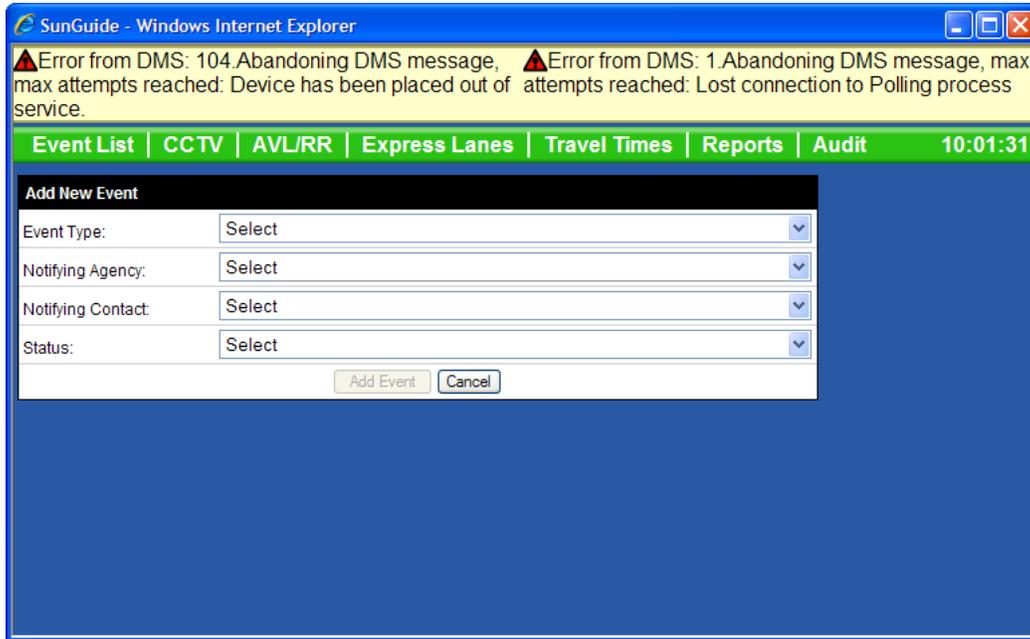
Figure 3–145 – Add Event Screen

The primary purpose of the Event Details window is to facilitate the management of events, the coordination of Road Ranger resources, and the recording of all related data points – including those required by the calculation of performance measures.

SunGuide also has the capability to receive events from internal and external sources; these include TSS alarms, VisioPaD detection, weather related events, FHP incidents, and other 3rd party sources. When a possible event is received from these sources, an alert is provided to the operator using the Alert List (see Figure 3–175). Each version of the alarm management dialog is discussed in the following paragraphs.

For all alert types, the operator has the options to perform one of the following actions:

- Create a new event: Data from the alarm will be entered into a new event record which the operator may begin managing.
- Create a secondary event: Data from the alarm will be entered into a new event record which the operator may begin managing, and the new event will be flagged as being secondary to the event the operator selects when completing the dialog.
- Set Responder Arrival: After selecting the event and the unit that is responding to the event, the arrival will be noted in the event record.
- Dismiss as already detected: If the alarm relates to an existing event, the operator may select the event that is already in the system and dismiss the alarm.
- Dismiss as False Alarm: If the alarm is not related to an actual traffic event, the operator may dismiss the alarm without further action.

If the alert is for a VisioPaD detected alarm, the VisioPaD Incident Detection Event dialog (see Figure 3–146) is displayed.
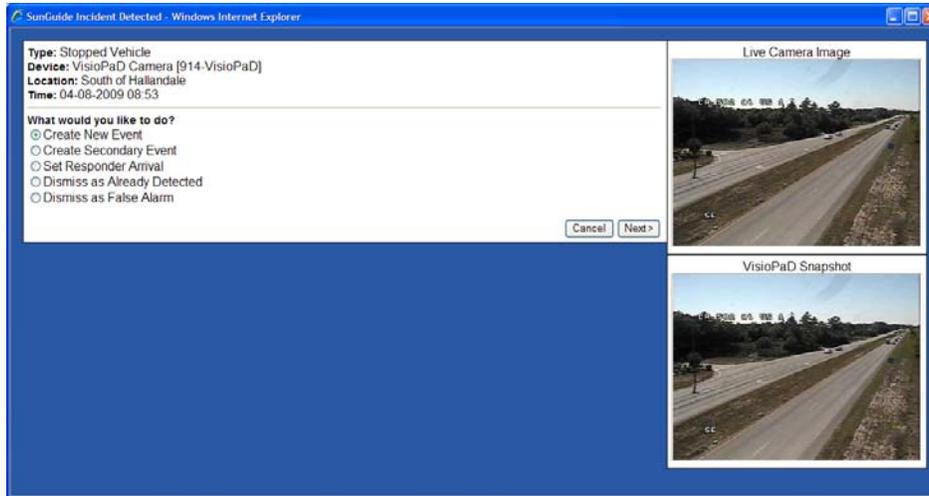
Figure 3–146 – VisioPaD Incident Detection Event Screen

In addition to the standard management options, the current snapshot from the camera is displayed, along with the snapshot from when the VisioPaD alarm was detected. Also, when creating a new or secondary event, an option is provided to allow further detection on that VisioPaD camera to be disabled for the duration of the event. The initial setting of this option is defined by an administrator through the System Settings dialog, but can be changed if the operator has sufficient privileges.

If the alert is for a weather event, the Weather Alert Incident Detection Event dialog (see Figure 3–147) is displayed.
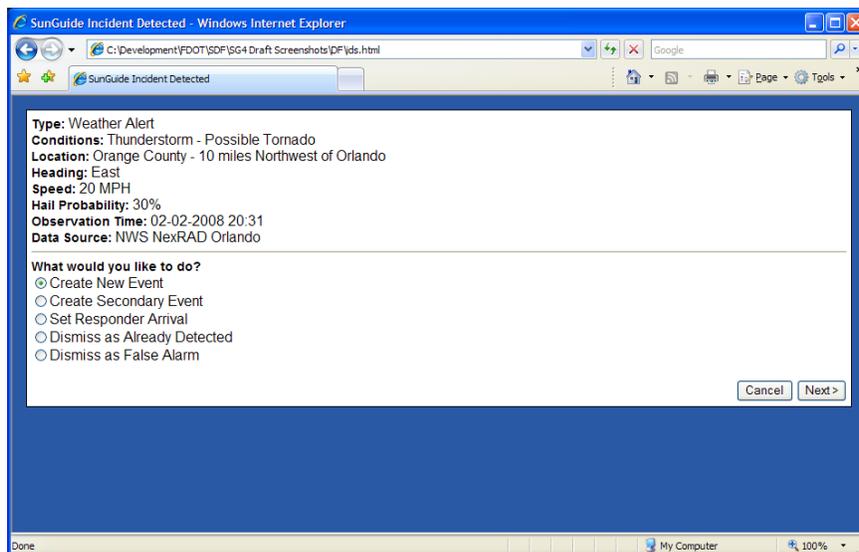
Figure 3–147 – Weather Alert Incident Detection Event Screen

When creating an event from a weather alert, data regarding the weather conditions will be copied into the comments section of the event record.

If the alert is for an external event, the External Alert Incident Detection Event dialog (see Figure 3–148) is displayed. Note that on this dialog a drop down box of events within a system specified

distance (that is configurable by the system administrator) is provided to assist the operator in determining if the third party should be associated with an already existing event.
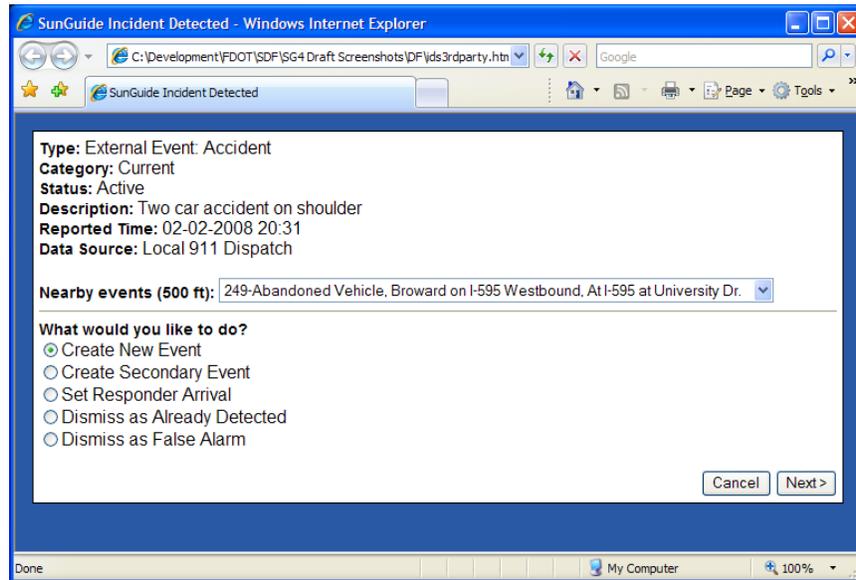
Figure 3–148 – Third Party Incident Detection Event Screen

When creating an event from an external event, if a nearby event was selected, it will be preselected when completing the Create Secondary Event, Set Responder Arrival, and Dismiss as Already Detected options.

If the alert is for an FHP incident, the FHP Incident Detection Event dialog (see Figure 3–149) is displayed. Note that on this dialog a drop down box of events within a system specified distance (that is configurable by the system administrator) is provided to assist the operator in determining if the third party should be associated with an already existing event.
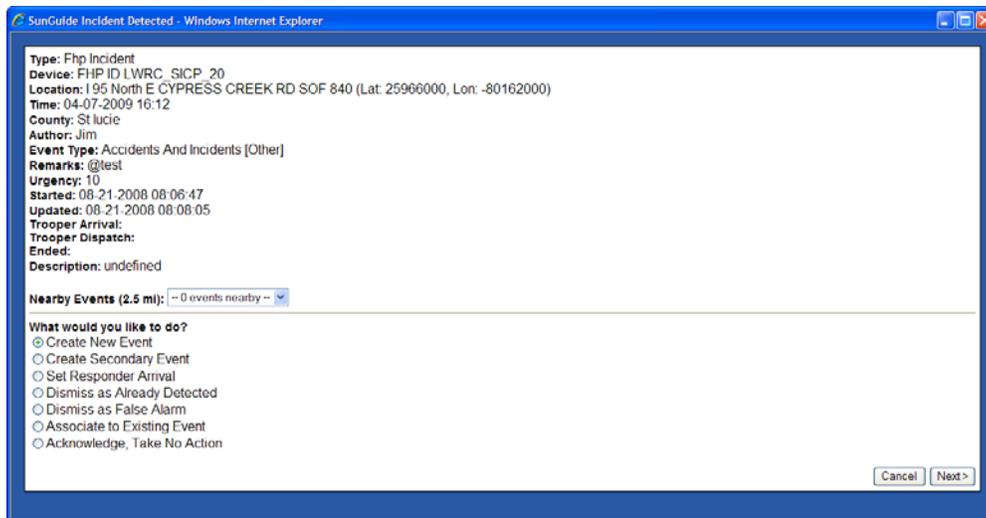
Figure 3–149 – FHP Incident Detection Event Screen

When creating an event from an external event, if a nearby event was selected, it will be

preselected when completing the Create Secondary Event, Set Responder Arrival, and Dismiss as Already Detected options.

For managing FHP incidents, two additional options are also available.

- Associate to Existing Event: Sets the FHP incident reference on an existing event to the incident reported in this alarm, and then dismisses the alarm itself. This may require interaction with another operator if the user handling the FHP incident alarm does not own the related event. This process is described below.

- Acknowledge, Take No Action: Dismisses the alert without any additional actions.

If an FHP incident is resolved using any option other than Dismiss as Already Detected or Dismiss as False Alarm, future updates to the incident in the FHP data source will cause the alarm to reappear. If the alarm is resolved using either Dismiss option, it will not reappear even if the incident is updated in the future.

If the Associate to Existing Event option is selected, but the selected event is not owned by the operator managing the FHP incident, the following rules will apply.

- If the event is unowned, owned by a system process, or owned by a user not currently logged in to the system, the operator managing the FHP incident will be given ownership of the event, and the FHP incident number will be updated.

- If the event is owned by a non-system user who is currently logged in, the system will request a resolution of the request from the owner of the event.

If a resolution request is required, the system will display a message to the operator managing the FHP incident indicating that the request is in progress. Meanwhile, the owner of the event will be presented with a dialog (see Figure 3–150) providing information regarding the requested change, and showing the available options to resolve it.
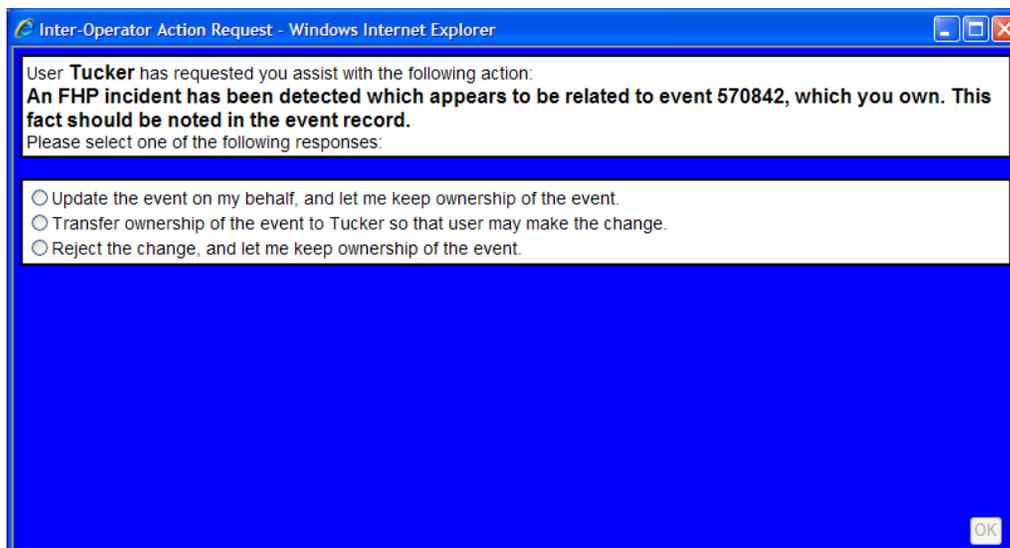
Figure 3–150 – Operator Interaction Request

The following options are available to the event owner to resolve this request.

- Update the event: The current owner will retain ownership of the event, and the FHP

incident number will be added to the record.

- Transfer ownership: The operator managing the FHP incident alarm will gain ownership of the event, and the FHP incident number will be added to the record.

- Reject the change: The current owner will retain ownership of the event, but no change to the event record will be made.

Regardless of which option is selected, the operator managing the FHP incident alarm will be informed of the result. If no response is received, the request will be cancelled and the operators must manually resolve the issue.

The Event Details screen consists of collapsible sections. Each section is described in detail in the subsequent sections.
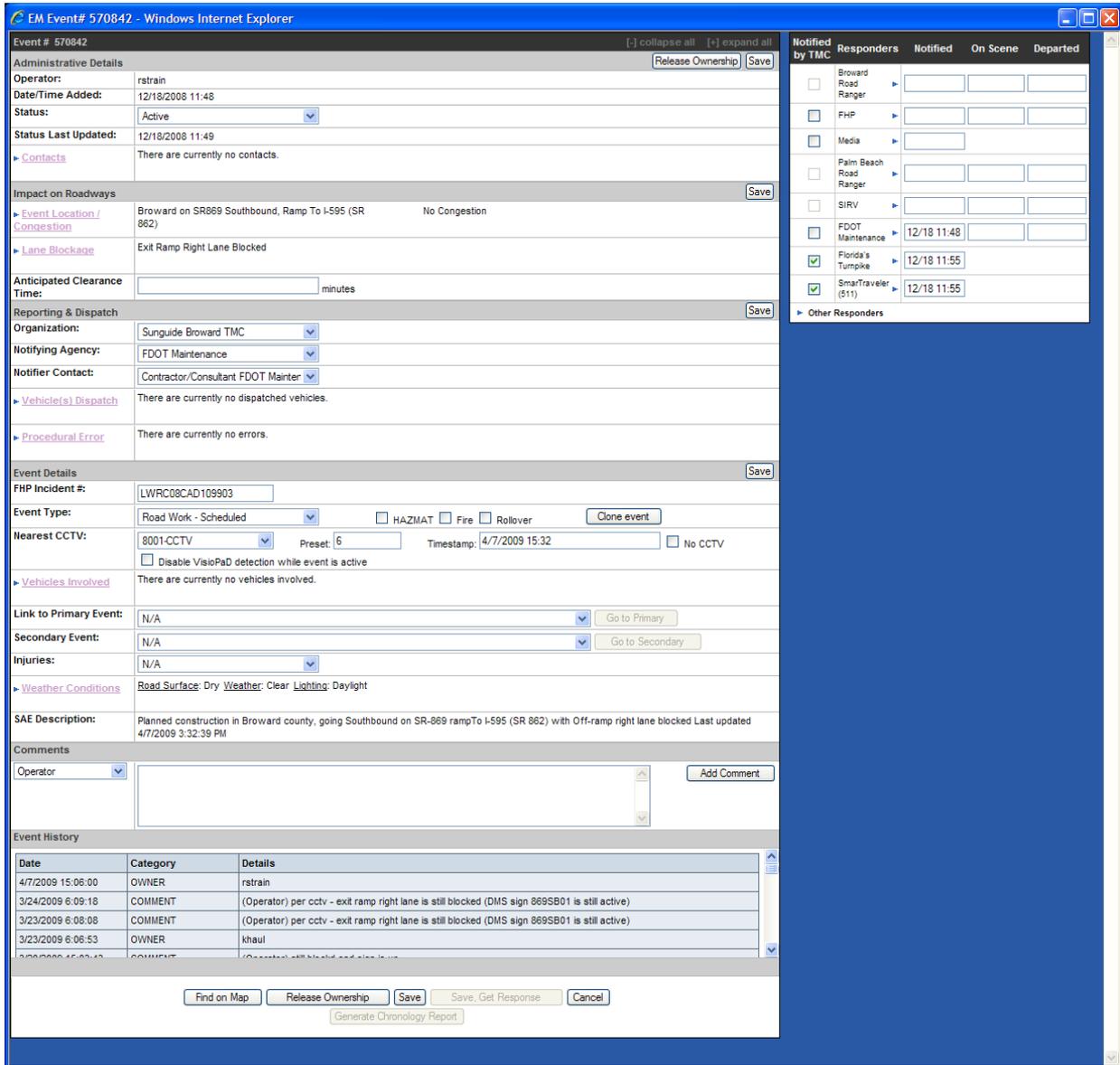
Figure 3–151 – Event Details Screen

Event severity is computed automatically by the system and cannot be modified by an operator. The severity is determined based on the following:

- Severe: lane blocked over 2 hours or full closure – note "full closure" means all travel (road) or exit lanes blockage.

- Moderate: lane blocked between 0.5 hour and 2 hours

- Minor: lane blocked less than 0.5 hour

- Unknown: other (default)

Options available from the screen include:

Collapse All / **Expand All**: Collapse (expand) all expandable sections (Contacts, Event Location / Congestion, Lane Blockage, Vehicle(S) Dispatch, Procedural Error, Vehicles Involved, Weather Conditions)

Release Ownership / **Obtain Ownership** (top and bottom): Events must be owned by an operator in order to modify the event. These buttons facilitate taking or releasing ownership.

Save (throughout the dialog): Save the current state of the event including all pending modifications.

Find on Map: Center the operators map on the event.

Save, **Get Response**: Save the current state of the event including all pending modifications and request a response plan (see Section 0).

Cancel: Abandon all changes made since the last save.

Generate Chronology Report: Generates a report that contains all changes made to an event.

3.3.1.2 Administrative Details Section

Figure 3–152 – Administrative Details

The administrative details section is used to give an overview of the status of the event and includes:

- Event Number – unique field assigned by the system.
- Operator name
- Created date/time – non-editable field that is automatically filled in by the system at creation.
- Event Status – determined by Operator selection; each change in Status is time stamped and recorded by the system. Status Last Updated contains the date and time of the most

recent status change. A complete status change history can be viewed in the Event History.

Following is a list and brief explanation of each status type:

- Unconfirmed – Events that have not yet been verified by CCTV or RR
- Active – Verified Events
- Closed – Closed Events
- Unresolved – Events that remain on the shoulder but no responders are present (e.g. abandoned vehicles)
- False Alarm – Verified events that have been saved in the system and cancelled prior to arrival of any responders
- Void – Events that have been entered in error (e.g. duplicate events)
- Audit – Reopens the event for editing (must have proper permissions)

3.3.1.3 Contacts Subsection

Figure 3–153 – Contacts

Contact information for the event can be added by selecting agency, and entering name and phone number into the relevant free-form text fields. Click Add to record all selected/entered contact information.

Contact information can be edited by clicking the Modify button beside an entry, and making any necessary drop-list/edit box changes. Clicking the Save button will commit those changes.

A contact can be deleted by clicking the Delete button beside an entry. A confirmation dialog will appear, confirming the deletion.

3.3.1.4 Impact on Roadways Section

The Impact on roadway subsection consists of information pertaining to Event Location & Congestion as well as Lane Blockage, Clearance Time, and FL-ATIS Incident Severity. FL-ATIS Incident Severity is based on the percentage of travel or exit lanes blocked, and will be automatically updated when an operator modifies the lane blockage, displaying the warning shown below. The operator may adjust the severity if necessary prior to saving the event. This severity will be reported with the event record if it is broadcast via the FL-ATIS.

Figure 3–154 – Impacts on Roadway

Event Location / Congestion: Select the Event Location / Congestion to open the location entry form. Use the drop-down lists provided. Subsequent drop-down lists are populated based on the previous selection so entry must be made in the following order:

1. County
2. Road
3. Direction
4. Reference Point
5. Relationship to Exit

Figure 3–155 – Event Location / Congestion

The Distance from the Relationship to Exit is recorded in feet by selecting the number of feet in ones, tens, hundreds, etc.

If Alternate Roads are specified for the location, an alternate may be selected by clicking the appropriate radio button. Once an Event Location is entered, Save Location/Congestion and

click the Event Location/Congestion link to close the form.

To enter congestion information, check the Congestion check box, and use the drop lists provided. Subsequent drop-down lists are populated based on the previous selection so entry must be made in the following order:

Congestion Head

1. County
2. Reference Point
3. Relationship to Exit

Congestion Tail

1. County
2. Reference Point
3. Relationship to Exit

Congestion Tail County, Reference Point and Relationship to Exit will be pre-populated with the values entered for the Congestion Head, although the County may be modified to another county with the correct roadway. Road and Direction values are from the current Event Location. If the system allows modification of Congestion Tail roadway direction, that field may also be modified. Congestion must be cleared to close an event. Click the Event Location / Congestion link again to close the sub-section.

Lane Blockage:

Figure 3–156 – Lane Blockage

Lane configuration (number and type of lanes) is automatically provided based on the selected Event Location.

Lane configuration can be changed using the Insert Lane and Remove Lane buttons, after selecting the relevant lane number (and lane type for inserts). Lane attributes can be changed by clicking on the defined "hot spots" in the upper third of the graphical view by left clicking (right clicking will take you back) on the "hot spot." Available attributes are as follows:

- M – Travel Lane
- Hv – High Occupancy Vehicle lane
- EL – Express Lane
- On – On ramp
- Off – Off ramp
- Sh – Shoulder

- G – Gore

Lane configuration changes will only apply to the specific event (will not affect the default lane configuration of the next event placed at this location).

Lane blockage is indicated by clicking on the green arrow "hot spot" shown on the second third of the graphical view. Left clicking on the "hot spot" will allow the following lane status changes:

- Green Arrow – lane open
- Red X – lane blocked
- Question Mark – unknown status

Changes to the lane configuration and blockage can be saved by clicking the Save Blockage button. All lane blockages must be cleared and saved prior to closing an event. Unresolved events may contain shoulder blockages. Click the Lane Blockage link again to close the sub-section.

3.3.1.5 Reporting & Dispatch Section

The Organization (managing TMC) is Operator selected from the drop-down list. The list can be set to default for each TMC.

Figure 3–157 – Reporting and Dispatch

Notifying Agency and Notifier Contact are first entered on the Add Event form; these fields can be changed – each change is time stamped and recorded by the system.

Vehicle Dispatch: Select the Vehicle(s) Dispatch link to open the Vehicle(s) Dispatch form shown below.

Figure 3–158 – Vehicle Dispatch

All Road Ranger or SIRV activities, dispatches, arrivals, cancellations and departures are managed by use of this form.

Process Times: Process times include dispatch, arrive, depart, and cancel. The Vehicle(s) Dispatch form facilitates the entry of process times by ensuring that timestamps are entered in the following order:

1. Dispatch – To record the time the RR is dispatched to an event
2. Arrive – To record the time the RR arrives at an event
3. Depart – To record the time the RR departs from an event
4. Cancel – To cancel a RR that has been dispatched to an event (you cannot cancel a RR who has already arrived).

Activities may only be selected/added after the entry of an arrival time, and before the entry of a depart time or cancel time. For non-Road-Ranger vehicles, selecting one of the activities that is considered quantifiable causes a Quantity freeform edit box to appear, where a numeric quantity can optionally be entered.

At arrival (after the entry of an arrival time), status may be set to Assist Motorist, Assist FHP or Assist Other RR. This may no longer be true: At departure (after the entry of a depart time or cancel time) status may be set to Patrolling, Meal, Break, Out of Service, Mechanical, Fuel, Inspection, or Base.

Multiple vehicles may be dispatched to the same event; each of their respective activities being recorded in the database. Events may not be closed until all vehicles have been assigned at least one activity and have departed from (or cancelled) the event (after the entry of a depart time or cancel time). Select Submit to record all entries to the database.

A list of all vehicles assisting at the event and the current status of all vehicles assigned to a beat can be viewed from the dispatch form. Select the Vehicle(s) Dispatch link again to close the section.

Figure 3–159 – Procedural Error

Procedural Error: Select the Procedural Error link to open the Road Ranger Procedural Error form shown above.

Enter Procedural Error information by selecting Driver and Error Type from the corresponding drop-lists, and entering a Comment into the relevant free-form text field. Click Add to record all selected/entered contact information.

Procedural Error information can be edited by clicking the Modify button beside an entry, and making any necessary drop-list/edit box changes. Clicking the Save button will commit those changes.

A Procedural Error can be deleted by clicking the Delete button beside an entry. A confirmation dialog will appear, confirming the deletion.

3.3.1.6 Event Details Section

Figure 3–160 – Event Details

FHP Incident #: FHP incident number received from the FHP CAD system through the FHP CAD interface.

Event Type: Drop-down list selection of one of the following event types (this list is configurable):

- Abandoned Vehicle
- Crash
- Vehicle Alert
- Bridge Work
- Congestion

- Debris on Roadway
- Disabled Vehicle
- Emergency Vehicles
- Off Ramp Backup
- Police Activity
- Road Work – Emergency
- Road Work – Scheduled
- Special Event
- Visibility
- Weather
- Other
- Evacuation
- Flooding
- PSA

Additional event attributes may be selected by checking one of the following:

- HAZMAT
- Fire
- Rollover

You must Save Changes using the Save button at the top of the Event Details section (or at the top of any other section).

Clone Event: Clicking Clone event while in an active event will open a new event window with a new event number containing all the information from the original event. This functionality enables Operators to change the event type as circumstances change without losing the original event.

> *For example: A disabled vehicle in the system is abandoned by the owner and left on the side of the road. The Operator can select Clone Event and select Abandoned Vehicle as the Event Type without reentering all the information already recorded in the system (i.e. location, vehicle type). The disabled vehicle event is then closed and* the abandoned vehicle remains in the system as unresolved until such time as the *vehicle is removed.*

Nearest CCTV: Used to record the camera number and preset of the CCTV used to manage the event. Select a camera number from the drop-down list and record the appropriate preset, if applicable in the free-form text box. If the Disable VisioPaD checkbox is marked, VisioPaD detection on the selected nearest CCTV will be disabled until the event is closed.

Vehicles Involved: Select the Vehicles Involved link to open the section below.

Figure 3–161 – Vehicles Involved

Enter involved vehicle information by selecting color, make, model and state from corresponding drop-down lists. Enter tag information in the free-form text field. Click Add to record all selected/entered vehicle information.

Vehicle information can be edited by clicking the Modify button beside an entry, and making any necessary drop-list/edit box changes. Clicking the Save button will commit those changes.

A vehicle entry can be deleted by clicking the Delete button beside the entry. A confirmation dialog will appear, confirming the deletion.

Link to Primary Event: select the primary event from the Link to Primary drop-down list and Save Changes using the Save button at the top of the Event Details section (or at the top of any other section). Once saved, you can easily switch between primary and secondary events by clicking the Go to Primary and Go to Secondary buttons.

Click the Vehicles Involved link again to close the sub-section.

Injuries: Select injury details from the Injuries drop-down list that follows:

- *Unknown*
- None
- Minor
- Major, requiring treatment
- Fatality

Only one injury type may be recorded for each event.

Weather Conditions: Click the Weather Conditions link to open this section.

Figure 3–162 – Weather Conditions

Record the weather conditions at the event location by selecting the appropriate radio buttons and click Save Weather Conditions to record your selections and update the Weather Conditions summary description. Click the Weather Conditions link again to close the sub-section.

3.3.1.7 Event Details Screen Section – SAE Code Interpretation

The Data Fusion component added to SunGuide includes the capability to generate SAE (Society of Automotive Engineers) codes that use integer values to describe an event. These SAE codes are transmitted to other users of SunGuide in integer form. To allow the SunGuide operator to textually view the numbers being sent, a section on the Event GUI called "SAE Description" provides a textual interpretation of the SAE codes (see Figure 3–163).

Figure 3–163 – SAE Code Interpretation

3.3.1.8 Comments / Event History Section

Comments: The purpose of the comment section is to allow an operator to record information that cannot be recorded elsewhere on the Event Details screen. Comments are free-form text entered by placing your cursor in the field and typing. Comments are limited to 500 characters.

Figure 3–164 – Comments / Event History

The operator selects the appropriate comment type from the drop-list on the left, before saving the comment by clicking the Add Comment button on the right. The comment type drop-list is configurable.

Event History: The purpose of the event history is to provide a chronological record of all event related updates and activities – the most recent entry being at the top of the list. All entries can be viewed by scrolling down the list.

3.3.1.9 Responder Table Screen Section

The Responder table (see Figure 3–165) provides a means to record the Notified, On-Scene, and Departed date and time for all relevant incident responders. Clicking on the responder agency name displays controls where contacts and their phone numbers can be saved with that agency for the current event.

Figure 3–165 – Responder Table

Note that Road Ranger and SIRV times must be updated in the Reporting & Dispatch Section in order to be viewed on the Responder Table (they are read-only in the Responders Table).

Agencies flagged as TMC Managed in the Administrative Editor appear as read-only. When read-only, Notified by TMC status, Notified time, On-Scene time, Departed time, and agency contacts cannot be set or changed.

Agencies flagged as Notification Source Only in the Administrative Editor appear without On-Scene or Departed timestamp fields.

Changes to responding agency Notified by TMC status, timestamps, and contacts are not saved until one of the Save buttons at the top of one of the sections is clicked.

Notified by TMC: Checking the Notified by TMC checkbox will set the Notified timestamp to the current date and time. Un-checking the checkbox does not clear the Notified timestamp.

Notified, On-Scene, Departed: Clicking in the timestamp fields inserts the current date and time into that field. The field can be manually modified to alter the date and time stored. Setting the date in the Notified field does not set the Notified by TMC checkbox to check for that agency.

Contacts: Clicking on the responder agency name shows and hides the contact adding controls. Initially and after each save, only the most recent contact (assuming it exists) is displayed.

To add a contact, the Contact Name can either be chosen from among the stored contacts associated with the responding agency, or typed free-form. The Phone Number free-form field is optional. Clicking the add button appends the added contact to the list, stamped with the current time. Contacts cannot be edited after adding, and are not saved in the system until a save action is performed, as mentioned above.

3.3.1.10 Response Plan

When an operator selects the button to generate a recommended response plan a dialog similar to the one shown in Figure 3–166 will be displayed. The specific content of the recommended response will vary based on the location of the event and the device linking table (that establishes the relationships of the DMS and HAR devices) that is managed by the SunGuide system administrator. The operator can request a visual depiction of the devices selected by selecting **View Selected Devices** which highlights the selected devices on the Operator Map.
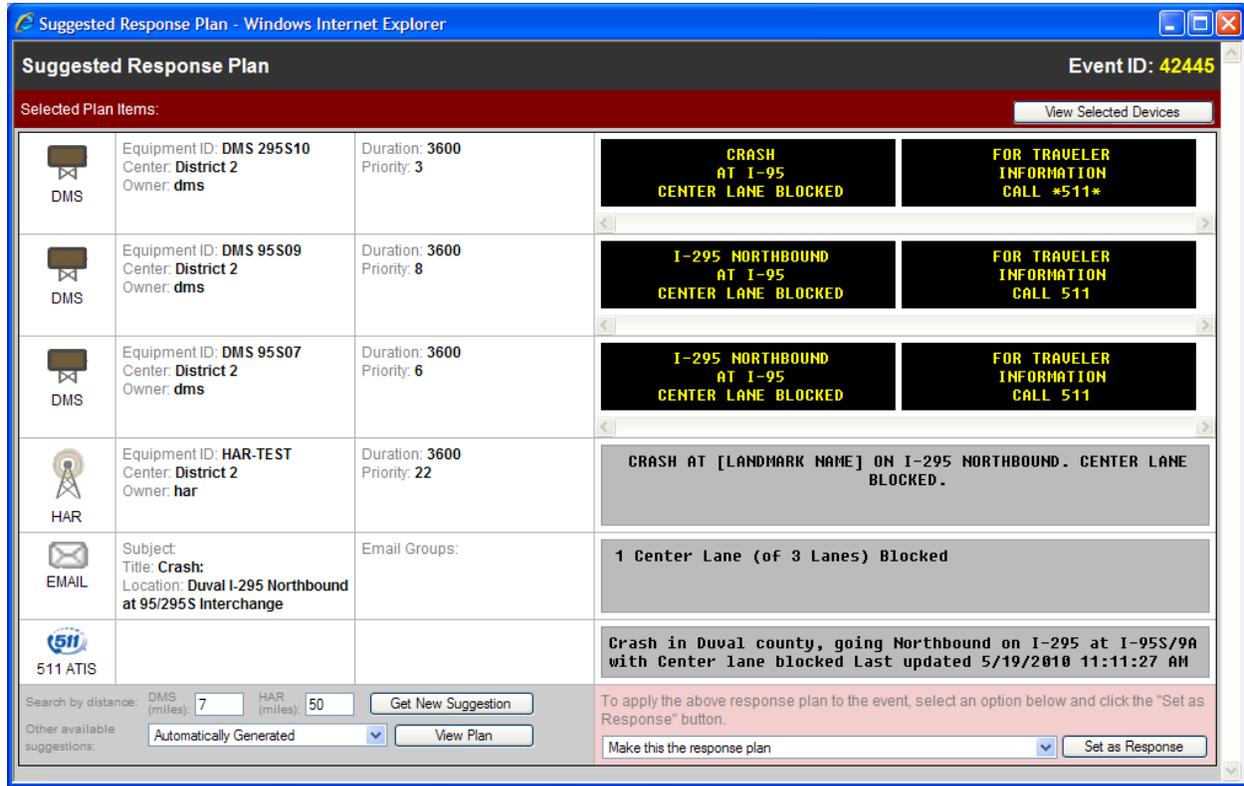
Figure 3–166 – Suggested Response Plan Screen

On the suggested response plan screen the operator can alter the **Search by Distance** values to increase/decrease the distance down the freeway that DMS and HAR devices will included. Once these values are altered the **Get New Suggestion** is selected to request a new plan. An operator who has obtained ownership may select to

- **Make this the response plan:** replaces the current response plan (if any) with this response plan,

- **Add all items to the response plan:** adds the shown items to the current response plan, if any of these exist in the current response plan, the existing items are replaced,

- **Add only new items to the response plan,** add the new items to the current response plan without modifying any items in the existing response plan

- Once the plan is acceptable, the **Set as Response** option is selected and the dialog shown in Figure 3–167 is displayed.
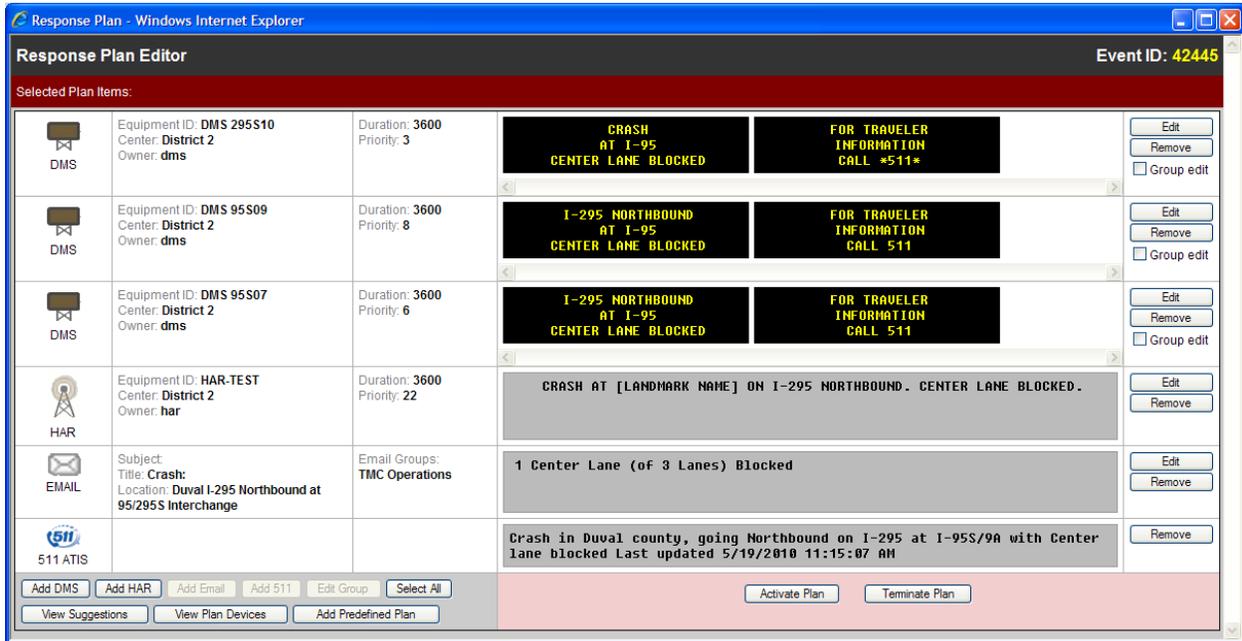
Figure 3–167 – Response Screen

The operator has the following options on the Response Screen dialog:

- **Add DMS**: When selected, a dialog with a list of DMS devices will be displayed. After the operator selects a device, an edit dialog will be displayed so a message can be composed. The message will then be included in the recommended response plan.

- **Add HAR**: When selected, a dialog with a list of HAR devices will be displayed. After the operator selects a device, an edit dialog will be displayed so a message can be composed. The message will then be included in the recommended response plan.

- **Add TAM**: When selected, a TAM edit dialog will be displayed so a Connected Vehicle traveler advisory message can be composed. The message will then be included in the recommended response plan.

- **Add Email** (see Figure 3–168): If the email entry had previously been removed from the response plan this button will be active, if selected an edit dialog will be displayed so an email message can be composed. The email will then be included in the recommended response plan.
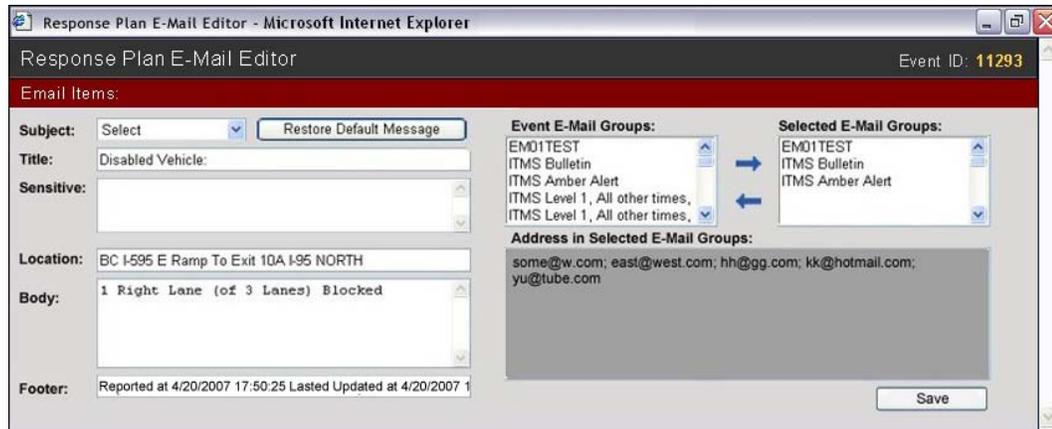
Figure 3–168 – Response Plan Email Editor Screen

- **Add FL-ATIS**: If the FL-ATIS entry had previously removed from the response plan this button will be active, if selected the FL-ATIS entry will be placed into the response plan (note that if the FL-ATIS entry is in the response plan then when **Activate Plan** is selected a command will be sent to the FL-ATIS system to publish the event information.

- **Edit Group**: If one or more DMS items are selected using the Group Edit checkbox to the right of the items, this button will be active and will allow the message for all selected signs to be edited as one. Once the edit is approved, the same message will be assigned to all selected DMS devices.

- **Select All**: This button sets the Group edit checkbox for all DMS items in the response plan to allow the ability to quickly edit the message of all DMS devices.

- **Add Predefined Plan**: When selected, a dialog with a list of predefined plans will be displayed. After the operator selects a plan, the devices associated with the plan will be included in the recommended response plan.

- Buttons available for each DMS or HAR device or Email entry listed:

  o **Edit**: When pressed by the operator, the device edit dialog will be displayed so that the contents of the recommended message can be edited.
  o **Remove**: When pressed by the operator, the selected device will be removed from the response plan.
  o **Group Edit**: When checked by the operator, the selected device will be used in any group edit functions. This functionality is only available for DMS devices.

- Buttons available for the 511 Advanced Traveler Information System (ATIS) entry:

  o **Remove**: When selected by the operator, the event information will not be transmitted to the 511 system when the **Activate Plan** button is selected.

- **View Suggestions**: Selecting this option will cause the Suggested Response plan dialog (Figure 3–166) to be displayed.

- **View Plan Devices**: Selecting this button will cause each of the devices listed in the response plan to be highlighted on the (see Figure 3–169); this can be cleared by selecting the **Clear Device Highlighting** option on the context menu.
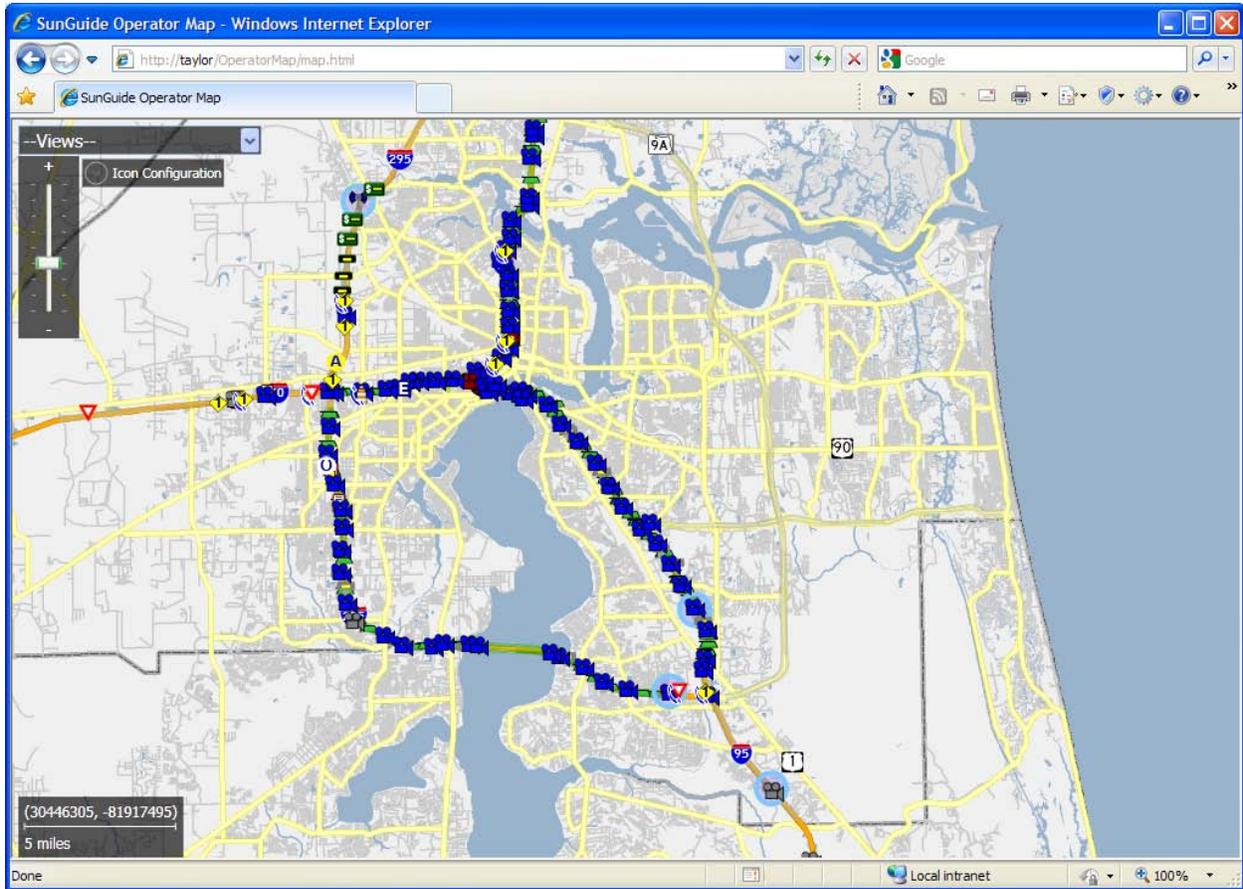
Figure 3–169 – Plan Devices Highlighted

- **Activate Plan**: When selected by the operator a "confirmation dialog" (i.e., a "are you sure" dialog) will be presented. If the operator selects **OK,** the messages in the recommended response plan will be sent to MAS for processing (i.e., the messages will be placed on the message queues for potential transmission to the devices – MAS will send the highest priority message for each device out for display). If an email message was configured in the response plan it will be sent. If the FL-ATIS entry is in the response plan the event information will be transmitted to the FL-ATIS system (note that event data is ONLY sent when the action is taken by the operator); the command to the FL-ATIS system is only attempted once so if the communications to the FL-ATIS system fails then the event data will not be available on the FL-ATIS system (see Section 3.3.1.11 on how to resend the command). The **Activate Plan** button becomes disabled after a plan is activated.

- **Terminate Plan**: Selecting this button will cause the SunGuide Incident Management system to remove the messages associated with the event from the MAS queues and to send a closure email. If the FL-ATIS entry was in the response plan a command will be sent to the FL-ATIS system to remove the event; the command to the FL-ATIS system is only attempted once so if the communications to the FL-ATIS system fails then the event data will remain available on the FL-ATIS system (see Section 3.3.1.11 on how to resend the command).

General comments about response plans:

- If a response plan is activated for an event and the event is closed, the operators should be sure to terminate any active response plans prior to closing an event.

- If a response plan DMS message is merged with another message and the response plan is terminated, the other message will be "unmerged" and will resume its normal location in the queue based on its priority after the response plan message is terminated.

- To remove a response plan message from the DMS message queue you can blank the entire queue.

- When activating a response plan, the administrator needs to ensure that all relevant words ('crash', roadway names, etc) are in the approved words list (or operators will be promoted to approve spellings).

- If primary event is assigned to a secondary event, the primary event will be updated when the secondary event is updated.

3.3.1.11 Publishing / Terminating Events Being Sent to the 511 System

If an event has been previously published to the 511 system (i.e. the 511 entry was in the response plan when it was activated) it can be "resent" by selecting Republish Events to 511 from the Event Management context menu. The dialog shown in Figure 3–170 will be displayed, only events that have been previously published via a response plan will be shown. The event selected by the operator will be resent to the 511 system with the **Republish Event** button is pressed. Note that this dialog should only need to be used if for some reason the 511 system was unavailable the first time a response plan was executed.
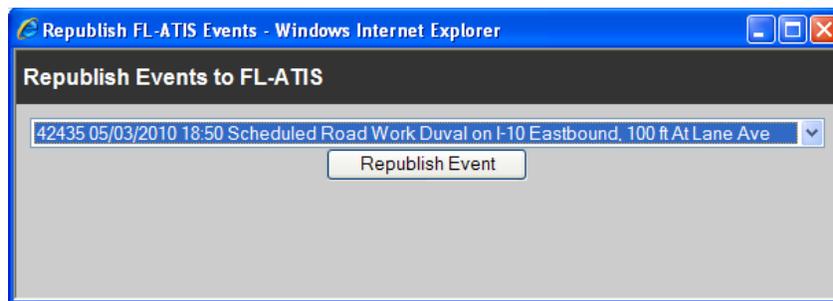
Figure 3–170 – Republish FL-ATIS Event

If an event has been previously published to the 511 system (i.e. the 511 entry was in the response plan when it was activated) it can be "removed" from the 511 system by selecting the Remove Events from 511 from the Event Management context menu. The dialog shown in Figure 3–171 will be displayed; the operator then enters the event number and selects **Remove Event** to send a command to the 511 system to remove the event. A list of events is not provided because is it will because there may be an "old" event in the 511 system that no longer exists in the SunGuide EM Event summary. Note that this dialog should only need to be used if for some reason the 511 system was unavailable the first time a response plan was terminated.
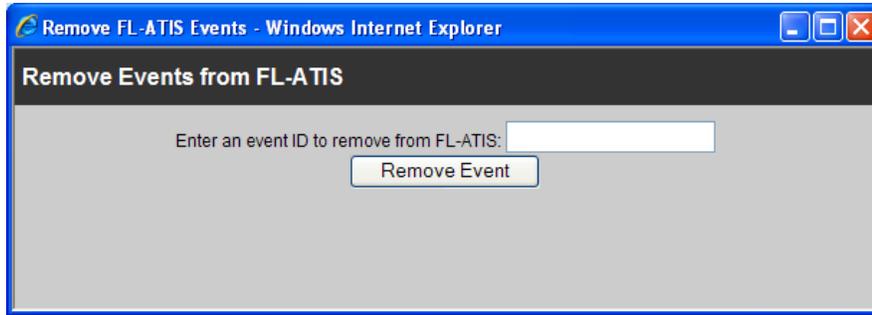
Figure 3–171 – Remove FL-ATIS Event

Following either a republish 511 event or remove 511 event request, the result of the request will be displayed in the System Messages dialog. The message will indicate either that the request succeeded or failed.

3.3.1.12 SAE Code Generation

The Florida ATIS system (FL-ATIS) receives SAE (Society of Automotive Engineering) codes from SunGuide that are used to describe the event. The purpose of SAE codes is to provide a very simple numbering nomenclature to depict attributes of events, the SAE code are 3 or 4 characters long and a single code can represent an entire text string. Within SunGuide, SAE codes are automatically selected, an operator will NEVER see a SAE code which means operators are not expected to know the codes; however, the event details screen does have view only text field called "SAE Description" which provide a textual interpretation of the SAE codes. The following discussion provides insights into how the SAE codes are selected, the FL-ATIS system will interpret these SAE codes and generate descriptions/messages about the event for presentation on the FL-ATIS web site, 511 voice system and email alerts.

The primary determining factor in generating a particular SAE code is the selected Event Type. Each SAE code is generated by selecting an event type from the Event Type drop-down as seen in Figure 3–172. After selecting an event type, more specific event attributes can be added to the event which can alter the SAE code generated such as including hazmat or a rollover.
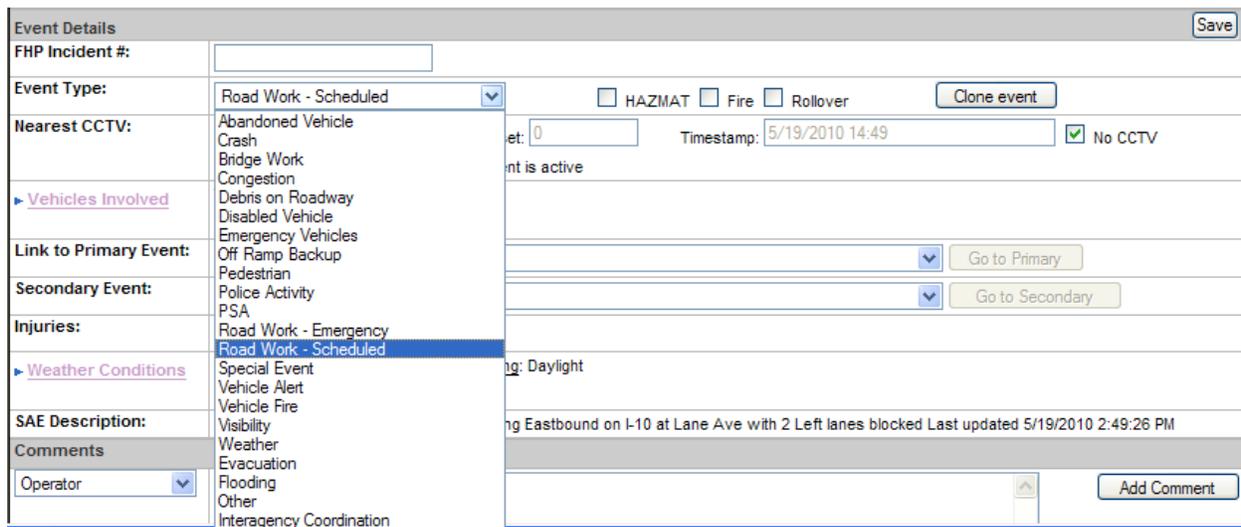
Figure 3–172 – List of Event Types

When working with Accident and Disabled Vehicle event types, additional information proved in the "Vehicles Involved" section can change the SAE code generated for the event. In order to generate one of these more specific SAE codes, a vehicle of the correct type or make must be added to the "Vehicles Involved" list. See Figure 3–173 for an example of the available vehicle types.

Figure 3–173 – List of Vehicle Types

When working with Weather event types, additional information provided in the "Weather Conditions" section can change the SAE code generated for the event. In order to generate one of these more specific SAE codes, the appropriate weather condition must be selected in addition to the Weather Event Type (see Figure 3–174).

Figure 3–174 – Weather Conditions

Each SAE Event Type code that can be generated by EM is listed below along with specific event definition which will generate that SAE code:

- Evacuation:
  - Select "Evacuation" from the event type drop-down.
- Accident Involving Hazardous Materials:
  - Select "Accident" from the event type drop-down.
  - Check the "Hazardous Materials" box to indicate that hazardous materials are involved in the accident.
- Multi Vehicle Accident:
  - Select "Accident" from the event type drop-down.
  - Add a minimum of two vehicles the list of involved vehicles.

- Overturned Tractor/Trailer:
  - o Add an involved vehicle of vehicle type "Tractor/Trailer"
  - o Check the roll-over box.
- Accident Involving Tractor Trailer:
  - o Select "Accident" from the event type drop-down.
  - o Select a maximum of one vehicle to add to the involved vehicle list
  - o Ensure that the vehicle type is "Tractor/Trailer".
- Accident Involving Bus:
  - o Select "Accident" from the event type drop-down.
  - o Select a maximum of one vehicle to add to the involved vehicle list
  - o Ensure that the vehicle type is of "Bus".
- Accident Involving Truck:
  - o Select "Accident" from the event type drop-down.
  - o Select a maximum of one vehicle to add to the involved vehicle list
  - o Ensure that the vehicle make contains the word "Truck".
- Accident:
  - o Select "Accident" from the event type drop-down.
  - o Note: Involvement of a Tractor/Trailer, Bus, or Truck will cause one of the other accident types to be selected.
- Emergency Road Construction:
  - o Select "Road Work – Emergency" from the event type drop-down.
- Disabled Tractor Trailer:
  - o Select "Disabled Vehicle" from the event type drop-down.
  - o Select a vehicle to add to the involved vehicle list
  - o Ensure that the vehicle type is of "Tractor/Trailer".
- Disabled Bus:
  - o Select "Disabled Vehicle" from the event type drop-down.
  - o Select a vehicle to add to the involved vehicle list
  - o Ensure that the vehicle type is of "Bus".
- Disabled Truck:
  - o Select "Disabled Vehicle" from the event type drop-down.
  - o Select a maximum of one vehicle to add to the involved vehicle list
  - o Ensure that the vehicle make contains the word "Truck".
- Disabled Vehicle:
  - o Select "Disabled Vehicle" from the event type drop-down.
  - o Note: Involvement of a Tractor/Trailer, Bus, or Truck will cause one of the other disabled vehicle types to be selected.
- Vehicle On Fire:
  - o Select "Vehicle Fire" from the event type drop-down.
- Abandoned Vehicle:
  - o Select "Abandoned Vehicle" from the event type drop-down.
- Planned Construction:
  - o Select "Road Work – Scheduled" from the event type drop-down.
- Object On Roadway:
  - o Select "Debris on Roadway" from the event type drop-down.

- Traffic Congestion:
    - o Select "Congestion" from the event type drop-down.
- Bridge Maintenance Operations:
    - o Select "Bridge Word" from the event type drop-down.
- Flooding:
    - o Select "Flooding" from the event type drop-down.
- Emergency Vehicles:
    - o Select "Emergency Vehicles" from the event type drop-down.
- Off Ramp Backup:
    - o Select "Off Ramp Backup" from the event type drop-down.
- Police Activity:
    - o Select "Police Activity" from the event type drop-down.
- Interagency Coordination:
    - o Select "Interagency Coordination" from the event type drop-down.
- Weather Event Due to Rain:
    - o Select "Weather" from the event type drop-down.
    - o Select "Rain" from the Weather Conditions menu.
- Weather Event Due to Fog:
    - o Select "Weather" from the event type drop-down.
    - o Select "Fog" from the Weather Conditions menu.
- Weather Event Due to Flooding:
    - o Cannot be created using current user interface.
- Weather Event:
    - o Select "Weather" from the event type drop-down.
- Special Event:
    - o Select "Special Event" from the event type drop-down.
- Incident:
    - o Select "Other" from the event type drop-down.
- Unknown:
    - o Cannot be created. The default for events that do not match any of the other event types is "Incident".

The Lanes blocked code (SAE code 2104) is selected if there is any non-contiguous blockage of travel lanes. Blockages of Express lanes are not part of this determination, only regular travel lanes. It should be noted that priority in the selection of SAE codes for lane selection is as follows:

- Non-contiguous lane blockages are higher priority than Left lane blockages
- Left lanes are higher priority than Center
- Center is higher priority than Right

As a rule of thumb, this means that if the left lane is blocked as part of a contiguous blockage, the blockage will be treated as a left lane blockage. The same applies for center lanes if no Left lane is blocked. This means that a right lane blockage will only be the result if the far right lane is blocked with no other lanes blocked. The following corner cases were implemented based on feedback provided by FDOT operational staff during development efforts.

Given a lane diagram where sh = shoulder lane, ex = express lane, onR = on ramp, offR = off ramp, and t = travel lane with the following layouts

- |sh|ex|ex|ex|sh|t|t|sh|

    - If there is a closure to the left shoulder in your example, the system should readout SAE code 2079.
    - If there is a closure to the middle shoulder in your example, the system should readout SAE code 2051.
    - If there is a closure to the right shoulder in your example, the system should readout SAE code 2050.

- |sh|t|t|t|sh|onR|onR|sh|

    - If there is a closure to the left shoulder in your example, the system should readout SAE code 2051.
    - If there is a closure to the middle shoulder in your example, the system should readout SAE code 2050.
    - If there is a closure to the right shoulder in your example, the system should readout SAE code 2050.

- |sh|t|t|offR|offR|sh|

    - If there is a closure to the left shoulder in your example, the system should readout SAE code 2051.
    - If there is a closure to the right shoulder in your example, the system should readout SAE code 2050.

3.3.2 Alert Box

A standalone dialog and several tabbed interfaces provide access to an Alert List that collects all alerts; a sample of this GUI is shown in Figure 3–175. A set of radio buttons is provided to allow filtering of alerts and a **Group Alerts by Category** allows alerts of similar type to be grouped in the Alert list.
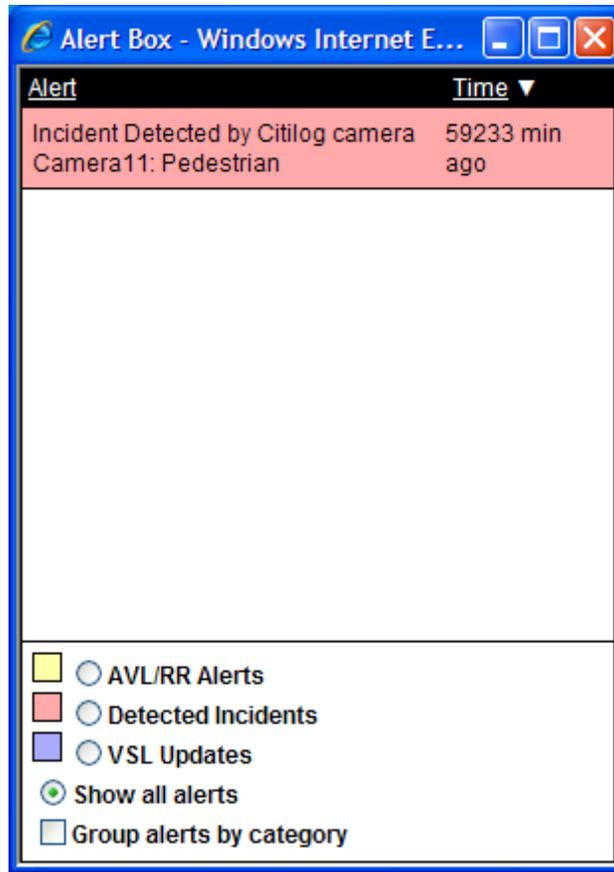
Figure 3–175 – Alert List

3.3.3 CCTV Tab

The CCTV Tab provides a list of all cameras that are currently enabled in the system. Some cameras may be video destinations which can be blocked, and some cameras may have VisioPaD detection enabled, which can be temporarily suspended. A sample screen is shown in Figure 3–176. If detection is disabled system wide, this will be indicated in the panel to the right of the list. Any other cameras which have been disabled will describe the reason for the disabling in the list.
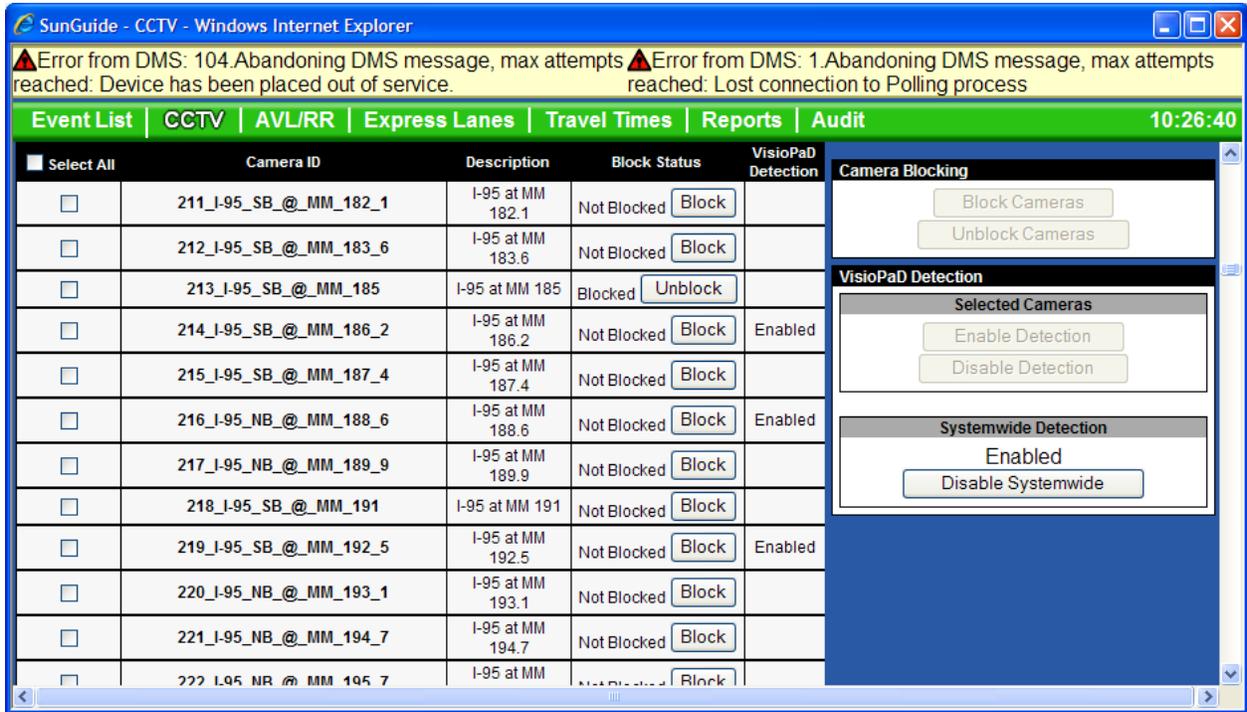
Figure 3–176 – CCTV Tab

The user can **Block** a video destination; when this occurs the video cannot be switched to a restricted external destination and snapshots are no longer transmitted via the Center-to-Center interface. Additionally, a user may select one or more cameras by clicking on the Select checkbox or the camera name, and may then press the **Block** or **Unblock** buttons to the right of the list. This blocks or unblocks multiple cameras at once.

To remind operators that CCTVs are blocked, a blocking notification will be displayed on a pop-up in a configurable number of minutes (timing is configured by the system administrator). The dialog is shown in Figure 3–177 and can be dismissed by pressing **Confirm**.
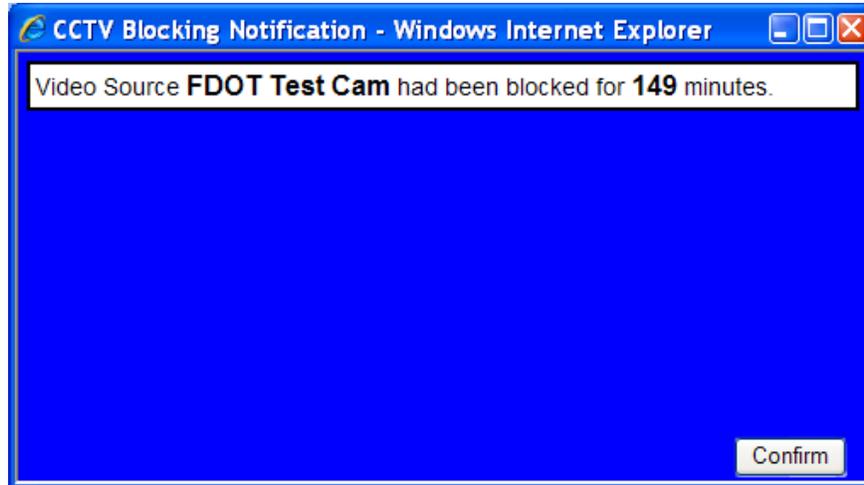
Figure 3–177 – Blocked CCTV Reminder

The user can disable VisioPaD detection on a camera; when this occurs the camera will not be used for incident detection. A user may select one or more cameras by clicking on the Select checkbox or the camera name, and may then press the **Enable Detection** or **Disable Detection** buttons to the right of the list. This enables or disables multiple cameras at once. All cameras system wide may also be disabled by using the **Enable Systemwide** or **Disable Systemwide** button.

To remind operators that VisioPaD detection is disabled, a notification will be displayed on a pop-up in a configurable number of minutes (timing is configured by the system administrator). The dialogs are shown in Figure 3–178 and Figure 3–179. In each dialog, the user may elect to re-enable some or all of the disabled cameras, or may dismiss the dialog without changing any camera detection states.
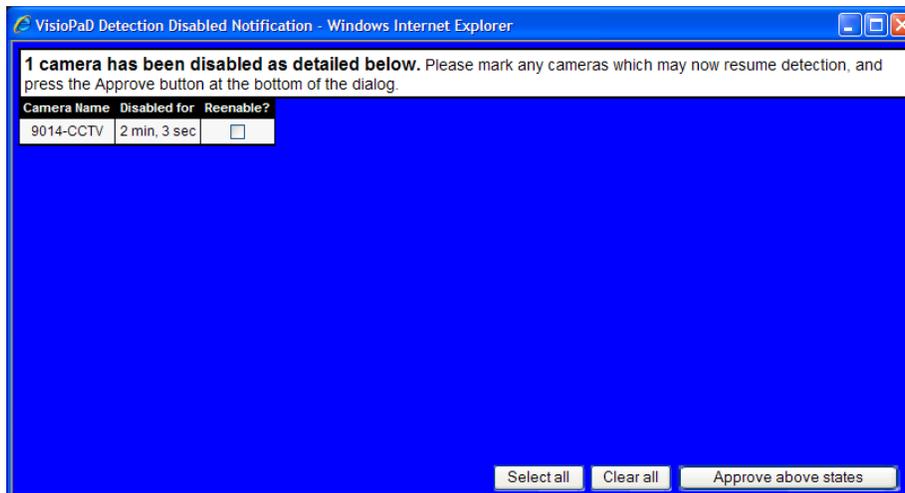
Figure 3–178 – Disabled VisioPaD Reminder (Single Camera)
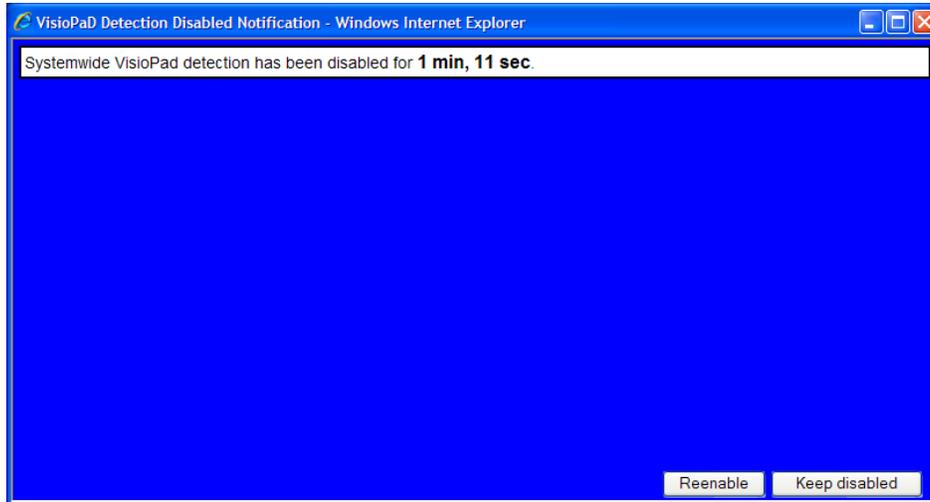
Figure 3–179 – Disabled VisioPaD Reminder (Systemwide)

3.3.4 Incident Detection

When the video incident detection subsystem receives an incident alarm from the video driver, it is shown on the map using a flashing circle around the CCTV that was the video source for the alarm generation. Figure 3–180 shows an example map view with a video alert highlighted.
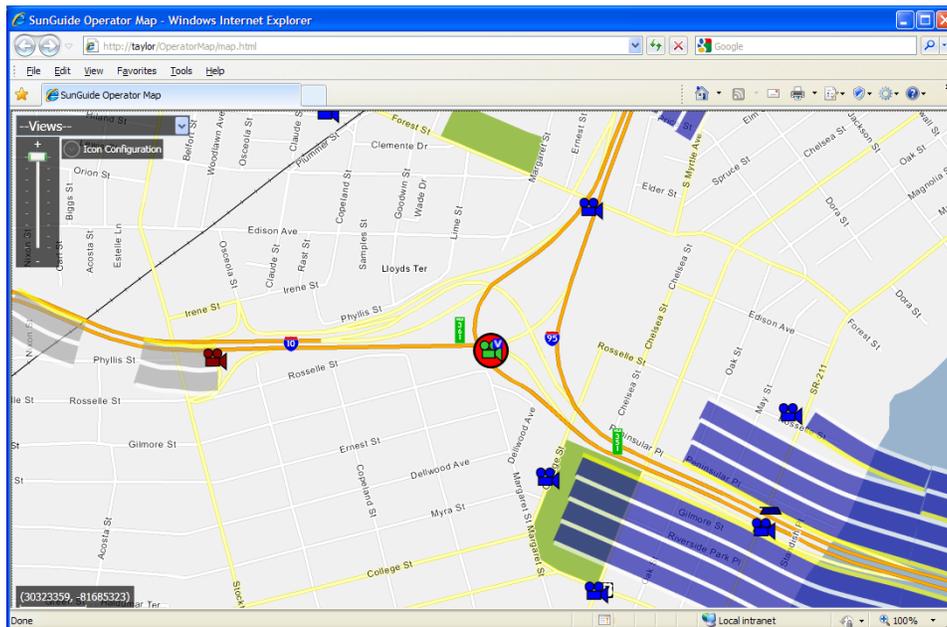
Figure 3–180 – Video Detection Event

The operator may resolve the alarm by either right clicking on the icon and selecting Handle VisioPaD event, or by clicking on the alarm in the Alarm List. The alarm management screen is described above.

3.3.5 Road Rangers Tab

When the Road Ranger tab is displayed the status of the Road Ranger devices will be displayed as shown in Figure 3–181

Figure 3–181 – AVL Tab

If a Road Ranger is on break, the Geo-fence alert will not be triggered as a status of "breaks" and "assisting" status values do not trigger this alert. The periodic speed and position values are of Road Rangers are archived, note that the time stopped and moving values are not archived.

If a Road Ranger is in a status that does not have the "Default End Shift" flag marked, then it can only be changed to a status which does not have the "Default Start Shift" flag marked AND DOES NOT have the "Assisting" flag marked. Additionally, if the vehicle is in a status which has the "Assisting" flag marked, the AVL/RR GUI will not allow any change to the status of the vehicle, as it should be managed via EM only.

In the general settings panel, an operator may set the number of "Live Track Points" that will be displayed on the Operator map for all road rangers.

An operator may elect to replay a vehicle track by selecting Vehicle Location Replay from the Responders context menu. When the operator elects to replay a vehicle track the dialog shown in Figure 3–182 will be displayed. The operator enters the **Vehicle ID**, the **Start** and **End** time along with a replay **Speed** (i.e. how fast the track should be played back) and selects **Load Track History** to access the data from the database. The options **Restart**, **Play** and **Pause** can be used to control the replay of the track on the map. The option **Show Full Track** displays all track points in a static manner. The option **Position Report** generates a report in time based order of track points, shown in Figure 3–183.
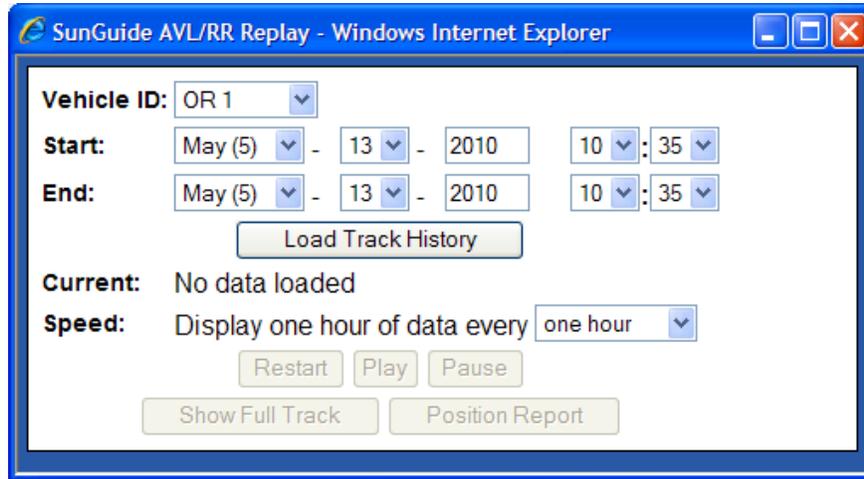
Figure 3–182 – AVL Replay Dialog
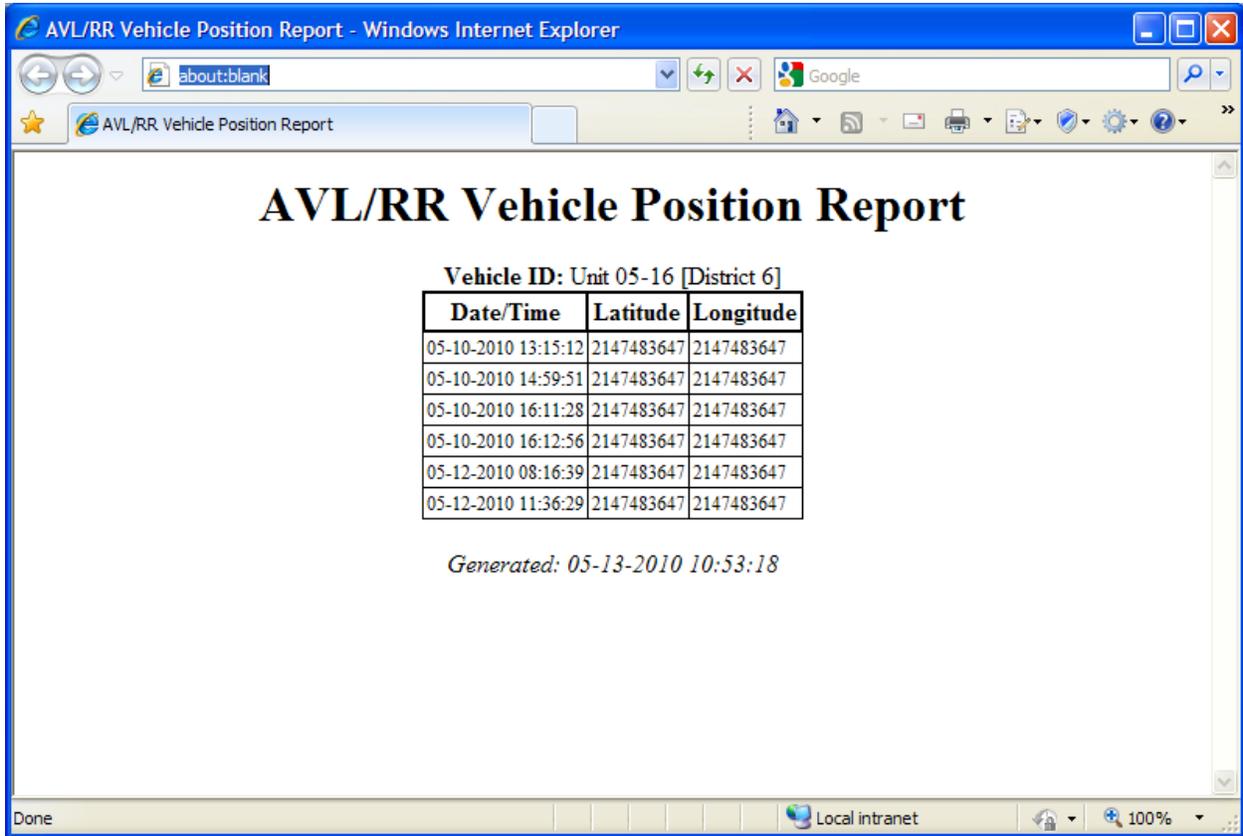
Figure 3–183 – AVL Position Report

When the operator selects to view the status of a specific vehicle by selecting the vehicle and selecting the **View Details** button the dialog shown in Figure 3–184 will be displayed to show the detailed vehicle status.
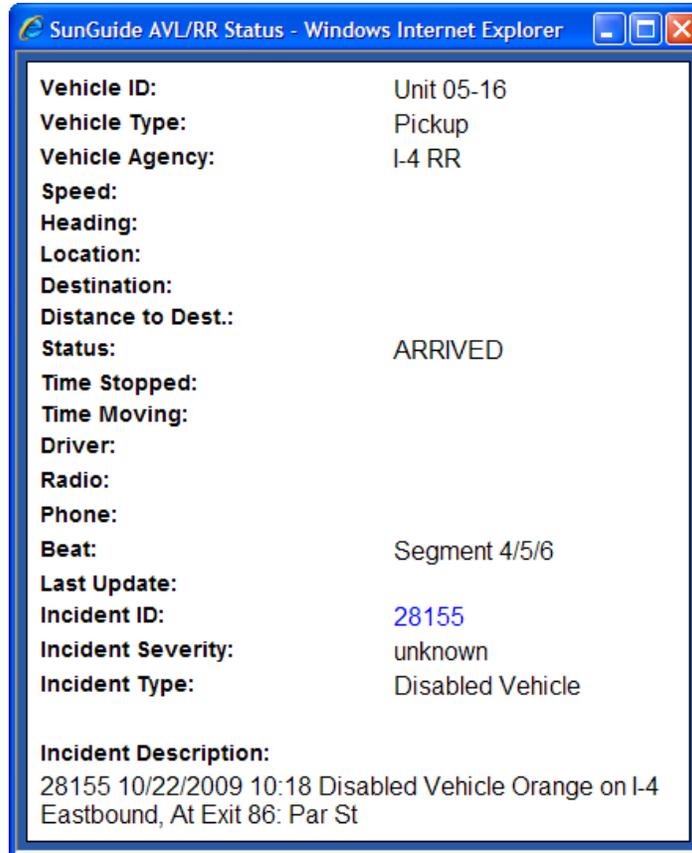
Figure 3–184 – AVL/RR Vehicle Details

3.3.6 Reports Tab

The reports tab is shown in Figure 3–185. The Reports Tab offers TMC Operators, Supervisors and Managers (with the appropriate permissions) the ability to search and analyze event and road ranger data.
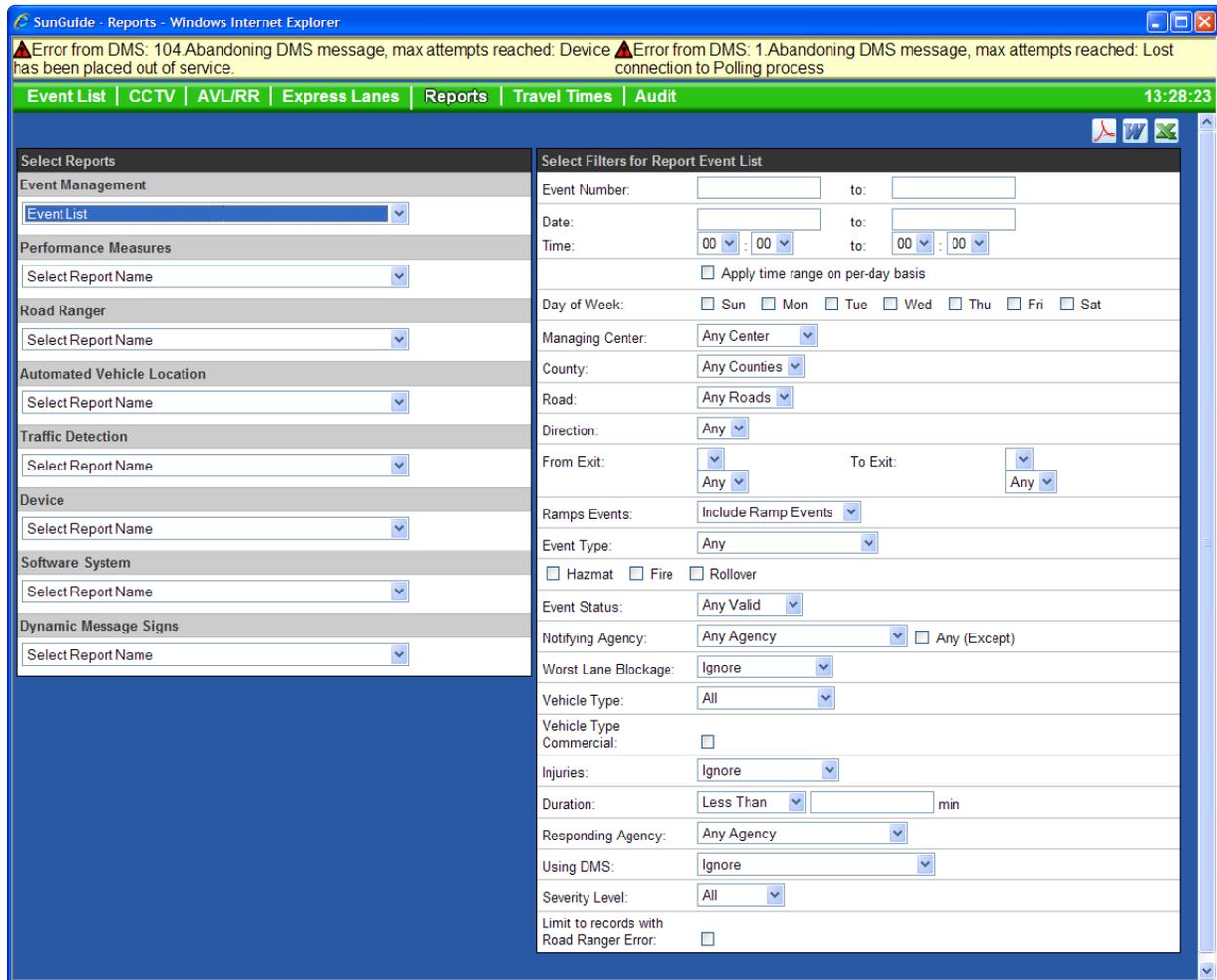
Figure 3–185 – Reports Tab

Within the Report Tab, there are a series of filters that can be used to narrow searches. Reports may be filtered by the following (or any combination thereof):

- Event number or range
- Specific date or range
- Specific time or range
- Day of week
- Location (county, road, direction, exit)
- Event type
- Status
- Notifying agency
- Worst lane blockage
- Vehicle type
- Injuries
- Duration
- Responding agency

- DMS usage
- Severity level
- Road Ranger procedural error
- Road Ranger vehicle
- Road Ranger status
- Road Ranger driver
- Road Ranger beat
- Road Ranger radio
- Road Ranger phone

Reports can be created in PDF, Word or Excel (CSV) format.

3.3.7 Audit Tab

The Audit Tab facilitates the correction of erroneous data and/or the inclusion of additional data (obtained after an event has been closed).

The Audit Tab is only available to users with the appropriate permissions. Entering an event number will retrieve stored data for editing. All modifications made via the Audit Tab are recorded, along with the relevant user id.

To Audit data enter the relevant event identifier into the edit box on the left. Then select one of the following from the drop-down list:

- Notifying Agency and Contact
- Event Status
- Event Location and Congestion
- Lane Blockage
- Vehicle Dispatch
- Responder Times
- Vehicles Involved

Selecting Notifying Agency and Notifying Contact will retrieve data for the agency and agency contact associated with the selected Event ID. Agency and contact selections may be changed by selecting from the drop down list. Select Update Record to save the changes to the database.
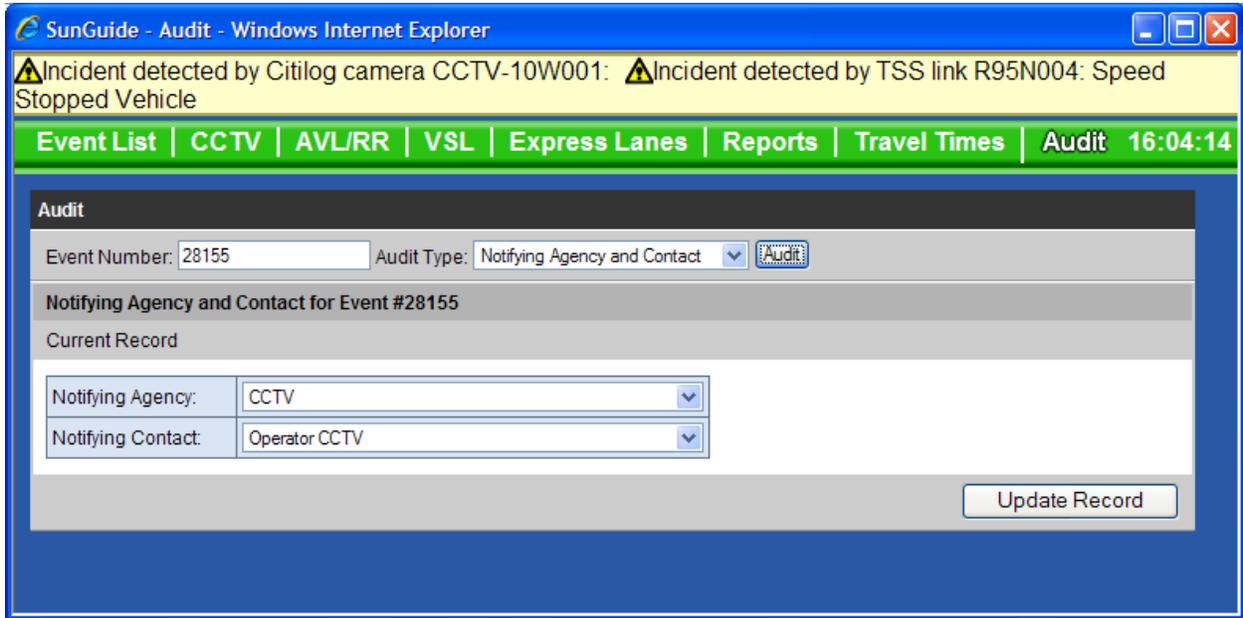
Figure 3–186 – Notifying Agency and Notifying Contact Screen

Selecting Event Status will retrieve all status records associated with the selected Event ID. A new status record may be added or an existing record may be modified or deleted.

Following is a list and brief explanation of each status type:

- Unconfirmed – Events that have not yet been verified by CCTV or RR
- Active – Verified Events
- Closed – Closed Events
- Unresolved – Events that remain on the shoulder but no responders are present (e.g. abandoned vehicles)
- False Alarm – Verified events that have been saved in the system and cancelled prior to arrival of any responders
- Void – Events that have been entered in error (e.g. duplicate events)

Select Update Record to save the changes to the database.

Select Create New Record to add a new Event Status record to the database with the specified Status Date/Time and Event Status.
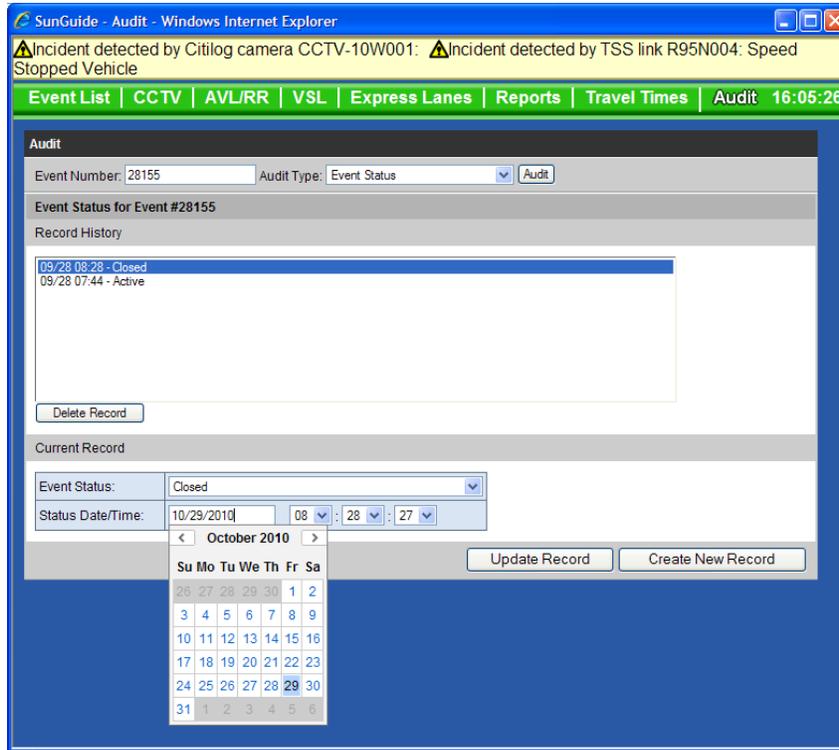
Figure 3–187 – Event Status Screen

Selecting Event Type will retrieve all event type records associated with the selected Event ID. A new event type record may be added or an existing record may be modified or deleted.

Select Update Record to save the changes to the database.

Select Create New Record to add a new Event Status record to the database with the specified Status Date/Time and Event Status.
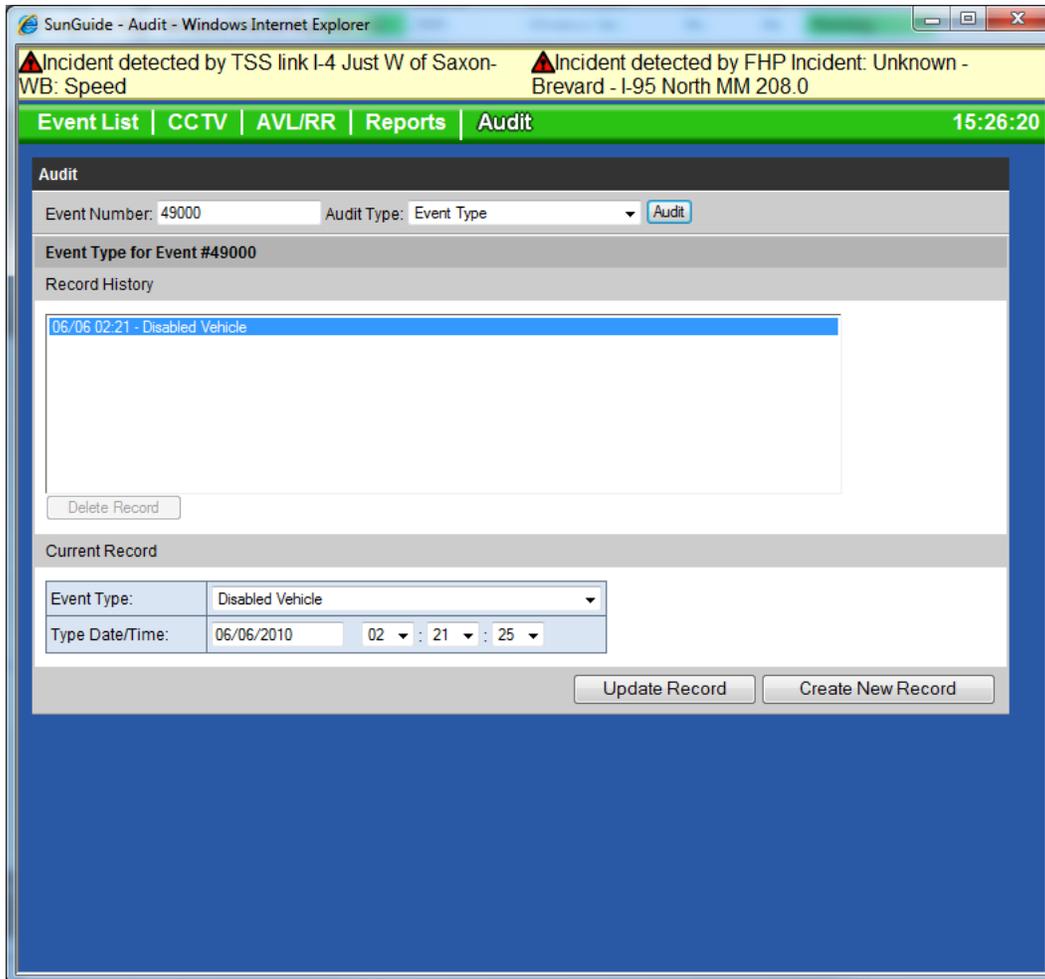
Figure 3–188 – Event Type Screen

Selecting Event Location / Congestion will retrieve event location and congestion data associated with the selected Event ID. The drop-down lists for event Location have to be edited in the same order they were populated, i.e. subsequent drop-down lists are populated based on the previous selection so edits must be made in the following order:

1. County
2. Road
3. Direction
4. Reference Point
5. Relationship to Exit

The Distance from the Exit may be edited by selecting the number of feet in ones, tens, hundreds, etc. For the Congestion Head and Tail records, only the county, exit, relationship to exit and congestion time may be changed. Changes to road and direction have to be made through the event location record. Select Update Record to save the changes to the database.
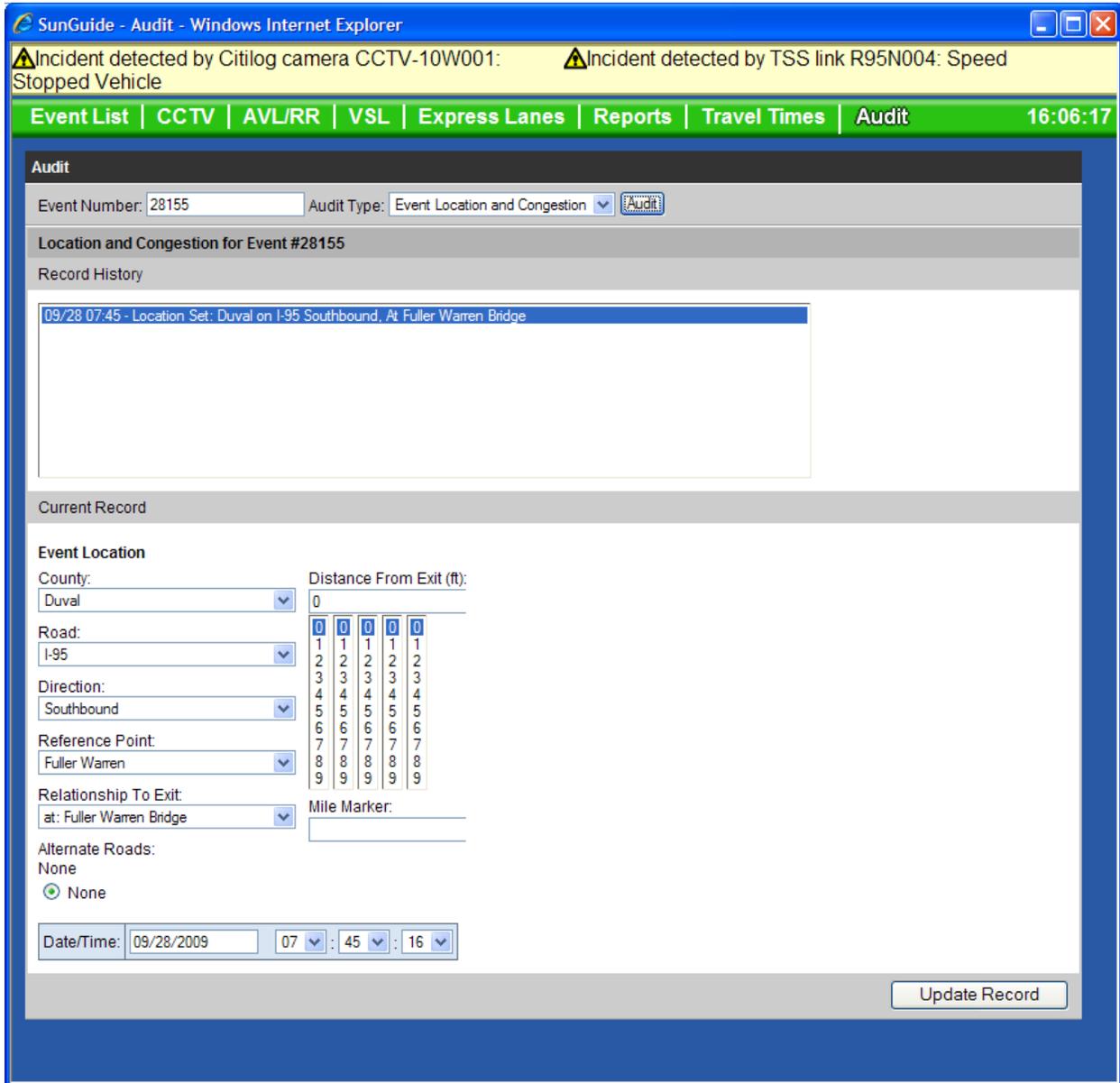
Figure 3–189 – Event Location / Congestion Screen

Selecting Lane Blockage will retrieve all lane blockage records associated with the selected Event ID. A new record may be added (Create New Record) or an existing record may be changed (Update Record) or deleted (Delete Record). The lane configuration (number of lanes, shoulders, and exit ramp lanes) for the new record is automatically provided based on the location of the event. Lane configuration can be changed using the Add Lane and Remove Lane buttons. Lane attributes can be changed by clicking on the defined "hot spots" in the upper third of the graphical view by left clicking (right clicking will take you back) on the "hot spot." Available attributes are as follows:

- M – Travel Lane
- Hv – High Occupancy Vehicle lane
- EL – Express Lanes

- On – On ramp
- Off – Off ramp
- Sh – Shoulder
- G – Gore

Lane blockage is indicated by clicking on the green arrow "hot spot" shown on the second third of the graphical view. Left clicking on the "hot spot" will allow the following lane status changes:

- Green Arrow – lane open
- Red X – lane blocked
- Question Mark – unknown status

Select Update Record to save the changes to the database.

Select Create New Record to add a new Lane Blockage record to the database with the specified Blockage Date/Time and Lane Blockage given.
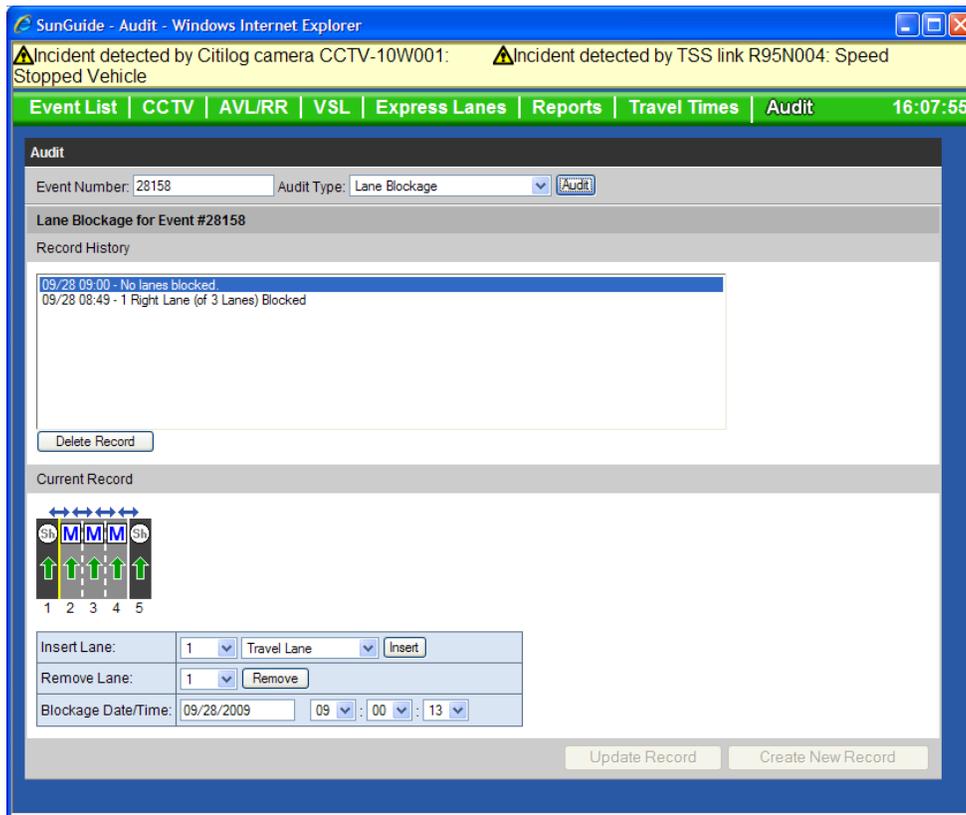
Figure 3–190 – Lane Blockage Screen

Selecting Vehicle Dispatch will retrieve all dispatched vehicle data associated with the selected Event ID. It is important to note preconditions that must be met before a Vehicle Dispatch audit can be performed. The following rules determine whether those preconditions have been met:

- The following rules apply for setting the Availability Status through the AVL/RR GUI:

- o When no Availability Status is set, the status can only be set to the Default Start Shift status
- o Once the shift has started, the status can be set to any Availability Service that has been flagged as In Service

- The following rules apply when dealing with AVL/RR Vehicles in the EM GUI:
  - o Vehicles can only be dispatched in the EM GUI if its availability status is flagged with Can Be Dispatched
  - o When dispatched, vehicle statuses are not changed
  - o When arrived, vehicle status changes to Default Assisting status, and only other Availability Statuses that are flagged as Assisting can be set

Each selected record will display editable fields; all fields may be revised with exception of vehicle name. An existing record may be deleted; new records may be added.

As required with the original entry, process times have to remain in the following order:

1. Dispatch Time – To record the time the RR is dispatched to an event
2. Arrival Time – To record the time the RR arrives at an event
3. Tablet Arrive Time – Arrival time recorded in the field.
4. Departure Time – To record the time the RR departs from an event
5. Tablet Departure Time – Departure time recorded in the field.
6. Cancel Time – To cancel a RR that has been dispatched to an event (you cannot cancel a RR who has already arrived).

Vehicle activities may be added or deleted; a minimum of one activity must be associated with each record. Clicking on the vehicle name expands the view to show existing activities and allow for the addition and deletion of activities.
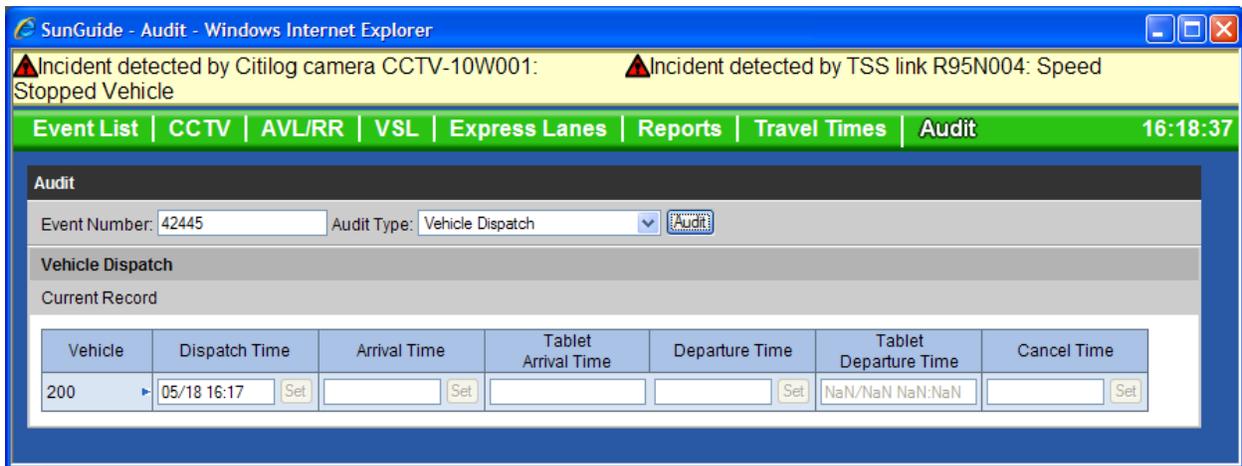
Figure 3–191 – Vehicle Dispatch Screen

Selecting Responder Times will retrieve data for all responders associated with the selected Event ID. Responder's Notified, On Scene and Departed date and time may be edited and saved. Contact information associated with a particular responder may be added, deleted or edited.

Clicking on the responder name expands the view to show allow the addition of contact information. Select Update Record to save the changes to the database.
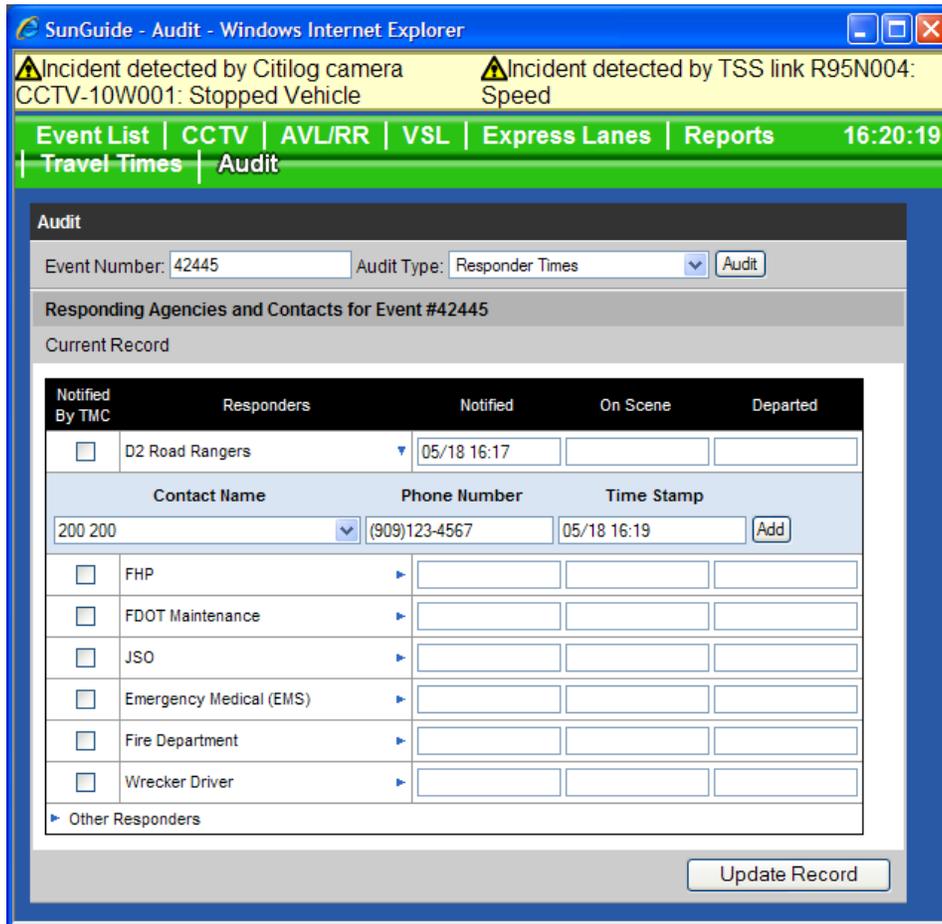
Figure 3–192 – Time Reported to TMC Screen

Selecting Vehicle Involved will retrieve all vehicle records associated with the selected Event ID. An existing record may be modified or deleted, or a new record may be added. A new record or a record chosen to be modified may select Color, Make, Model and State from the available drop-down lists. Tag information is entered in the free-form text field.
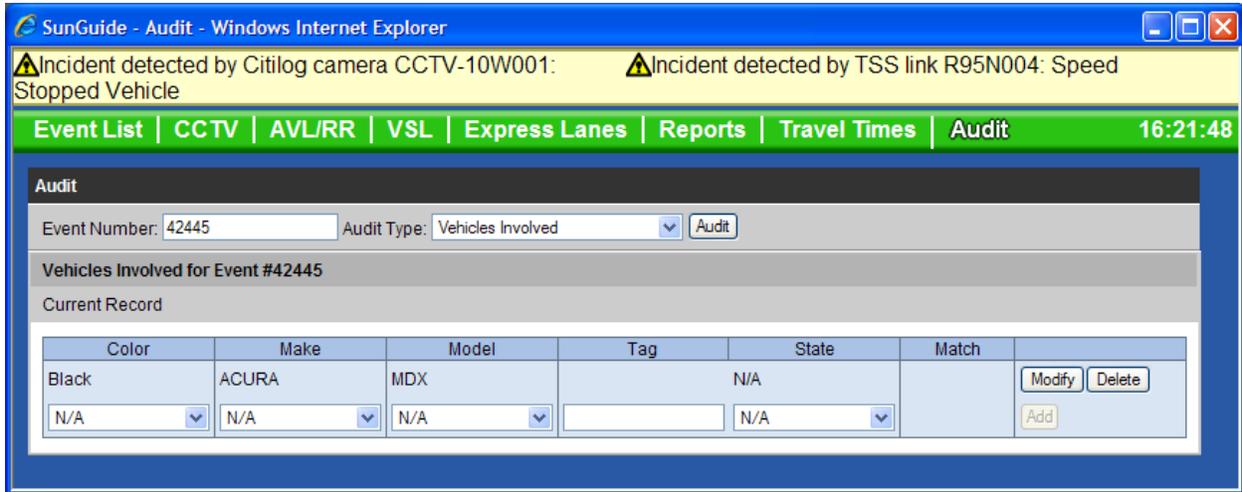
Figure 3–193 – Vehicle Make, Model, Color, State, Tag Screen

3.3.8 VSL Tab

The VSL tab is shown in Figure 3–194. When the tab is opened a status of all of the VSL devices is displayed. Options available to the operator include being able to **Enable recommendations** and **Set Group Plan**. When recommendations are disabled for a group, plan recommendation alerts will no longer be posted to the alert box, and plan changes can only occur by manually setting a plan using **Set Group Plan.** The **Set Group Plan** drop down box contains all plans that are available for the selected group(s).

The VSL devices of the group are displayed with their name, current operational status, beacon status, and last known message. If the sign is active, the display will have a green border. In any other operational state, the name of the sign will be displayed in bold, red italics, and the sign border will be colored based on the operational state. (Error: blue; Failed: red; Out of service: gray) The system may also be configured to display an alternate message for any sign in a non-Active state. Each sign's message is flanked by icons indicating the status of the sign's beacons. They will be colored yellow then the beacons are lit, and black when they beacons are turned off.

To set a plan, select a group and then left click on the group in the group list. The group should be highlighted blue when it is selected. Then select the chose the desired group from the list of plans, and then click the Set Plan button.

Figure 3–194 – VSL Tab Dialog

The VSL subsystem monitors the traffic conditions data from TSS. When traffic conditions vary enough to warrant a VSL change based on the plan currently enabled, a VSL alert will be displayed in the Alert box (see Figure 3–195).
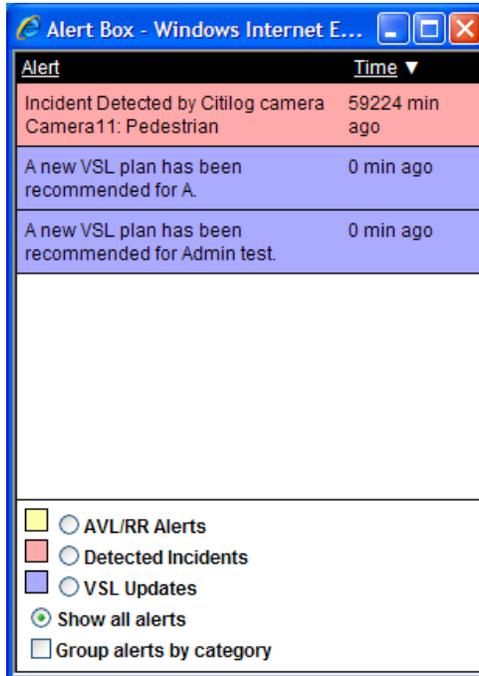
Figure 3–195 – Alert Box with VSL Alerts

When a recommendation to change a plan is left clicked a recommendation dialog will be presented (see Figure 3–196). The operator has the option to **Approve New Plan** which will result in the plan being sent to MAS for display or they can choose to **Reject New Plan** which will dismiss the dialog and discard the recommendation.
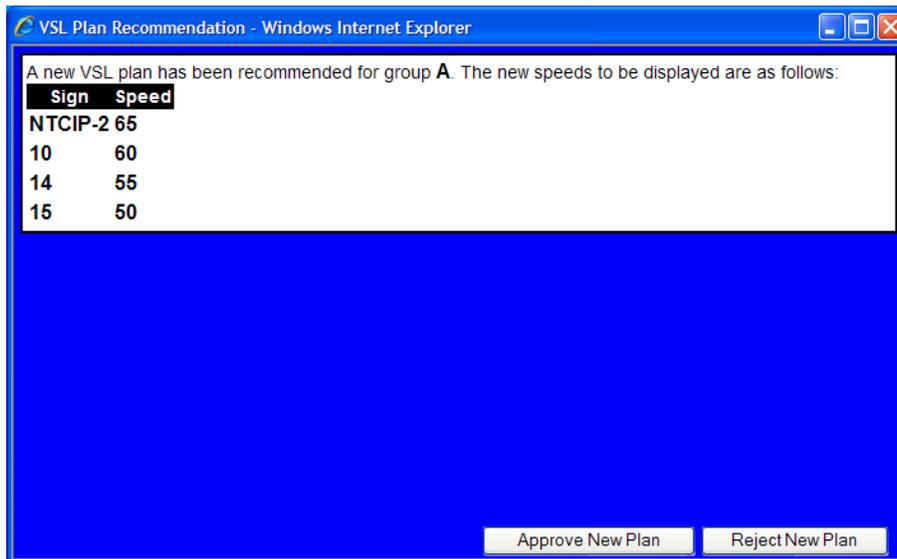
Figure 3–196 – VSL Plan Recommendation

3.3.9 Express Lanes Tab

The Express Lanes tab is shown in Figure 3–197. It can be accessed by selecting Express Lanes from the Express Lanes context menu on the map. When the tab is opened a status of all of the

Express Lane segments are displayed. The assigned Toll Rate/Toll Gantry signs for a segment are depicted in graphical format. The signs are displayed in the order (left to right) that they are assigned in the Segment configuration screen in Admin Editor. For each segment, the following is displayed:

- Segment id – is the name of the segment.

- Status – refers to the current mode the segment is operating under. The modes include: Time of Day, Dynamic, Closed, Zero Rate, and Manual. Apart from the operating modes, a segment may have an ongoing Middleware Rate Adjustment.

- Associated events – refers to the events that are associated with an Express Lanes segment that is currently in an override mode. This will only be shown if an operator associated the current mode or Middleware Rate Adjustment with an event when the mode or adjustment was started. (Events must be associated to Closed and Zero Rate modes and Middleware Rate Adjustments if the system configuration option to require event association is active.)

- Current rate – displays the rate most recently displayed on toll rate signs for the segment and the time that rate became/will become effective.

- Next rate – displays the next rate to be disseminated to the Middleware and displayed on the Toll Rate/Toll Gantry DMSs according the daily rate schedule for the segment or provided in Dynamic mode. The next rate is only displayed for when the segments associated with the DMS are in Time of Day or Dynamic mode; this field will be blank for all other modes.

- Display of segment details – is toggled on/off by clicking "Show" or "Hide" respectively.

- Display of segment rate schedule – is toggled on/off by clicking "Show" or "Hide" respectively.

The segment rate schedule includes past, current, and future rates. All rates for the current calendar day are displayed, along with the rates for a configurable number of days in the past and future. The rate schedule shows the date and time the rate was scheduled to start, the time the rate became effective, the rate that was normally scheduled to be active at that time, and the rate that was actually charged. The mode of the rate and its owner are also displayed. Rates from modes other than Time of Day and Dynamic are displayed in a distinct color to be easily distinguishable from normal rates. The current rate is displayed either in a green font (for time of day or dynamic rates) or as white text on a red background (for overrides). Rates which have not (or did not) become effective do not display an effective time. The table may be sorted by either scheduled start time or by effective time. The sort order may be selected by clicking the appropriate column header.

Manual control of DMSs can be executed (if that user has DMS permission to edit toll signs and send messages/terminate messages) via clicking on the individual DMS sign icon in the Toll Rate graphic for a particular segment. A dialog matching the standard DMS status dialog will be displayed allowing full manual control of the DMS.

The Express Lanes tab contains an alert box for displaying Express Lanes related alerts. The alerts that may occur include:

- Non Normal/Dynamic mode alert
- Unsuccessful Middleware communication

- No DMS update (failure)
- Rate change alert
- Associated event termination
- Ongoing Middleware Rate Adjustment
- External client generated alerts

The user can filter for Express Lanes only alerts by selecting the appropriate check box located at the bottom of the alert box. The alert bar and pop up dialogs are also used to display Express Lanes related alerts. Also, the server clock time is displayed on the green bar on the top of the Express Lanes tab for purpose of displaying accurate server time.
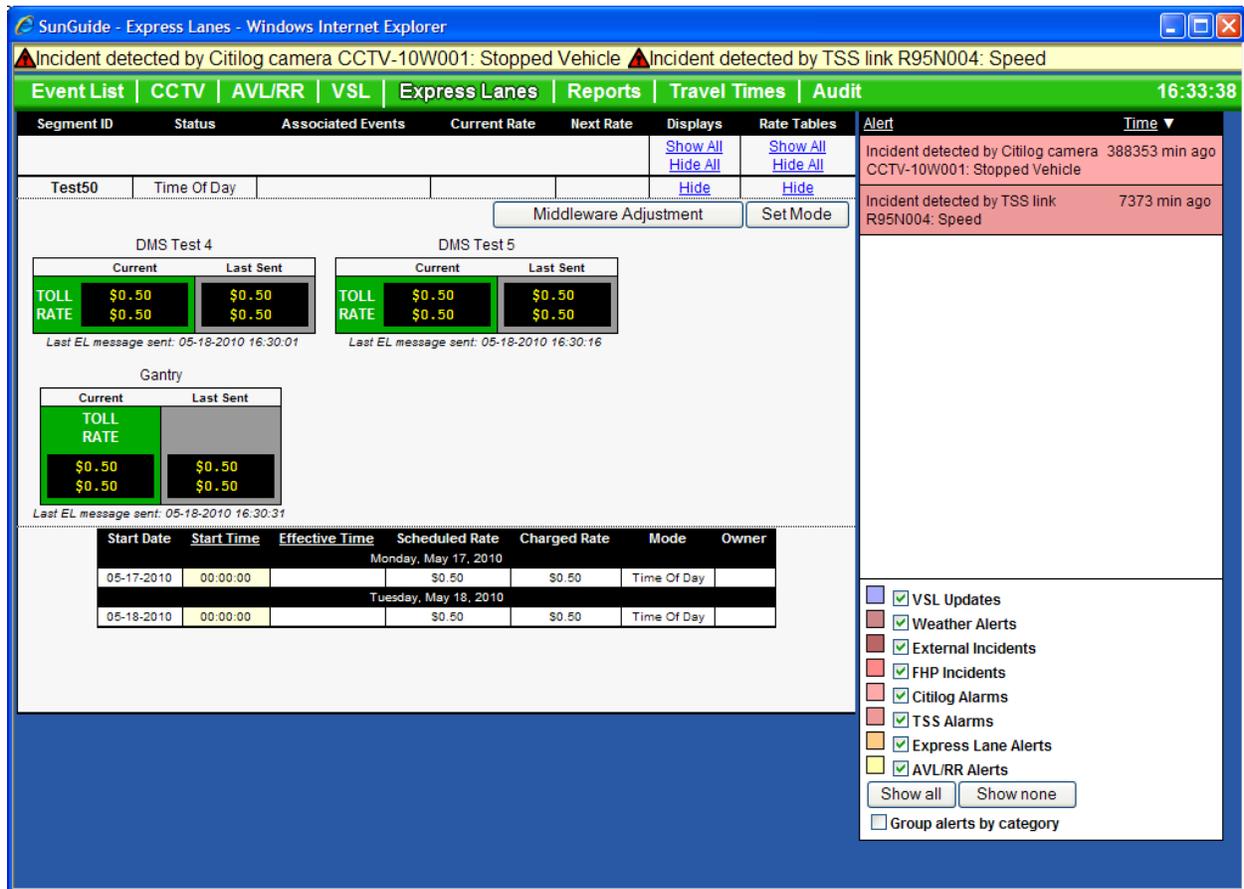
Figure 3–197 – Express Lanes Tab Dialog

Options available to the operator include being able to set a **Middleware Adjustment**, **Set Mode** and **Acknowledge Alerts**. When the **Set Mode** button is clicked a dialog box as shown in Figure 3–198 is displayed to the user. The user can select from the available modes. Depending on the mode selected the user then will be required to enter an effective time, toll rate, associated event, or comment. Once the **Set Mode** button is clicked, the override takes effect. The following actions occur depending on the override mode:

- Time of Day – Segment uses TOD schedule in effect for the day of the week.
- Manual – Segment is updated to use specified rate.

- Closed – Segment is closed to travelers and zero toll is charged.
- Zero rate – Segment is open to travelers and zero toll is charged
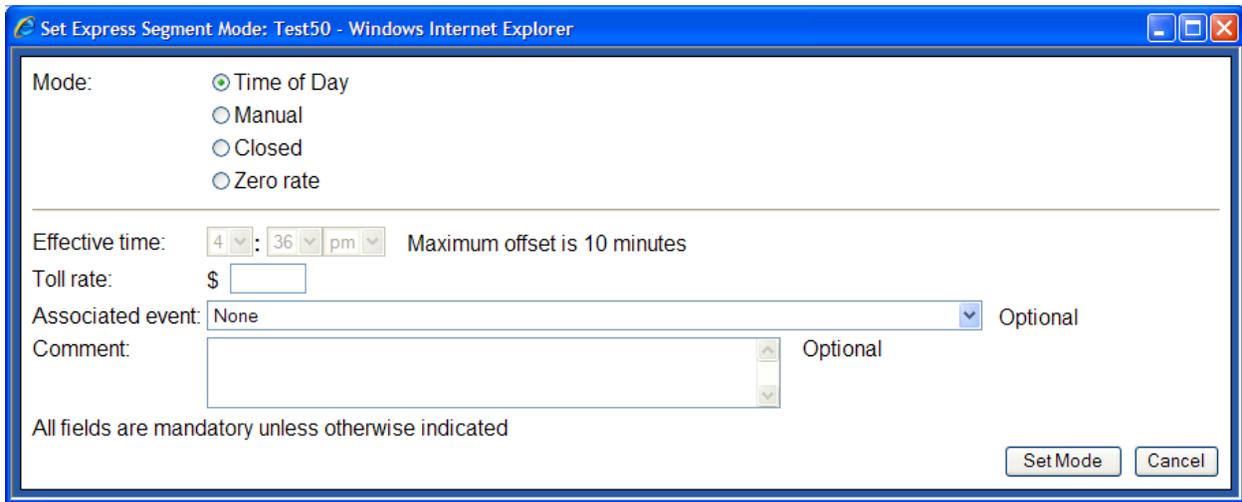
Figure 3–198 – Express Lanes Set Override Dialog

When the **Middleware Adjustment** button is clicked a dialog box as shown in Figure 3–199 is displayed to the user. The user must specify the effective time for the adjustment and a rate to apply, and may select an associated event and comment. (The event is required if the event association required flag is active.) Once the **Set Rate Adjustment** button is clicked, the adjustment is applied, and will continue until cancelled by selecting a new operating mode (or having an existing mode resend its rate), at which time the operator will be prompted to either continue or end the adjustment.
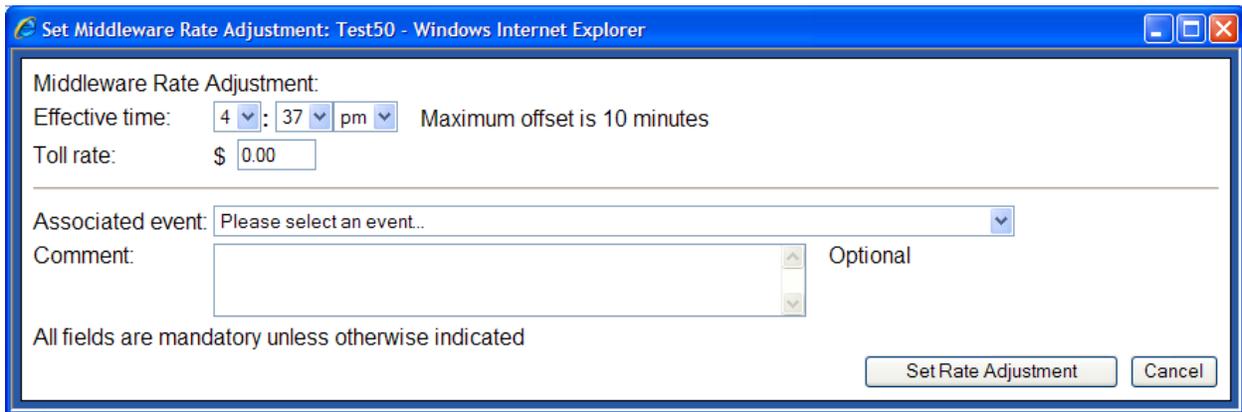
Figure 3–199 – Express Lanes Set Override Dialog

The Acknowledge Alerts dialog box is used to clear Express Lane alerts. Figure 3–200 shows the dialog box that appears when user clicks on an alert displayed in the alert box. The user can enter a description of the steps taken to remedy the problem in the text field box. After the user clicks the **Acknowledge** button the specific alert no longer is active and no longer appears in the list of Express Lane alerts as depicted in Figure 3–197.
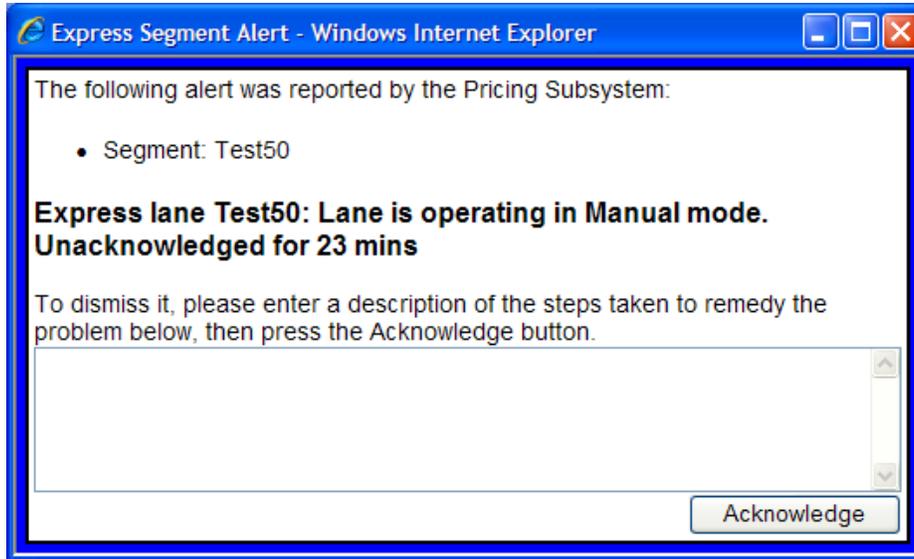
Figure 3–200 – Express Lanes Acknowledge Alert Dialog

In addition to standard alerts, a special alert is displayed to operators when a Middleware Rate Adjustment is in effect, and a new mode or rate is posted. Figure 3–201 shows the dialog box that appears automatically, or when user clicks on an alert displayed in the alert box. The user must select to either continue the Middleware Rate Adjustment (in which case an update is sent to the Middleware application) or end it. After the user clicks either button, the specific alert no longer is active and no longer appears in the list of Express Lane alerts as depicted in Figure 3–197.
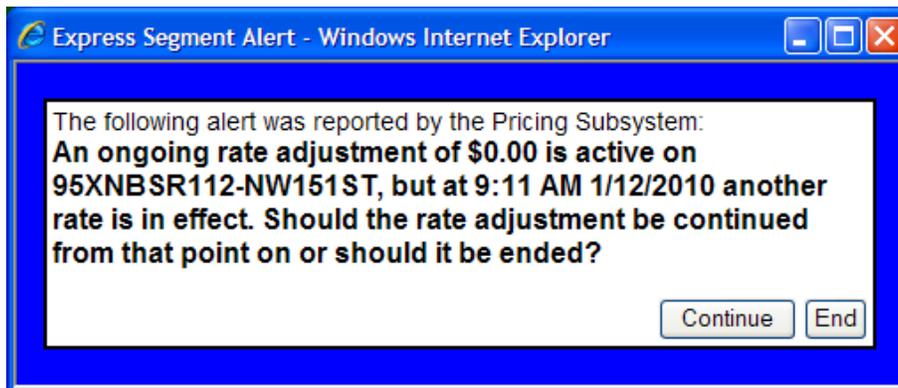
Figure 3–201 – Express Lanes Ongoing Middleware Rate Adjustment Dialog

When the user clicks the **Offline Synchronization** option from the context menu, the Offline Toll Rate Synchronization dialog is displayed. Figure 3–202 shows this dialog. The user can click the Browse… button to select a local file containing offline Middleware synchronization XML data, then press the Upload File button to submit the data to the Pricing subsystem.
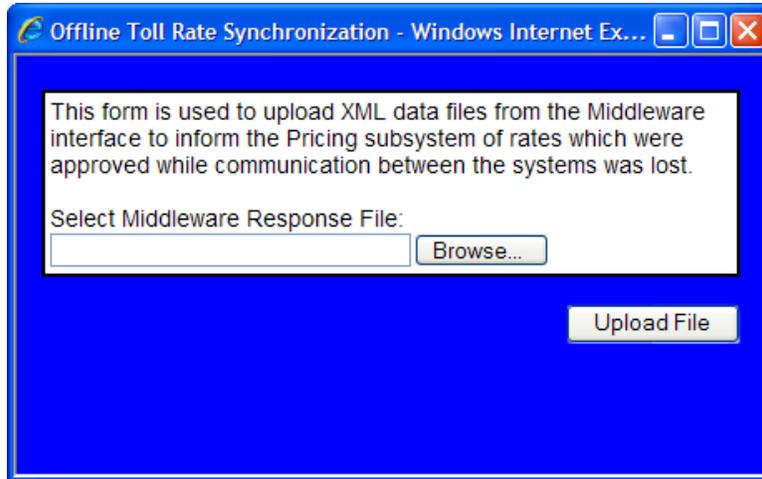
Figure 3–202 – Express Lanes Offline Synchronization Dialog

When the Pricing subsystem has restarted, operator approval of each segment's startup state is required before pricing activities can begin. Figure 3–203 shows the dialog box that appears when Pricing restarts and a user logs into the system, or when a user clicks the Pricing Startup State context menu option if they previously closed the dialog. The user must review and approve the startup state of each segment by selecting a segment from the drop down box at the top of the screen, configuring the startup state for the segment, then clicking the Segment State Startup Approved checkbox at the bottom. Once each segment is approved, the Apply Startup State/Rate History button will be enabled.

Operators may configure the startup state using the controls in the middle of the dialog and an ongoing Middleware Rate Adjustment using the controls at the bottom. Each of these sections of the dialog reflects the same controls as in the Set Mode and Set Middleware Rate Adjustment dialogs previously described. Operators may also add historical rates which were applied since Pricing was stopped using the Add Manual Rate button and table at the top of the dialog. Each manual rate allows the operator to specify an effective time and rate. End time is automatically determined based on other historical rates and the proposed startup state and Middleware Rate Adjustment.

While editing the values, approving states, and applying the startup state, several data consistency checks are performed. When any check fails, the operator is notified via an error display that appears in the lower left of the dialog. Once the error condition is corrected, the warning will disappear. This display is also used when an error is reported from the subsystem regarding data checks which could not be performed by the dialog itself.
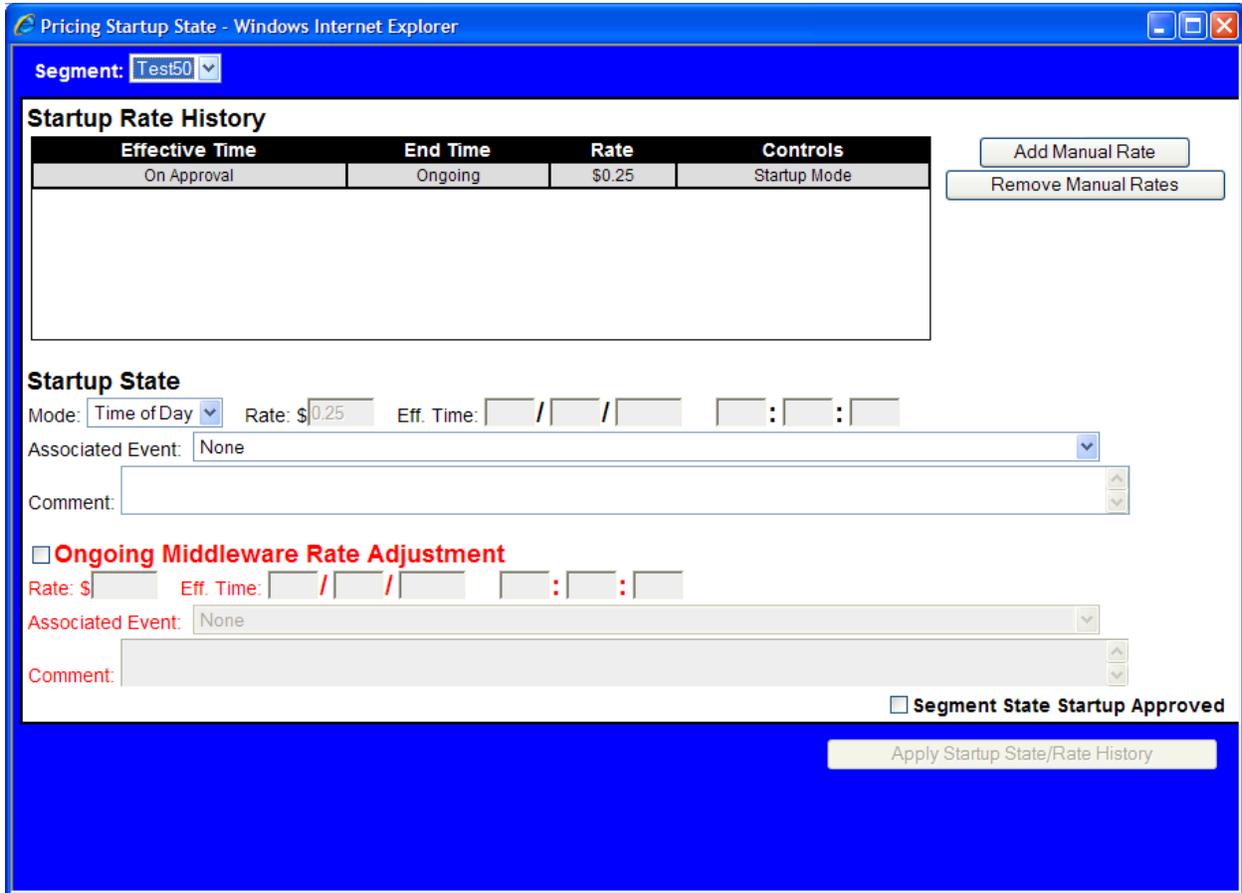
Figure 3–203 – Express Lanes Startup State Dialog

3.3.10 Floodgates Tab

The Floodgate Message tab is shown in Figure 3–204. It can be accessed by selecting Floodgate Messages from the Center-to-Center context menu and selecting the Floodgate Main tab. When the tab is opened the operator can select which Floodgate they wish to record an audio file for or provide text for the Floodgate. The Floodgate is selected using the radio buttons and drop downs at the top of the screen. Once a Floodgate is selected, the audio file can be recorded using the controls in the middle of the dialog and the text messages can be entered into the text box. When the **Save** button is selected the Floodgate information is sent to the FDOT ATIS provider. For local auditing purposes, a field **Associated Event** and **Comment** are provided, these are optional field that will be logged to the local database so that a record of why a Floodgate message was sent can be recorded (these two fields are not transmitted to the FDOT ATIS provider). If a message should be broadcast to multiple floodgates, pressing the Expand Floodgate button will switch to the Set Multiple view and pre-populate the form with values from the current display.
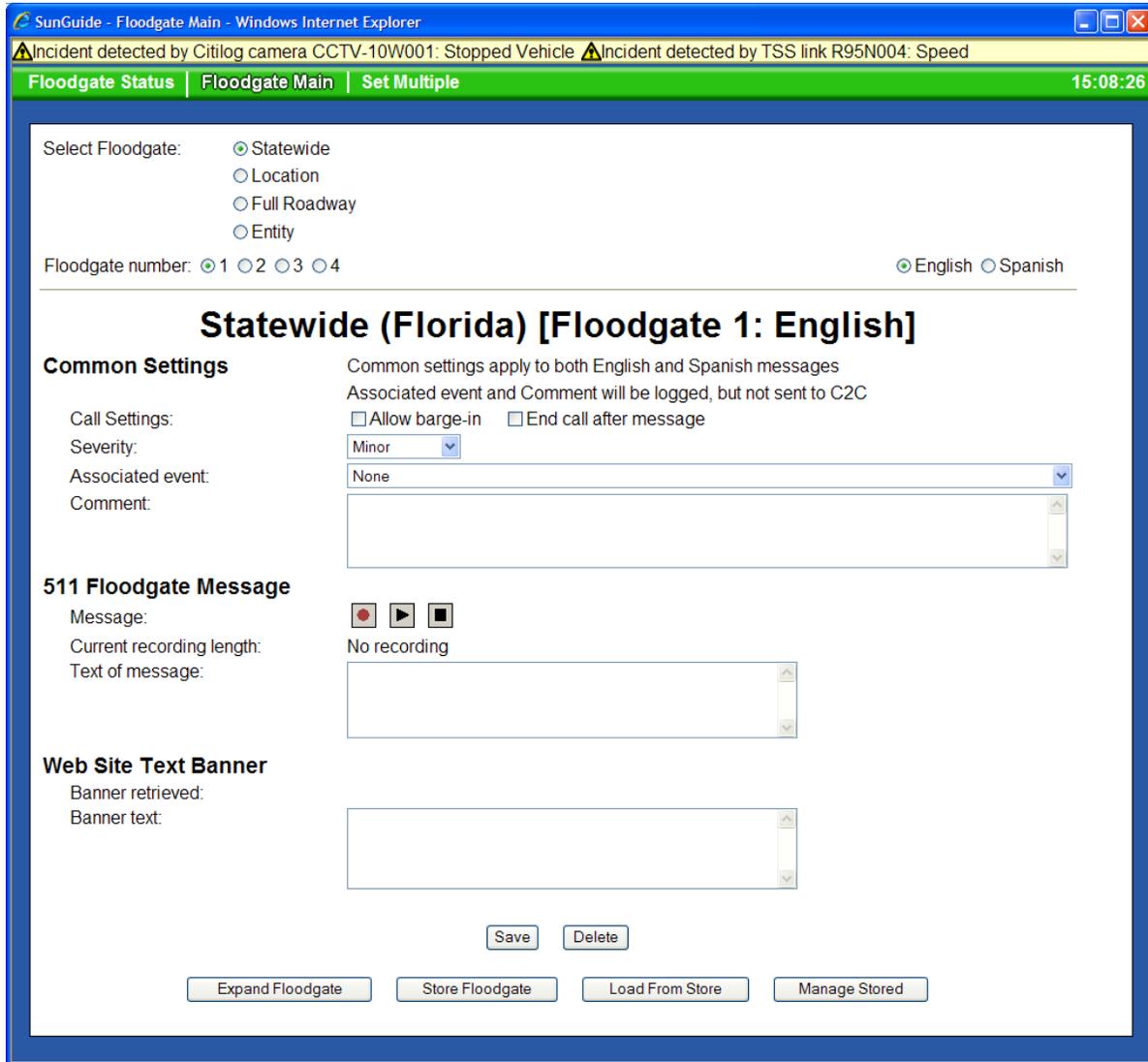
Figure 3–204 – Floodgate Entry Screen

If a user wishes to set multiple floodgate messages simultaneously, the Set Multiple tab allows this functionality, as shown in Figure 3–205. The interface works as the standard floodgate entry screen, but after selecting a floodgate, the user must press the Add Floodgate button to include it in the list of floodgates to be set. Floodgates may be removed by pressing the Remove Floodgate to remove the currently selected floodgate in the list, or the Remove All button to remove all floodgates.
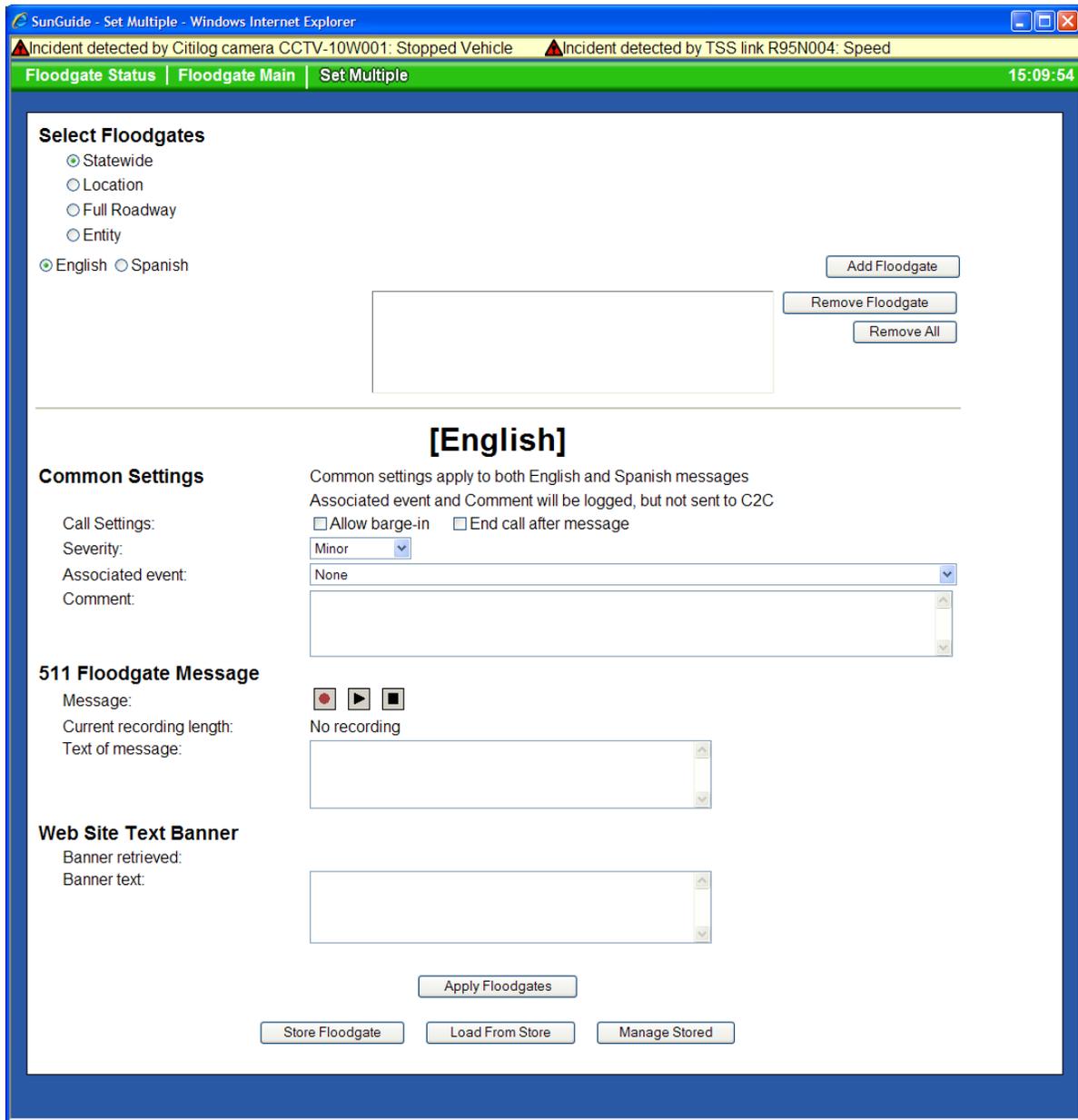
Figure 3–205 – Floodgate Multi Entry Screen

In either floodgate entry tab, buttons at the bottom allow for management and interaction with a library of stored floodgate messages. Pressing the Store Floodgate button displays the Store Floodgate dialog, shown in Figure 3–206. In this dialog, the user must select a library from the tree control, enter a name for the floodgate, and press the Store button. This will cause the floodgate message from the main dialog to be stored for future use.
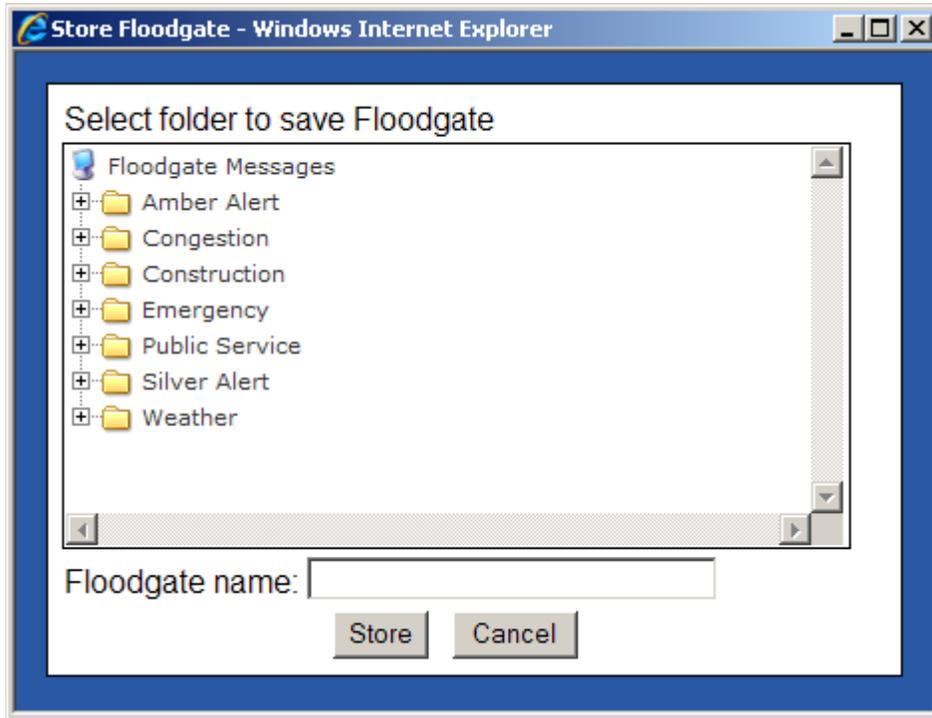
Figure 3–206 – Store Floodgate Screen

Pressing the Load From Store allows a user to retrieve a previously stored floodgate message. In the dialog shown in Figure 3–207, the user may select a library in the tree control, then select a message and press the Load button. This will populate the floodgate entry screen with the previously stored message data.
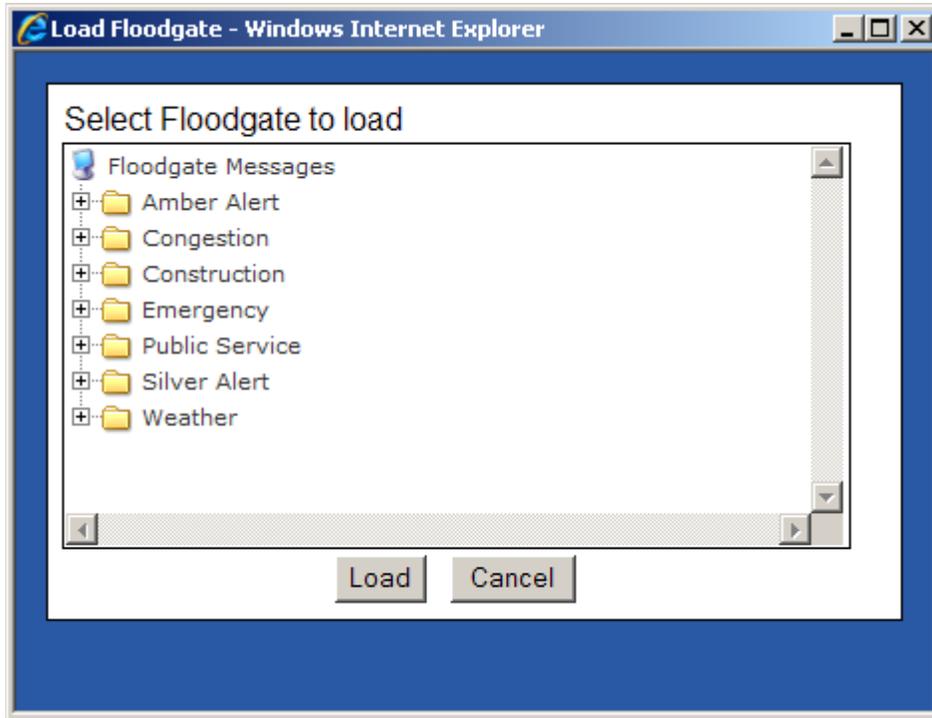
Figure 3–207 – Load Floodgate Screen

To manage stored messages (any operations other than saving and loading the actual messages) the user may press the Manage Stored button. The dialog shown in Figure 3–208 allows the user to move, copy, rename, or delete libraries and messages. The user must first select the source for the operation in the left pane of the dialog, select the desired operation on the right side, and then either select a new name or destination library, as appropriate for the action. Once the desired action is displayed, pressing the Execute button will cause it to be performed.
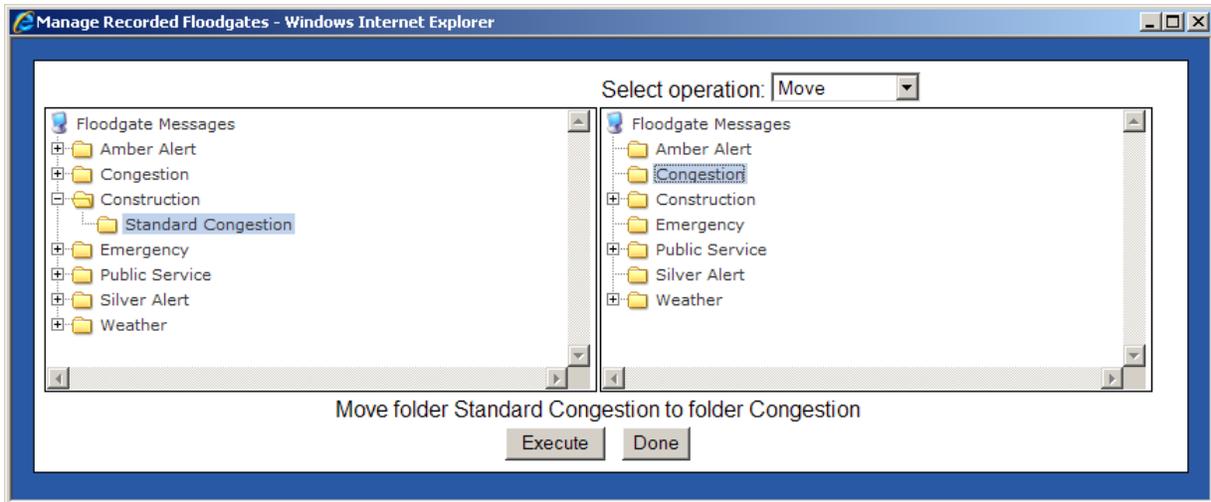
Figure 3–208 – Manage Recorded Floodgates Screen

The Floodgate status tab is shown in Figure 3–209. When the tab is opened the status of any active floodgate is displayed. If the operator selects one of the entries the Floodgate Entry Screen

is displayed, from this screen the operator will see the current text associated with the Floodgate as well as any audio files.

Floodgate Status	Floodgate Messages									
	Active 511 Floodgate Message	Active Web Site Text Banner								
		English				Spanish			
Type	Description	1	2	3	4	1	2	3	4
Statewide	Statewide (Florida)	🐚🚩							
Full Roadway	Beachline Expressway	🐚🚩				🐚🚩			
Full Roadway	I-10	🐚🚩				🐚🚩			
Full Roadway	Polk Parkway	🐚🚩	🐚🚩			🐚🚩	🐚🚩		
Entity	Tallahassee Regional Airport			🐚🚩					
Location	Southeast	🐚🚩	🐚🚩			🐚🚩		🐚🚩	
Location	Southeast/Broward County/I-95	🐚🚩							
Location	Southeast/Miami-Dade County/US 1	🐚🚩							

Figure 3–209 – Floodgate Status Screen

3.3.11 Travel Times Tab

Travel Times allows an operator to view current travel times throughout the system, enable or disable specific travel time links, enable or disable travel time messages system wide, view data about groups of matching and alternate travel time routes, and view the TSS links that comprise a travel time link on the map.

Travel Times (see Figure 3–210) is launched by selecting Travel Times from the main context menu. This display lists all travel time links defined in the system, providing the following data for each link: Name, current travel time, travel time if traffic moves at free flow speeds, current delay (difference between current travel time and free flow travel time), whether calculations on the link are enabled, and a list of DMSs which could display travel time messages including the link. To show or hide the DMS information, the operator may click the "Show" or "Hide" link to the right of the row. At the top of the table, "Show All" and "Hide All" options are provided to show or hide DMS information for all travel time links.
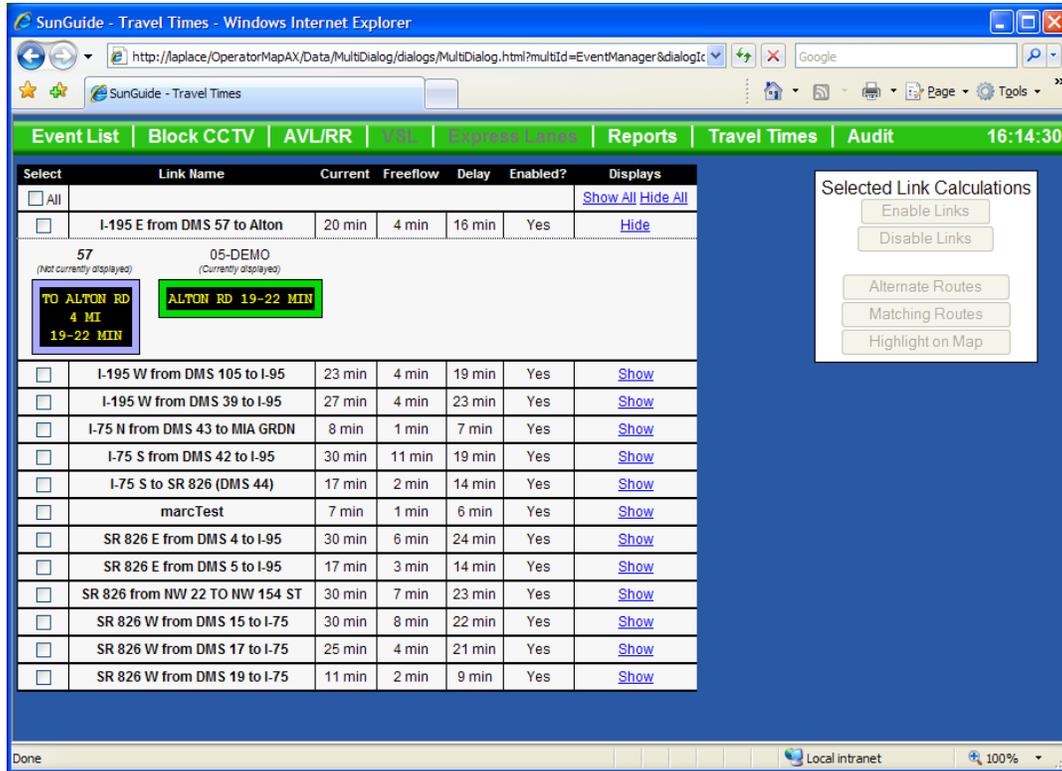
Figure 3–210 – Travel Times Tab

The DMS information shown will include the name of the DMS, the message that the travel time subsystem has determined should be displayed on the DMS, and whether or not that message is currently displayed on the DMS. If the current message does not match the recommended travel time message, the sign will be displayed with a red border and the sign name will be displayed in bold, red italics. Operators may click on the sign display to view the current status of the sign.

Operators may enable or disable calculation of travel times by selecting one or more travel time links (either by clicking the link name or the checkbox to the left of the row) then pressing the "Enable Links" or "Disable Links" button to the right of the table. If only one row is selected, the operator may view alternate and matching routes of the selected link by pressing the "Alternate Routes" or "Matching Routes" button to the right of the table. (If the link is not part of an alternate or matching route group, the appropriate button will be disabled.) To view the TSS links that comprise a travel time link, the user may select a link then press the "Highlight on Map". This will cause the included TSS links to be highlighted on the map, and will re-center the map to the selected links.

The Alternate Route Comparison dialog, viewed by selecting a link which is part of an Alternate Route group and clicking the "Alternate Routes" button in the Travel Times tabular display, shows each travel time link in a set of alternate routes, along with the short name of the route for display in a comparison message and the current travel time of the route.

Figure 3–211 – Alternate Route Comparison

The Matching Route Comparison dialog, viewed by selecting a link which is part of an Matching Route group and clicking the "Matching Routes" button in the Travel Times tabular display, shows each travel time link in a set of matching routes, along with the description of the route (which may specify the detection method being used by the link) and the current travel time of the route.

Figure 3–212 – Matching Route Comparison

3.3.11.1 Travel Time Calculations

Each Travel Time link is made up of one or more TSS links, which in turn are made up of one or more TSS lanes. Speed data is reported at the lane level. In the Administrative Editor, the frequency of travel time calculation is specified. The Frequency field specifies the number of seconds between each set of system-wide calculations for travel time values and DMS messages. For each TSS link, an average speed is calculated based on the speed of the individual lanes. If the average speed for the link is faster than the speed limit, the speed limit will be used instead. If a lane is actively reporting zero as its speed, the speed limit is used instead for this purpose. However, if the entire link is reporting no data whatsoever (rather than actively reporting zero speed), the link will be marked as invalid and will not be used in speed calculations.

Once all links have been evaluated, an average speed is calculated by averaging the speed of each valid link, weighted by the length of the link. (For instance, the speed on a 10 mile TSS link will count 10 times as much towards the average as the speed on a 1 mile TSS link.) The

length of each TSS link is typically determined by the length specified by the TSS subsystem, but on creation of a travel time link, an administrator may alter the TSS link length used for that travel time link only. This may be done if a travel time link starts in the middle of a TSS link (so only 1 mile of a 2 mile segment should be used) or if a travel time link extends beyond the range of TSS coverage (so a final 1 mile segment should be applied for 2 or 3 miles).

Once the average speed has been determined, an overall travel time for the travel time link is calculated by adding together the travel time of each link that reported valid data, then adding travel times for the invalid links that were previously set aside based on the overall average speed. If calculation boundaries are defined for the travel time link, they are applied at this point. If the calculated value is less than the lower bound, it is replaced by the lower bound. If the calculated value is greater than the upper bound, it is replaced by the upper bound unless the upper bound is lower (faster) than the time across the link at the speed limit (free flow). (In that case, where the upper bound is lower than the free flow time, free flow is reported as the travel time in all cases. This is an incorrect configuration, and should not be experienced in practice.) This value is then published to clients. DMS signs are then updated with the newly calculated travel times, except that if the percentage of links that were determined to be valid is less than the percentLanesWithData item in the configuration file, data for that link will not be included on any DMS.

3.3.11.2 Travel Time DMS Message Formatting

For travel time messages placed on DMSs, several formatting tags are available. Some tags are associated to a particular travel time link, while others are generic tags which are not necessarily tied to a link. The available generic tags are as follows:

- [NEW LINE] – All text following this tag should display on the next lower line of the DMS

- [NEW PAGE] – All text following this tag should display on the first line of the next page of the DMS message

- [SPACE] – A literal space character (normally, spaces are included in free text sections, but a single space at the beginning or end of free text may not render)

- [TIME] – The time of day the message was generated

- Freetext – Not a tag, but arbitrary static text as entered by the administrator

All other tags are specifically related to a destination. Travel time templates can be configured to allow a specific number of travel time links to display information. Each of the following tags is associated to one of those links based on the number at the end of the tag. For instance, [DEST1] would apply to the first travel time link, while [TVT2] would apply to the second. In the tag names below, the trailing "x" should be replaced by the appropriate link number.

- [STARTx] – Indicates the start of a section of the travel time message related to a particular travel time link. (Discussed in detail below.)

- [DESTx] – Replaced with the name of the destination associated to the travel time link in the device template.

- [TVTx] – Replaced with the current travel time of the link, in minutes. This usually is displayed as a range with a suffix, such as "6-8 MINS". The range and suffix are specified in the configuration file, described below.

- [SPEEDx] – Replaced with the current average speed of the link, in miles per hour.

- [DISTx] – Replaced with the length of the link, in miles.

- [ENDx] – Indicates the end of a section of a travel time message related to a particular travel time link.

The START and END tags deserve special mention. They do not display anything directly on a sign, but instead are used to show which portion of a message relates to a particular travel time link. If no data is available for that link, then all text and tags between the matching START and END tags for the link will be removed. To ensure a consistent message, all data tags for a particular link must be placed between their corresponding START and END tags, and no data tags for one link may appear within another link's START and END tags. Any template which does not follow these guidelines will fail to save, and report an error about the template formatting to the user. If all links of a message report no data, the normal travel time message will not be generated. Two configuration file values determine the behavior of the system in this case:

- blankIfNotGenerated – If "true", the system will simply display a blank message when no links report data for a message. If "false", a default message will be displayed.

- msgIfNotGenerated – The MULTI formatted message to display when no links report data for a travel time message. Only used if blankIfNotGenerated is false.

The display of the TVT, SPEED, and DIST tags are specified by values in the configuration file. TVT tags are replaced with either a single integer or a range of integers followed by a unit suffix. SPEED and DIST are replaced by a single integer followed by a unit suffix. The following configuration file elements specify the full behavior of these replacements:

- useTimeRange – If "true", display a range for the TVT tag; if "false", display only a single number. (The remaining range configuration tags are not used if this is "false")

- timeRangeInterval – The number of minutes to display in the range. The range will be set so that half the range is below the calculated travel time, and half the range is above. If the range specified is odd, then displayed range will asymmetric, it will be larger above the calculated travel time. If the range would include a value faster than free flow, the entire range will be shifted higher to avoid the condition. Examples:

    Example 1, timeRangeInterval is odd
        calculated travel time is 20 minutes
        timeRangeInterval is 5
        "lower interval value" is 20 – floor(5/2) = 18
        "upper interval value" is 20 + ceiling(5/2) = 23
        displayed range will be [18, 23]

    Example 2, range is faster than free flow time
        Free flow time is 20 minutes (traveling at speed limit)

Calculated travel time is 20 minutes
timeRangeInterval is 4
"lower interval value" is 20 – floor(4/2) = 18
"upper interval value" is 20 + ceiling(4/2) = 22
Calculated ranage is [18,22]
Range after shifting is [20,24]

- changeRangeInterval – When the travel time exceeds this value, a secondary range will be used, typically to show a larger range of possible times.

- largeTimeRangeInterval – The number of minutes to display in the range if the travel time exceeds the changeRateInterval.

- minTimeInMins – The lowest travel time to display on a DMS. If the travel time is below this value, a less than message will be displayed instead of a range.

- lessThanText – If the travel time is below the minTimeInMins, this text will precede the minTimeInMins. (For example, if minTimeInMins is 5, lessThanText is UNDER, and the travel time is 4 minutes, the TVT text will read "UNDER 5".)

- maxTimeInMins – The highest travel time to display on a DMS. If the travel time is above this value, a greater than message will be displayed instead of a range.

- greaterThanText – If the travel time is above the maxTimeInMins, this text will precede the maxTimeInMins. (For example, if maxTimeInMins is 30, greaterThanText is OVER, and the travel time is 35 minutes, the TVT text will read "OVER 5".)

- distUnits – The units to display following a distance (usually MI)

- spdUnits – The units to display following a speed (usually MPH)

- minUnits – The units to display following a travel time or travel time range (usually MIN)

In some cases a travel time message may be replaced with an alternate route diversion message. This may occur only when the following criteria are met:

- The device template specifies that alternate route replacement is allowed on the device,

- The route to be replaced is the only route on its page of the message,

- The route is part of a set of alternate routes defined in the TVT subsystem, and

- Another route in the set of alternate routes is faster than the route normally included in the message by at least the value specified in the Alternate Route Time Difference field of the Administrative Editor Travel Times Options page.

If those conditions hold, the TVT will attempt to replace the message on the sign. If the message is a single phase message, then it will be replaced with a two phase message – the first phase shows the travel time along the normal route, the second phase shows the travel time along the fastest alternate route. If the original message was already more than one phase, the affected phase will be replaced by a single phase showing the fastest alternate route.

The subsystem will first attempt to use the following template to format each message:

<div align="center">

TO [DEST]

VIA [ROUTE] [DIST]

[TVT]

</div>

If the message does not fit using this template, an alternate template will be attempted:

<div align="center">

TO [DEST]

VIA [ROUTE]

[DIST] [TVT]

</div>

For a message which was originally more than one phase, if neither message fits, the original travel time message will be displayed. For a message which was originally one phase, if either new phase would not fit, the original travel time message will be displayed. In either of these cases, an alert will be broadcast to any currently logged-in users to indicate that the alternate route configuration failed to generate a valid message.

4. System Administration

The following sections describe the System Administration functions of the SunGuide software. The text in **bold** is referencing a 'button' on the GUI.

4.1 Configuration Editor

The configuration editor is a windows application that allows an administrator to edit the "config.xml" file. This file contains the configuration information for the SunGuide processes. Before running this editor, the most recent version of the SunGuide *Version Description Document (VDD)* should be accessible. The VDD provides the list of configuration variables that can be present in the config.xml file (adding entries not in the VDD will have no effect on SunGuide).

When the Configuration Editor is started, the last file edited will automatically be opened (the first time the editor is used no file will be opened). A file can be selected for opening using the **File** option in the menu bar of the application. Once a file is opened, a backup copy of the file will be created in the same folder where the file exists. Figure 4–1 contains a depiction of the opening screen of the Configuration Editor with a file opened.
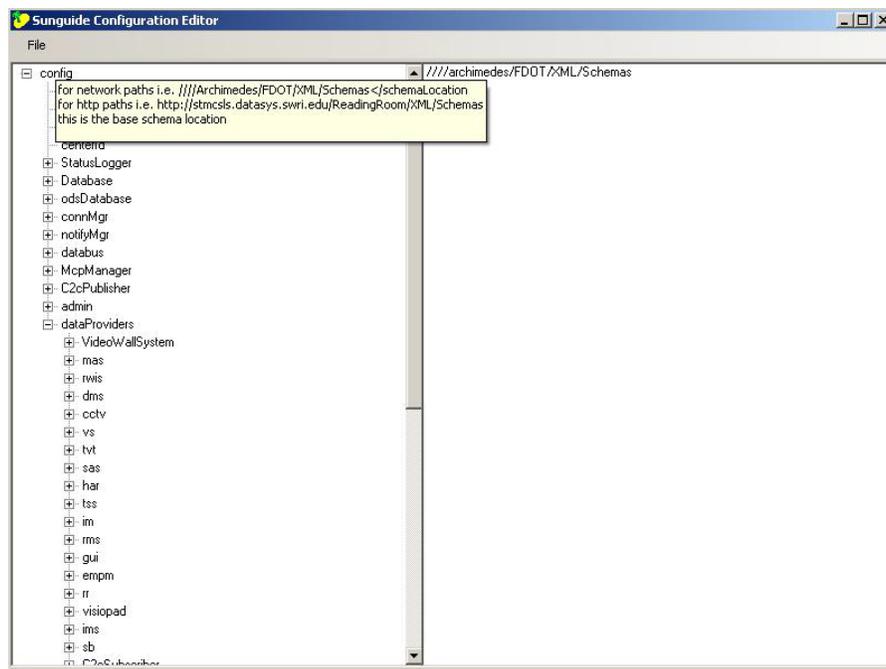
Figure 4–1 – Configuration Editor Entry Screen

If the SunGuide Status Logger is configured, changes made to the file will be logged to the Status Logger. Note that the FIRST time SunGuide is installed Status Logger will not be operational. It is recommended that minimal editing of configuration files is performed until the Status Logger is configured.

Once a file is opened, the view presented to the user will be quite similar to Windows Explorer. The user can click on the "+" sign to expand nodes and the "-" sign to close a node. Figure 4–2

contains a view of the editor with the elements of a tree node displayed in the right hand pane. By "right clicking" on tree entries it will allow the following actions to be taken:

- **Create Element Node**: create a new element
- **Create Comment**: allows a general comment to be added (this comment is only informational and not used by any SunGuide process)
- **Create New Attribute**: create a new attribute for the element node selected
- **Rename Element**: change the name
- **Delete Element**: remove the element
- **Edit Comments**: edit an existing comment

If the mouse is allowed to hover a "tool tip" containing the node's comments will be displayed.
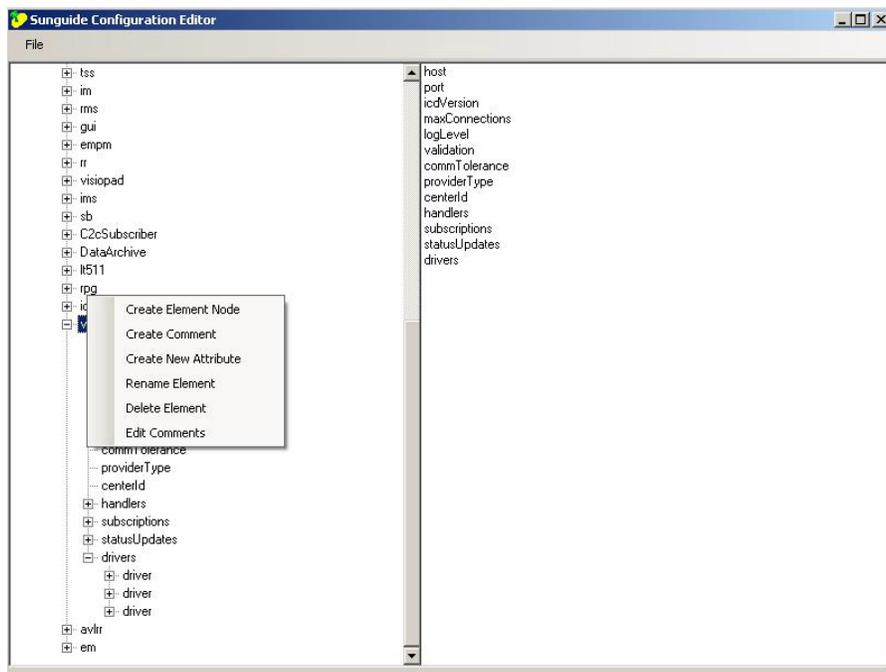
Figure 4–2 – Configuration Editor Node Detail

When an element is selected for editing, a dialog will be displayed that will allow the element name to be modified along with the text associated with the element. Figure 4–3 contains an example of the editing dialog. Care needs to be taken when editing element contents to verify that the entries are consistent with the options provided in the VDD.
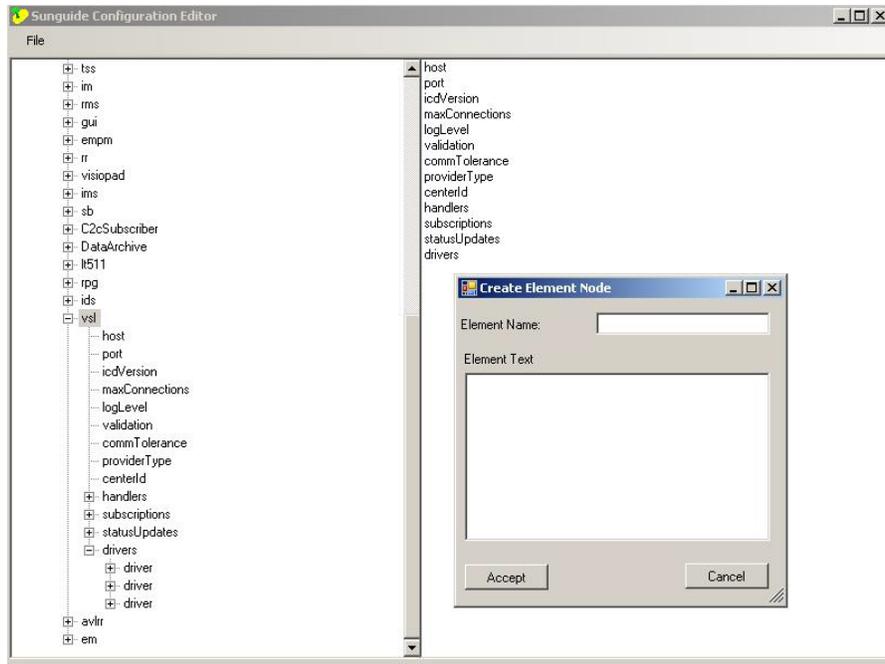
Figure 4–3 – Configuration Editor Element Entry

Once the edits are complete, the editor can be closed by selecting the **Exit** option of by selecting the Windows "Close X" in the upper right hand corner. An option to save the current version of the file will be presented, and after the choice is made, the editor will be terminated.

4.2 Subsystem Control with Executive Handler

Executive Handler (EH) is a set of applications that enables operators to control the execution of other SunGuide subsystems, and the operational status reporting of these controlled subsystems processes. Specifically, the Executive Handler Server has the following capabilities:

- Automatic execution control of subsystem processes.
- On-demand execution control of subsystem processes by an operator.
- Viewing of subsystem process operational status, listed by hosting workstation.
- On-demand updating of the logging level in use by executing subsystem processes.

Executive Handler is comprised of a Server, Editor, and Viewer, described in the following sections.

4.2.1 Executive Handler Editor

The Executive Handler Editor allows the operator to specify which processes are to be controlled by the Executive Handler, and to establish the criteria by which these processes will be controlled. The list of processes as well as their control options may be modified via the editor.

4.2.1.1 Software Familiarization

The Executive Handler Editor is started by pressing the Windows **Start** button, selecting the All Programs→ SunGuide menu, then selecting Executive Handler Editor application. Figure 4–4 depicts the user interface of the Executive Handler's Process List Editor upon startup.
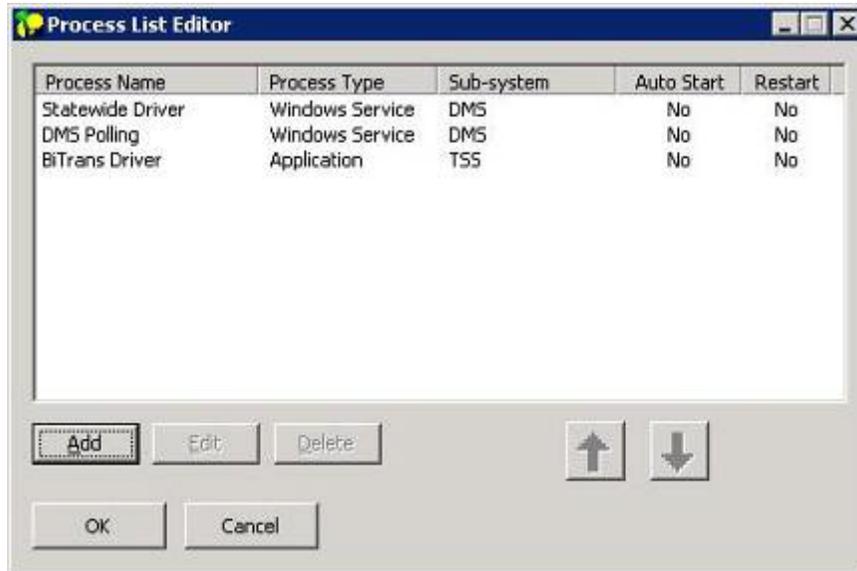
Figure 4–4 – Process List Editor

This application may be exited by clicking on either the **OK** or **Cancel** button, or by clicking on the 'X' at the upper-right corner of the window. Selecting the **Add** button invokes the add process dialog that is described in Section 4.2.1.2. If process parameters are to be altered then the process is selected (using the left mouse button) and the **Edit** button should be selected, the dialogs shown in Section 4.2.1.2 will be displayed. If a process is to be deleted, the process should be selected (using the left mouse button) and the **Delete** button selected. The **Up Arrow** and **Down Arrow** keys can be used to move processes up and down in the list, select the process to be moved (using the left mouse button) and press the up and down arrows until it is placed where desired.

4.2.1.2 Processing Procedures

Upon starting the application, the editor window displays a list of processes to be controlled by the Executive Handler. Additional processes may be added to this list, and their control options may be modified. From the editor, the operator may also discontinue process control for a particular process, as well as order the list of processes. Selecting the **Add** option in the main editor (see Figure 4–4) window will display the dialog as shown in Figure 4–5.
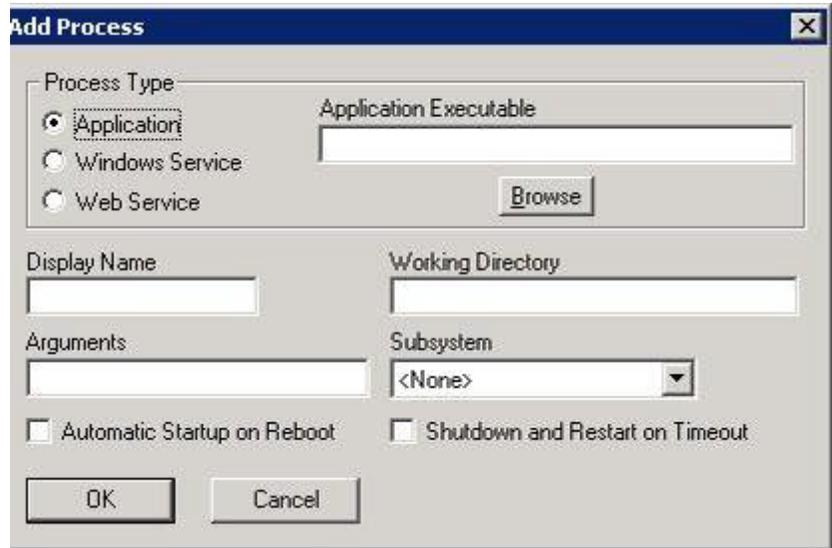
Figure 4–5 – Add Process – Blank

The operator should select the Process Type and Subsystem, and fill in the values for Application Executable, Display Name, Working Directory, and Arguments. The Browse button will bring up a file or service list dialog depending on the selected process type, allowing the operator to view the directories on the server and select the appropriate executable or Windows service. The Subsystem dropdown will display a list of the systems known to the editor; this list, which will be defined during installation and should not need subsequent modifications, is stored in the SubSystemList.txt file located in the same directory as the Executive Handler Editor application.

The operator may specify whether or not the process should startup automatically on server reboot. Reboot refers to the Executive Handler stop and restart, which could occur as a result of the operator stopping and restarting the service in the Windows Services applet, or from hardware reboot. However, when the Executive Handler Server is started, the EH Server, upon startup, will startup processes under its control that are flagged with the automatic restart option. Such processes should show a Startup Type of Manual in the Windows Services applet.

The operator may also specify whether or not to shutdown and restart the process on a timeout. Timeout refers to the SunGuide system heartbeat, where processes report to the Executive Handler on a periodic basis. If a subsystem set for restart on timeout fails to report within a specified time period, the process will be stopped and restarted automatically by the Executive Handler. Selecting **Cancel** will cause the dialog to close without saving any data. An example dialog with data entered is shown in Figure 4–6.
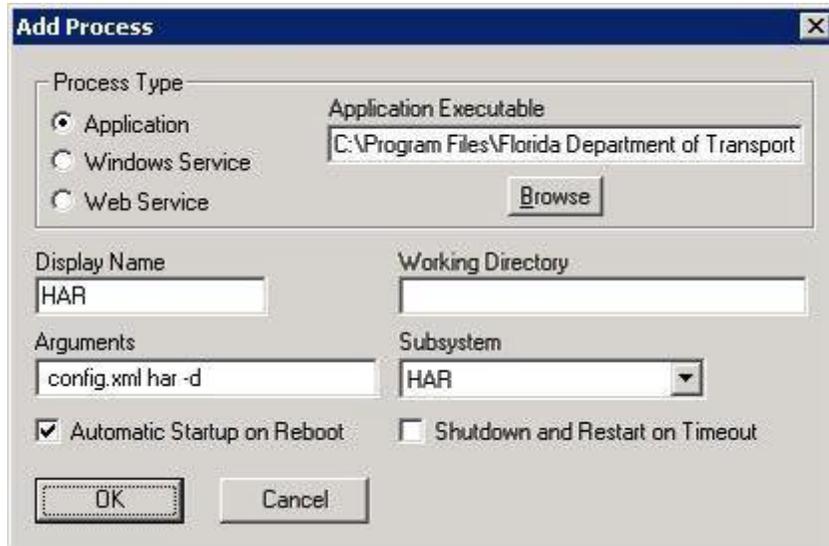
Figure 4–6 – Add Process – Detail

The operator may choose to cancel this operation, or select **OK** to save the new settings. After selecting **OK**, the newly added process will display in the editor's process list if no errors occur. The operator must then stop and restart the Executive Handler Server (service) so that it will recognize these configuration changes. Selecting **Cancel** will cause the dialog to close without saving data.

Editing a process will display the same dialog as in Figure 4–6. However, the Process Type and Application Executable options will be disabled. Only the remaining fields may be modified.

4.2.2 Executive Handler Server

The Executive Handler Server controls other SunGuide processes established in the process list of the Executive Handler Editor.

4.2.2.1 Software Familiarization

The Executive Handler Server is started and stopped via the Services window found in the system Control Panel. To open the Services window, press the Windows **Start** button, select **Control Panel**, then **Administrative Tools**, and finally, **Services**. **Executive Handler** should be in the Services list, and its Startup Type should be set to Automatic. If needed, the server may be stopped and restarted manually from the Control Panel.
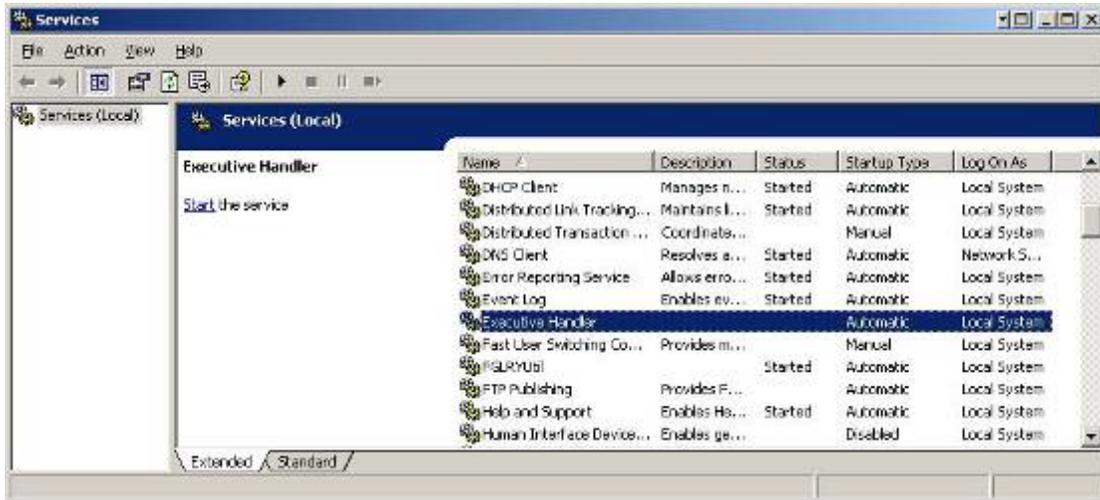
Figure 4–7 – Executive Handler Service

4.2.2.2 Processing Procedures

There are no other processing procedures for this application.

4.2.3 Executive Handler Viewer

The Executive Handler Viewer allows the operator to monitor the various SunGuide system processes currently running, and to filter the view of these processes.

4.2.3.1 Software Familiarization

The Executive Handler Viewer is started by pressing the Windows **Start** button, selecting the **All Programs**→ SunGuide menu, then selecting **Executive Handler Viewer** application.   The application may be exited either by selecting the **File, Exit** menu option, or by clicking on the 'X' at the upper-right corner of the window.

Process status and connection information are highlighted in different colors depending on its value. Normal status and connection state are shown on a green background, problem situations are shown on a yellow background, and fatal errors or disconnected states are shown on a red background.

4.2.3.2 Processing Procedures

Figure 4–8 depicts the user interface of the Executive Handler's Viewer upon startup.
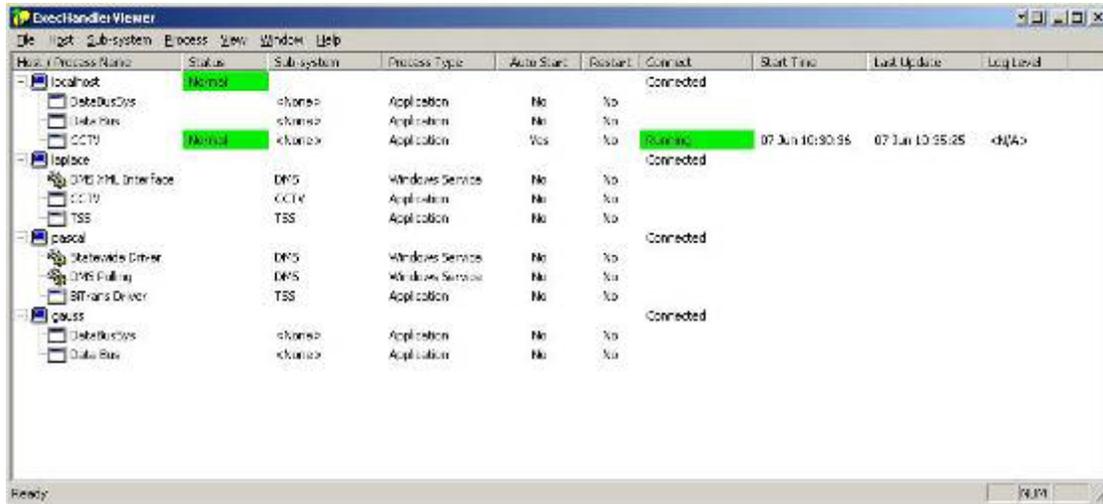
Figure 4–8 -- Executive Handler Viewer

By default, the viewer comes up in Host List view. The status and other pertinent information are displayed for each process currently under Executive Handler control.

The viewer provides numerous menu options which are described in detail in the following sections.

4.2.3.2.1 File Menu

The File Menu of the Executive Handler Viewer is shown in Figure 4–9, and its options are described in the following sections.

Figure 4–9 -- File Manu

4.2.3.2.1.1 Add New Host

This option is available only when in the Host List Window view, and it allows the operator to add a new host to the list of server/host machines on which controlled processes reside. Selecting this option causes the dialog in Figure 4–10 to be displayed:

Figure 4–10 -- Add New Host

The operator should enter either the host machine name or its Internet Protocol (IP) address in the entry field. Clicking on the Browse button will bring up a directory tree listing so that the desired machine may be found over a network. Entering the data and selecting OK will cause the new host name to appear in the viewer's host list. The shortcut for this option is **Ctrl+A**.

4.2.3.2.1.2 Connect/Disconnect All

Selecting the Connect All option will cause the Executive Handler Viewer to connect to all of the listed host machines. Conversely, selecting the Disconnect All option will cause the Executive Handler Viewer to disconnect from all of the listed host machines.

4.2.3.2.1.3 Exit

Exit may be selected to close the Executive Handler Viewer application.

4.2.3.2.2 Host Menu

The Host Menu of the Executive Handler Viewer is shown in Figure 4–11. Options are enabled only if the Window view has been set to Host List, and a host machine has been selected in the viewer. This same menu will popup if, in the same view, the operator right-clicks on a host machine's name.

Figure 4–11 -- Host Menu

Options for this menu are described in the following sections.

4.2.3.2.2.1 Connect/Disconnect

These options are mutually exclusive and will be enabled appropriately based on the current connection status of the viewer to the selected host machine.

4.2.3.2.2.2 Start/Stop All

The operator may quickly start or stop the processes related to a specific host machine by selecting the appropriate option here.

4.2.3.2.2.3 Delete

This option allows the operator to disconnect from the selected host and remove the host name from the list. On choosing this option, the dialog in Figure 4–12 will be displayed:

Figure 4–12 – Delete Host Confirmation

The operator may press **OK** to continue this operation, or **Cancel** to discontinue.

4.2.3.2.3 Sub-system Menu

The Subsystem Menu of the Executive Handler Viewer is shown in Figure 4–13. Options are enabled only if the Window view has been set to Sub-system List, and a subsystem has been selected in the viewer. This same menu will popup if, in the same view, the operator right-clicks on a subsystem's name.
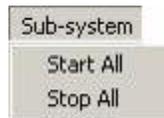
Figure 4–13 – Sub-system Menu

Options for this menu are described in the following sections.

4.2.3.2.3.1 Start/Stop All

Selecting one of these options will cause all processes within each subsystem under Executive Handler control to be either started or stopped.

4.2.3.2.4 Process Menu

The Process Menu of the Executive Handler Viewer is shown in Figure 4–14. Options are enabled only if a process has been selected in the viewer. This same menu will popup if the operator right-clicks on a process name in the viewer. For running processes, the menu displays as in the figure; however, if the selected process is not currently running, only the Start menu option is enabled.

Figure 4–14 – Process Menu

Options for this menu are described in the following sections.

4.2.3.2.4.1 Start/Stop

Selecting either of these two mutually exclusive options will start/stop the selected process. Only the applicable option will be enabled.

4.2.3.2.5 Set Log Level

This option allows the operator to adjust the log level for the selected process. When selected, the dialog in Figure 4–15 is shown:

Figure 4–15 – Log Level

Options include: **slInfo, slWarn, slError, slDebug,** and **slDetail**. **slInfo** represents the least amount of detail, and **slDetail** signifies the greatest amount; other values represent increasing levels of detail from **slInfo** to **slDetail**. To set the new logging level, the operator clicks the **OK** button. Alternatively, the operator may select **Cancel** to terminate the operation without modifying the log level. Once modified, the new logging level will be picked up automatically by Status Logger.

4.2.3.2.5.1 Enable/Disable Validation

These options refer to XML validation, and are used primarily during software development. These features are left in place in the release software to aide in error-tracking if needed.

4.2.3.2.6 View Menu

The View Menu of the Executive Handler Viewer is shown in Figure 4–16. All options are always enabled.

Figure 4–16 – View Menu

Options for this menu are described in the following sections.

4.2.3.2.6.1 Expand/Collapse All

These mutually exclusive options cause the processes under the highest level items, either subsystems or hosts, depending on the view, to either expand so that all can be seen, or collapse so that all are hidden.

4.2.3.2.6.2 Status Bar

This option shows or hides the Status Bar from the bottom of the application window.

4.2.3.2.7 Window Menu

The Window Menu of the Executive Handler Viewer is shown in Figure 4–17. All options are always enabled.
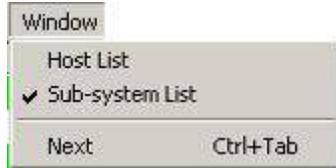
Figure 4–17 – Window Menu

Options for this menu are described in the following sections.

4.2.3.2.7.1 Host List

Selecting this option causes the processes to be listed under their respective host machines.

4.2.3.2.7.2 Sub-system List

Selecting this option causes the processes to be listed under their respective subsystems. Figure 4–18 shows an example of this view.
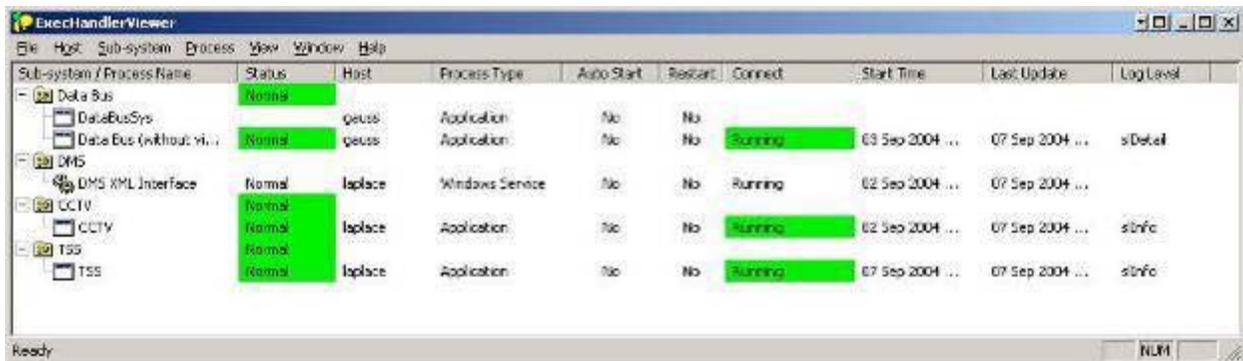
Figure 4–18 – Subsystem List View

4.2.3.2.7.3 Next

This option causes the Window List view to alternate between the Host and Sub-System List views. The shortcut for this option is **Ctrl+Tab**.

4.2.3.2.8 Help Menu

The Help Menu of the Executive Handler Viewer is shown in Figure 4–19.

Figure 4–19 – Help Menu

Options for this menu are described in the following sections.

4.2.3.2.8.1 About ExecHandler Viewer

Select this menu option to view a dialog containing Executive Handler Viewer version and copyright information.

4.3 Subsystem Monitoring with Status Logger

Status Logger (SL) is a set of applications that enables subsystems to log status information to a central location, and operators to view the logged information. Specifically, Status Logger has the following capabilities:

- Provide client applications with several different "levels" of messages.
- Accept messages from client applications and archive (log) them to the server's file system.
- Provide a mechanism for configuring the Status Logger Server, the Status Logger Configuration component.
- Provide a viewer to view the logged messages, the Status Logger Viewer component.

Status Logger is comprised of a Server, Control Panel applet, and Viewer, described in the following sections.

4.3.1 Status Logger Server

The Status Logger Service handles the collection of status information received from the various subsystems, and generates log files based on the information gathered.

4.3.1.1 Software Familiarization

The Status Logger Service runs as a Windows service. During SunGuide installation, the SL Server will have been configured to startup automatically, so the operator should not have to start this application. If there is a need to stop and restart the SL Server at any time, it may be accessed through **Control Panel, Services**, as shown in Figure 4–20.
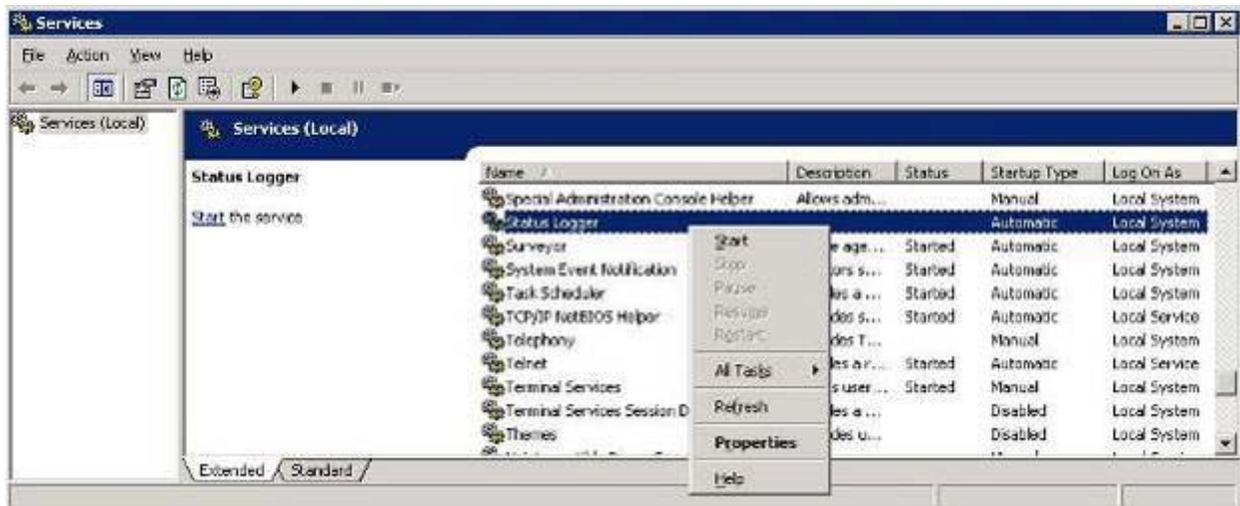
Figure 4–20 – Status Logger Service

4.3.1.2 Processing Procedures

There are no other processing procedures for this application.

4.3.2 Status Logger Control Panel Applet

The Control Panel Applet (CPA) handles Status Logger configuration. The following sections describe using the CPA.

4.3.2.1 Software Familiarization

The Control Panel Applet is accessible via the Windows Control Panel, as shown in Figure 4–21.
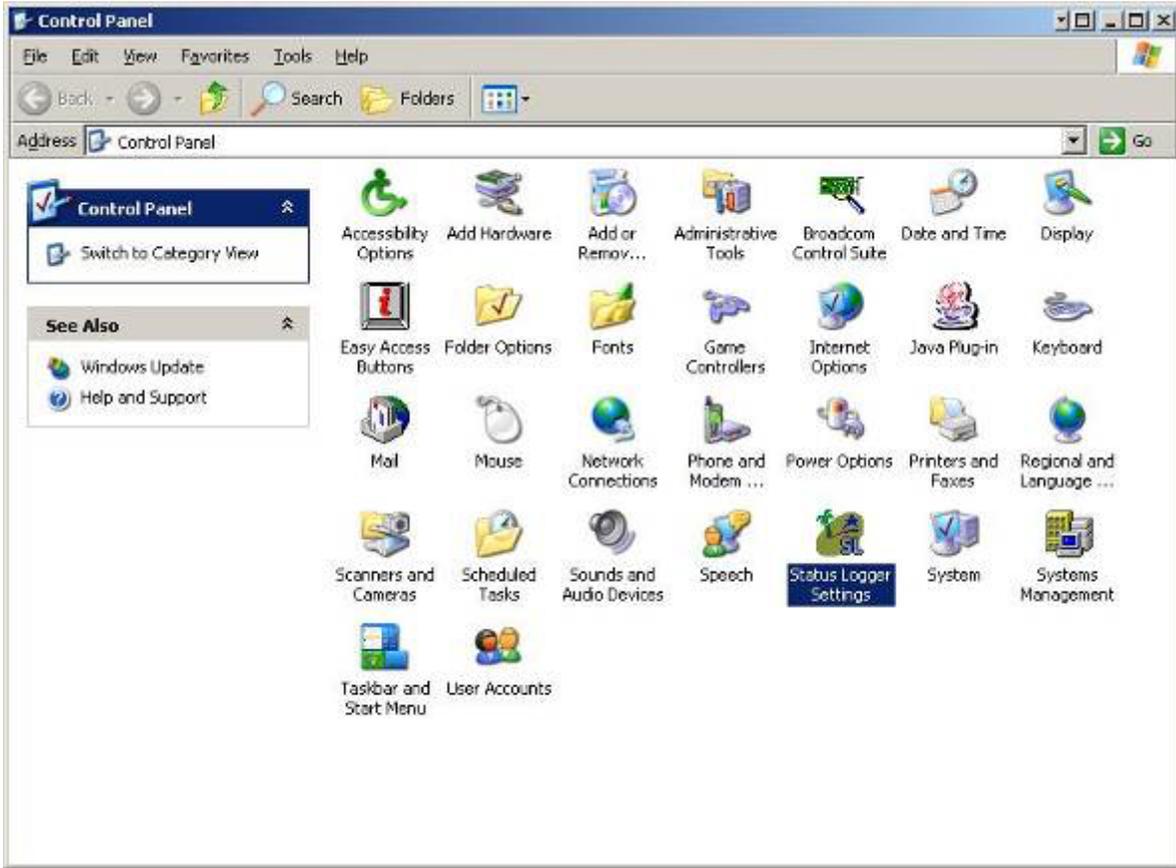
Figure 4–21 – Control Panel

4.3.2.2 Processing Procedures

As is shown in Figure 4–22, the CPA allows the operator to specify the directory where log files will be located, the frequency within which new log files will be generated, whether or not to reuse log files, and whether or not to use separate log files for each process/subsystem (and to name them according to the process names).
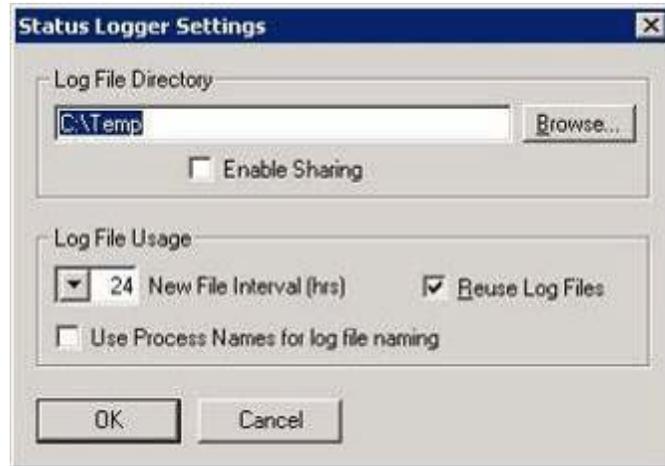
Figure 4–22 – Status Logger Control Panel Applet

Selecting **OK** will save these changes to the Windows Registry; selecting **Cancel** will exit the application without saving these changes.

4.3.3 Status Logger Viewer

The Status Logger handles the display of the various log files generated by the SL Server application, enabling the operator to monitor the status of the subsystems.

4.3.3.1 Software Familiarization

The SL Viewer is started by pressing the Windows **Start** button, selecting the **All Programs→** SunGuide menu, then selecting **Status Logger Viewer** application. The application may be exited either by selecting the **File, Exit** menu option, or by clicking on the 'X' at the upper-right corner of the window.

Status types are color-coded with informational messages at the highest level of detail in green, warning messages in yellow, error messages in red, detail messages in dark gray and debugging messages at the lowest level of detail in light gray.

4.3.3.2 Processing Procedures

Upon starting the application, a window similar to that in Figure 4–23 will be shown.
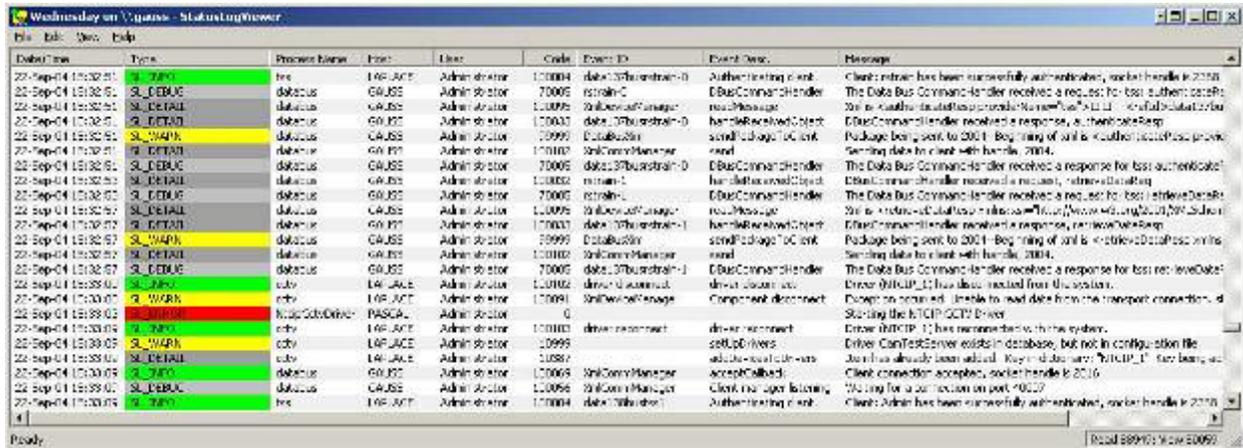
Figure 4–23 – Status Logger

The viewer displays a variety of process/subsystem status information, such as process name, status, host machine, and message. The display may be configured according to operator specifications. The SL Viewer provides numerous menu options for configuring the display; these options are described in detail in the following sections.

4.3.3.2.1 File Menu

The File Menu of the Status Logger Viewer is shown in Figure 4–24, and its options are described in the following sections.
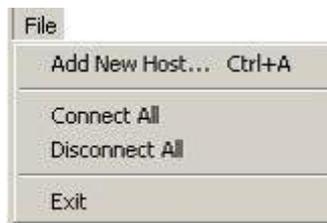

Figure 4–24 – File Menu

4.3.3.2.1.1 Connect

This option allows the operator to locate and view log files either on their local computer or a remote one. Selecting this option causes the dialog in Figure 4–25 to be displayed:
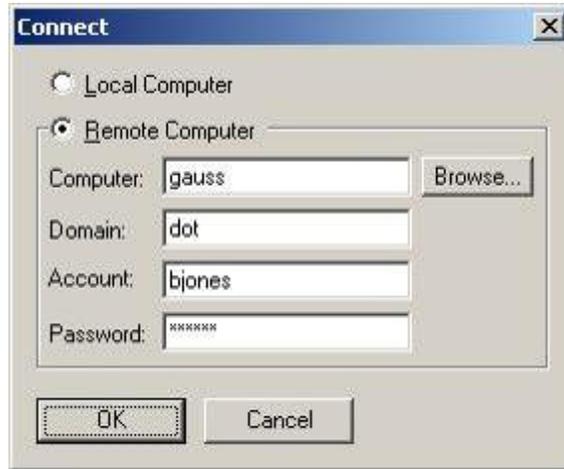
Figure 4–25 – Connect

If connecting to a remote computer, the operator must enter the remote computer name and domain, as well as a valid operator account name and password.

4.3.3.2.1.2 Open

This portion of the menu enables the operator to select a log file by day on the currently connected computer, or to open a specific log file on a network-accessible computer to which the operator has access, via an Open File dialog box. The shortcut for this option is **Ctrl+O**.

4.3.3.2.1.3 Save as Text

This portion of the menu enables the operator to save a highlighted text in the viewer to a text file. Selecting this option will display a File Dialog window in which the operator may select the location and name of the text file to be created.

4.3.3.2.1.4 Exit

The operator may select this option in order to exit the application.

4.3.3.2.2 Edit Menu

The Edit Menu of the Status Logger Viewer is shown in Figure 4–26, and its options are described in the following sections.

Figure 4–26 – Edit Menu

4.3.3.2.2.1 Copy

This is currently the only option under this menu, and it allows the operator to copy highlighted text from the viewer to the Windows Clipboard. This functions essentially the same as the **File, Save as Text** option, but uses the Clipboard as the copy destination rather than a text file. **Ctrl-C** serves as a shortcut to this menu option.

4.3.3.2.3 View Menu

The View Menu of the Status Logger Viewer is shown in Figure 4–27, and its options are described in the following sections.
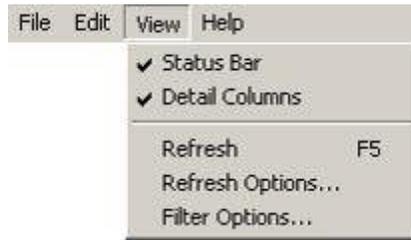
Figure 4–27 – View Menu

4.3.3.2.3.1 Status Bar

This option allows the operator to toggle the Status Bar display at the bottom of the Viewer window on or off.

4.3.3.2.3.2 Detail Columns

This option allows the operator to toggle the display of detail columns in the Viewer window on or off. The detail columns are the Event Description, Event ID, and Code columns.

4.3.3.2.3.3 Refresh

This option forces an immediate update of the Viewer display, as opposed to waiting for the automatic update that occurs at a specified time interval. **F5** serves as a shortcut to this menu option.

4.3.3.2.3.4 Refresh Options

This option causes the dialog shown in Figure 4–28 to display, allowing the operator to specify whether or not they want the SL Viewer to automatically update/refresh the content that it displays, and if so, how often.

Figure 4–28 – Refresh Options

4.3.3.2.3.5 Filter Options

This option allows the operator to filter the display in the Viewer using the dialog shown in Figure 4–29
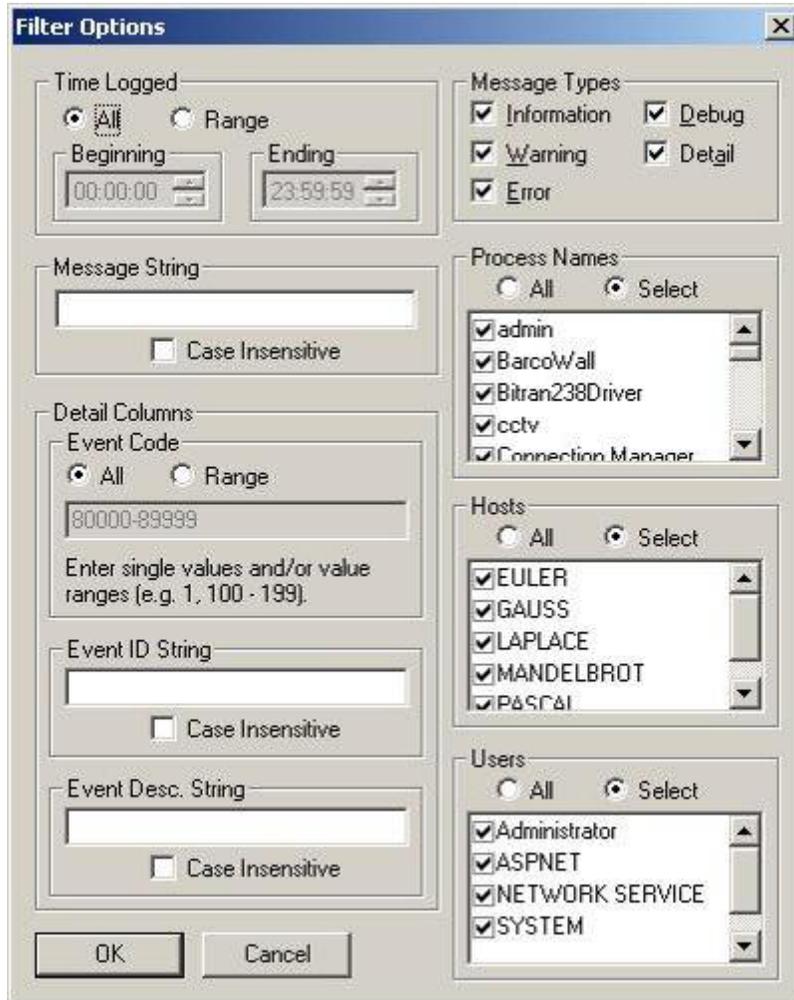
Figure 4–29 – Filter Options

Within this dialog, the operator is able to select the following SL Viewer filter options:

- Either ignore the time that a specific message was logged or use a specific time range.
- Show messages containing a particular string, and specify whether or not the search is case-sensitive.
- Either ignore the event code for messages or search for messages with event codes within a specific range.
- Show messages containing a particular event ID, and specify whether or not the search is case-sensitive.
- Show messages containing a particular event description, and specify whether or not the search is case-sensitive.
- Select the types of messages to display based on message priority level.
- Either ignore process names or specify processes of interest.
- Either ignore host computer names or specify computers of interest.
- Either ignore operators or specify operators of interest.

Note that when an option is ignored above, the option is not used for filtering; therefore all items within that category are displayed. The operator may press the **OK** button to apply the filter, or **Cancel** to remove the dialog.

4.3.3.2.4 Help Menu

The Edit Menu of the Status Logger Viewer is shown in Figure 4–30, and its options are described in the following sections.
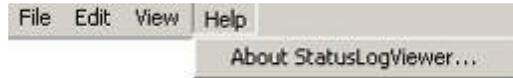
Figure 4–30 – Help Menu

4.3.3.2.4.1 About StatusLogViewer

Select this menu option to view a dialog containing Status Logger Viewer version and copyright information.

4.4 Data Administration with Administrative Editor

The Administrative Editor is actually a collection of numerous editors allowing the System Administrator to manipulate operator and equipment data in the database. Specifically, the Administrative Editor application allows administrators to edit the following categories of information:

- AVL/RR
  - Add / Edit / Delete Availability Statuses
  - Add / Edit / Delete Beats
  - Add / Edit / Delete Radios
  - Add / Remove Telephone Numbers
  - Edit Vehicle Agencies
  - Add / Edit / Delete Vehicle Operators
  - Add / Edit / Delete Vehicles
- CCTV/Video Switching
  - Add / Edit / Delete cameras.
  - Add / Edit / Delete video destinations.
  - Add / Edit / Delete video sources.
- Data Archive
  - Edit Data Archive properties
- DMS:
  - Add / Delete approved words.
  - Edit Connection Types
  - Add / Edit / Delete Fonts
  - Add / Delete Manufacturers
  - Add / Delete Polling Process Names
  - Add / Edit / Delete Dynamic Message Signs.
- Event Management
  - Add / Edit / Delete Activity Types

- o Add / Edit / Delete Agencies
- o Add / Modify / Delete Agency Contacts
- o Add / Edit / Delete Comment Types
- o Add / Edit / Delete Event Status Types
- o Edit Event Types (modify sort order)
- o Add / Edit / Delete Injury Types
- o Add / Edit / Delete Organizations
- o Location Configuration
    - Add / Modify / Delete Locations
    - Add / Edit / Delete Counties
    - Add / Edit / Delete Lane Maps
    - Add / Edit / Delete Lane Types
    - Add / Edit / Delete Reference Points
    - Add / Edit Roadways
- o Add / Edit / Delete Mailing Lists
- o Delete / Add Mailing List Contacts
- o Add / Edit / Delete Procedural Errors
- o Response Plans
    - Add / Edit / Delete Abbreviations
    - Add / Edit / Delete Device Templates
    - Add / Edit / Delete Message Templates
- o Vehicle Tracking
    - Add / Edit / Delete Colors
    - Add / Edit / Delete States
    - Add / Edit / Delete Vehicle Makes
    - Add / Modify / Delete Vehicle Models
    - View Vehicle Types
- o View Weather Conditions (set as default)
- Express Lanes:
    - o Edit System Configuration.
    - o Add / Edit / Delete Holidays/Special Events.
    - o Add / Edit / Delete Segments.
    - o Add / Edit / Delete Daily Rate Schedules.
    - o Add / Edit / Delete Segment/Rate Schedules.
    - o Add / Edit / Delete Toll Rate Signs.
- HAR
    - o Add / Edit / Delete Highway Advisory Radios.
- IDS
    - o Add / Edit / Delete CitiLog Cameras
- IMS
    - o Add / Edit / Delete equipment.
    - o Add / Edit / Delete equipment locations.
    - o Add / Edit / Delete vendors.
- Reporting
    - o Add / Edit / Delete Report Groups
    - o Add / Edit / Delete Reports

- Ramp Metering
  - o Configure fuzzy lanes.
  - o Configure fuzzy parameters.
  - o Add / Edit / Delete Ramp Meter controllers.
  - o Add / Edit / Delete Ramp Meter special event plans.
  - o Add / Edit / Delete Ramp Meter group data.
- RWIS
  - o Add / Edit / Delete Poll Cycles
  - o Add / Edit / Delete RWIS stations.
- Safety Barrier
  - o Add / Edit / Delete Safety Barrier stations.
- Scheduled Actions
  - o Add / Edit / Delete schedules
  - o Add / Edit / Delete sequences
- TSS
  - o Add / Edit / Delete Alarm Thresholds.
  - o Map Detectors to the links and lanes they occupy.
  - o Add / Edit / Delete Traffic Detectors.
  - o Add / Edit / Delete Detector Thresholds.
  - o Add / Edit / Delete Poll Cycles
  - o Edit System Configuration
- Travel Times
  - o Add / Edit / Delete travel time alternate routes.
  - o Add / Edit / Delete travel time destinations.
  - o Edit travel time device templates.
  - o Add / Edit / Delete travel time matching routes.
  - o Add / Edit / Delete travel time message templates.
  - o Modify travel time options.
  - o Add / Edit / Delete travel time links.
- VSL
  - o Add / Edit / Delete Groups
  - o Add / Edit / Delete VSL Plans
  - o Modify Zone Settings
- Miscellaneous
  - o Add / Delete Center Information.
  - o Add / Remove Device Drivers
  - o Add Manufacturers
- User Management
  - o Add / Edit / Delete Permission Groups.
  - o Add / Edit / Delete Operator Workstations
  - o Calculate Password Hashes
  - o Add / Edit / Delete Users.

The Administrative Editor is started by opening a web browser and navigating to the appropriate Uniform Resource Locator (URL); it is closed by simply closing the browser window. Figure 4–31 depicts the user interface of the Administrative Editor upon startup. The list frame contains

various categories of editors that may be chosen. The main editor frame will be blank until a link in the editor list frame is followed.
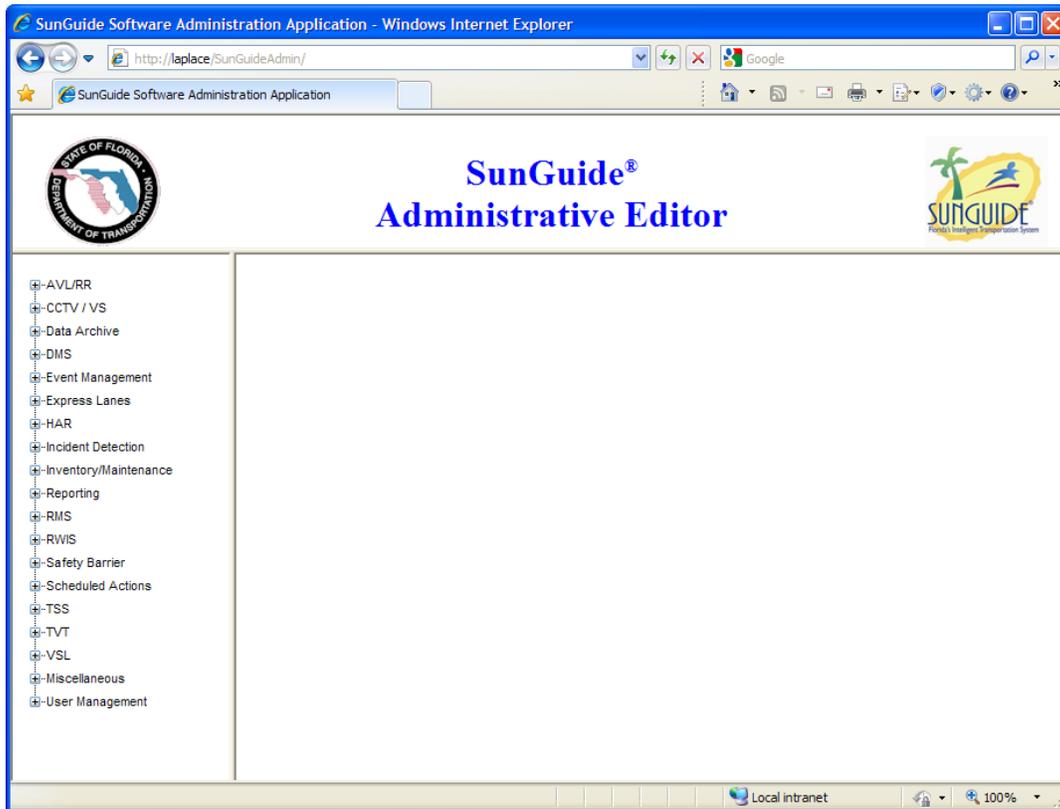
Figure 4–31 – Administrative Editor after Startup

On the various editor pages described in the sections below, the Administrative Editor uses a green background on fields that are read-only; editable fields use the same color background as the rest of the page. Informational and error messages are logged to the Status Logger, and are also displayed on the editor page where appropriate.

4.4.1 AVL/RR

The following sections describe the AVL/RR Administrator Editor functionality.

4.4.1.1 Availability Statuses

The Availability Statuses Editor (see Figure 4–32) enables the system administrator to manipulate AVL/RR status values in the database. This editor is opened by expanding the AVL/RR element of the Editor List Frame, then clicking on **Availability Statuses**. The Administrative Editor will query the database and retrieve a list of statuses currently in the database.

Figure 4–32 – AVL/RR Availability Statuses List

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified. The **Edit** screen is shown in Figure 4–33.

The **Name** can only be edited when the status is first added, in edit mode the **Status Classification** can be modified as well as the **Dispatch Category** and the **Billable** Flag. Selecting **Save and Exit** will store to the database, **Cancel** will return to the list screen.
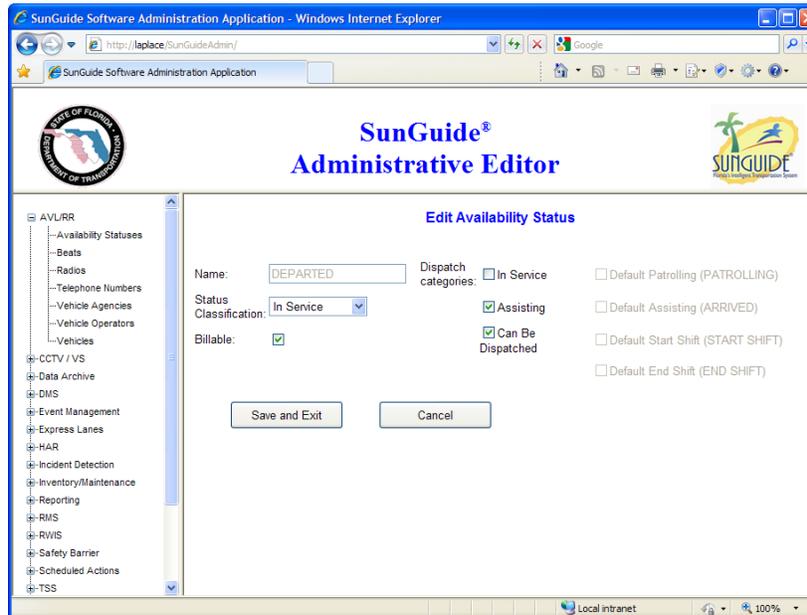
Figure 4–33 – Edit AVL/RR Availability Status

4.4.1.2 Beats

The Beats Editor (see Figure 4–34) enables the system administrator to manipulate AVL/RR Beats in the database. This editor is opened by expanding the AVL/RR element of the Editor List Frame, then clicking on **Beats**. The Administrative Editor will query the database and retrieve a list of beats currently in the database.

Figure 4–34 – AVL/RR Beats List

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified. The **Edit** screen is shown in Figure 4–35.

The **Name** can only be edited when the beat is first added, in edit mode the **Description** can be modified as well as the **Associated Geo-fence** (which must have been created in the Geo-fence Editor). The Entry Type can also be modified. Selecting **Save and Exit** will store to the database, **Cancel** will return to the list screen.
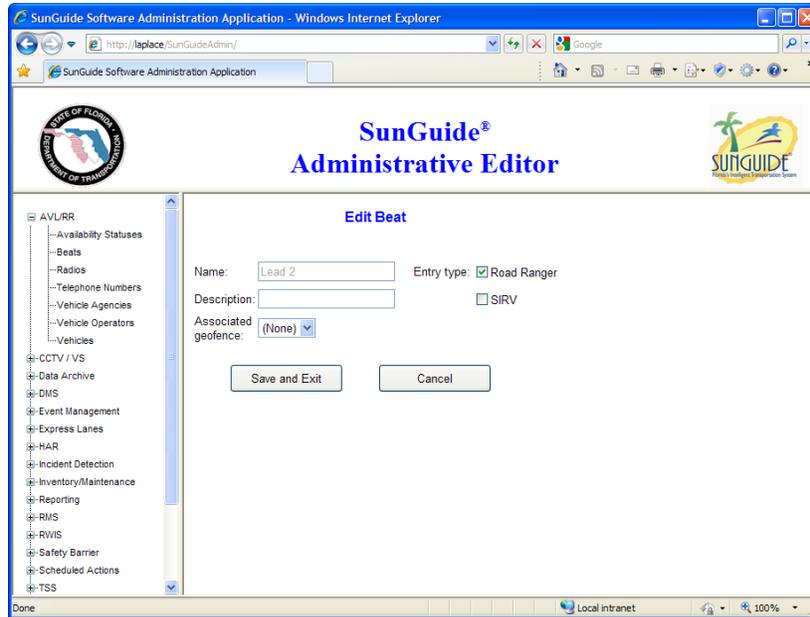
Figure 4–35 – Edit AVL/RR Beats

4.4.1.3 Radios

The Radios Editor (see Figure 4–36) enables the system administrator to manipulate AVL/RR radios in the database. This editor is opened by expanding the AVL/RR element of the Editor List Frame, then clicking on **Radios**. The Administrative Editor will query the database and retrieve a list of radios currently in the database.

Figure 4–36 – Edit AVL/RR Radios List

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified. The **Edit** screen is shown in Figure 4–37.

The **Name** can only be edited when the radio is first added, in edit mode the **Entry Type** is the only field that can be modified. Selecting **Save and Exit** will store to the database, **Cancel** will return to the list screen.

Figure 4–37 – Edit AVL/RR Radios

4.4.1.4 Telephone Numbers

The Telephone Numbers Editor (see Figure 4–38) enables the system administrator to manipulate AVL/RR telephone numbers in the database. This editor is opened by expanding the AVL/RR element of the Editor List Frame, then clicking on **Telephone Numbers**. The Administrative Editor will query the database and retrieve a list of numbers currently in the database. The editing screen will allow selection of a number and then the **Remove Telephone** button will be enabled. The administrators can **Add a New Telephone Number** by entering a number and then selecting **Add Telephone**.
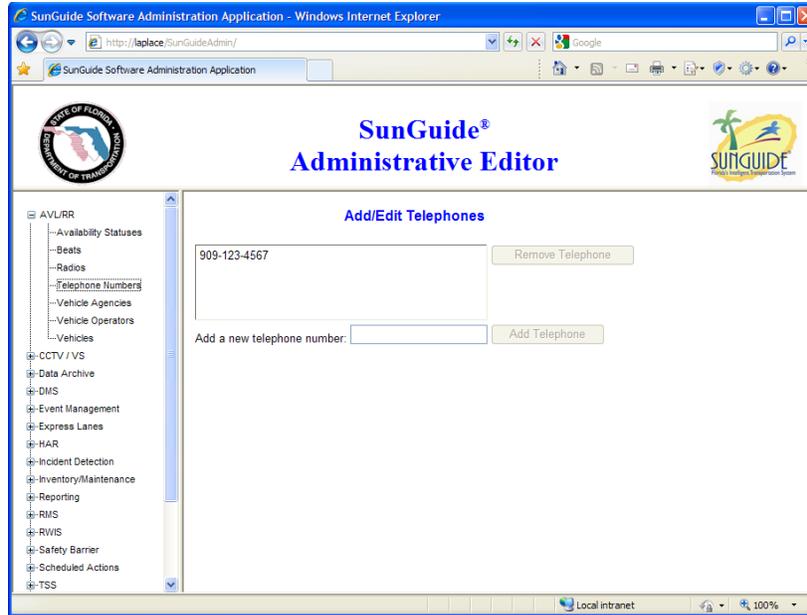
Figure 4–38 – AVL/RR Telephone Numbers

4.4.1.5 Vehicle Agencies

The Vehicle Agencies Editor (see Figure 4–39) enables the system administrator to manipulate AVL/RR vehicle operators in the database. This editor is opened by expanding the AVL/RR element of the Editor List Frame, then clicking on **Vehicle Agencies**. The Administrative Editor will query the database and retrieve a list of agencies currently in the database.

Figure 4–39 – AVL/RR Vehicle Agencies List

Agencies cannot be added or deleted; once a name is selected in the list, the **Edit** button is enabled. Upon selecting **Edit**, the page will redirect to another page allowing detailed data to be modified. The **Edit** screen is shown in Figure 4–40.

The **Name** cannot be edited; in edit mode the **Monitor Stop Time** and **Allowed stop time** can be modified. Selecting **Save and Exit** will store to the database, **Cancel** will return to the list screen.
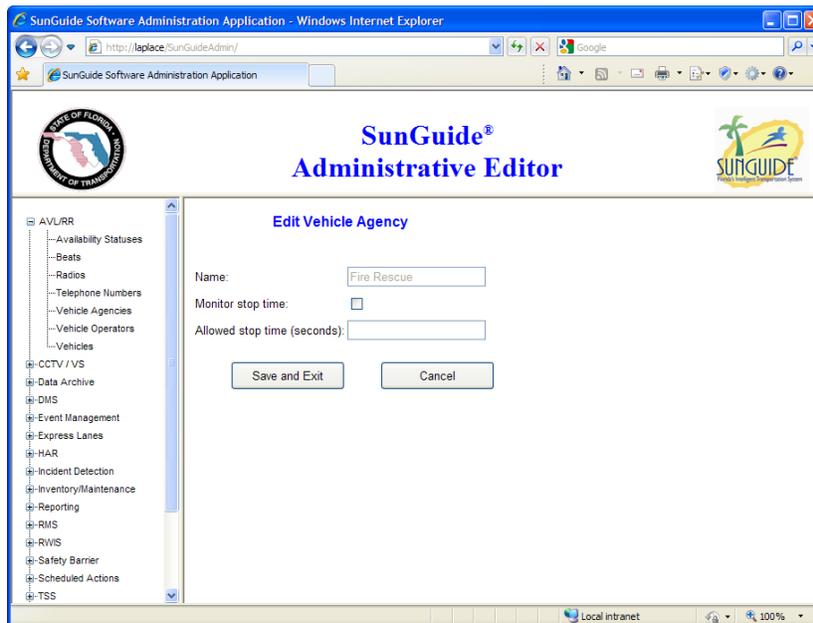
Figure 4–40 – Edit AVL/RR Vehicle Agencies

4.4.1.6 Vehicle Operators

The Vehicle Operators Editor (see Figure 4–41) enables the system administrator to manipulate AVL/RR vehicle operators in the database. This editor is opened by expanding the AVL/RR element of the Editor List Frame, then clicking on **Vehicle Operators**. The Administrative Editor will query the database and retrieve a list of operators currently in the database.

Figure 4–41 – AVL/RR Vehicle Operators List

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified. The **Edit** screen is shown in Figure 4–42.

The **Name** can only be edited when the operator is first added, in edit mode the **First Name**, **Last Name**, **Password** (must be entered twice) and with the **Entry Type** can be modified. Selecting **Save and Exit** will store to the database, **Cancel** will return to the list screen.
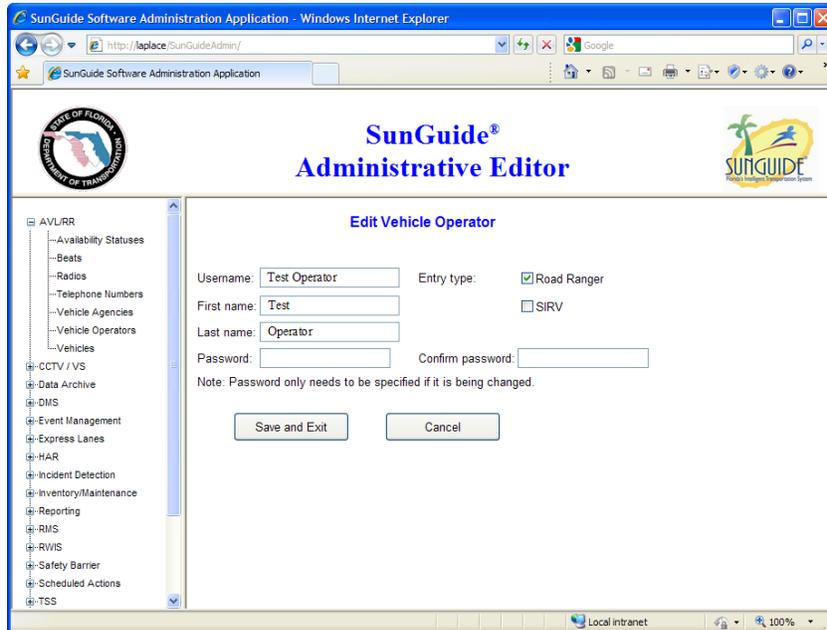
Figure 4–42 – Edit AVL/RR Vehicle Operators

4.4.1.7 Vehicles

The Vehicles Editor (see Figure 4–43) enables the system administrator to manipulate AVL/RR vehicle values in the database. This editor is opened by expanding the AVL/RR element of the Editor List Frame, then clicking on **Vehicles**. The Administrative Editor will query the database and retrieve a list of vehicles currently in the database.

Figure 4–43 – AVL/RR Vehicles List

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified. The **Edit** screen is shown in Figure 4–44.

The **Vehicle Name** can only be edited when the vehicle is first added, in edit mode the **Communications Driver** (this is the SunGuide driver communication to the AVL/RR end application) can be modifying which **Vehicle Agency** the vehicle is assigned to. The **Vehicle Type** and **Entry Type** can be modified and the **AVL Only** flag can be sent to indicate that the vehicle will not provide any event information. The **IP Address** and **Port number** can also be modified. Selecting **Save and Exit** will store to the database, **Cancel** will return to the list screen.
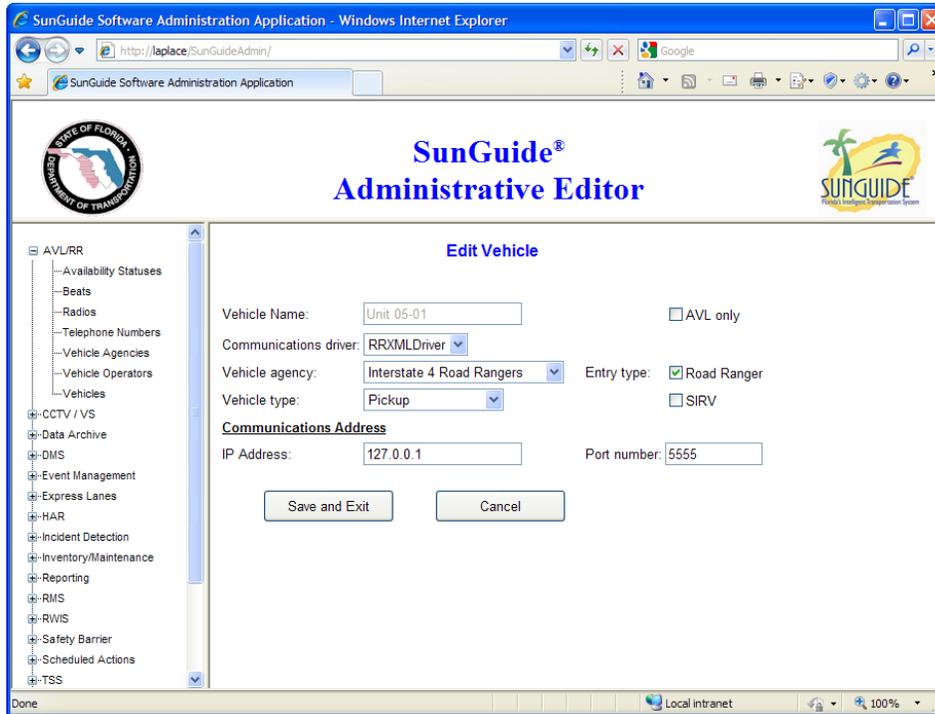
Figure 4–44 – Edit AVL/RR Vehicles

4.4.2 CCTV/Video Switch Editor

The following sections describe the editors that are CCTV and Video Switch related.

4.4.2.1 Camera Editor

The Camera Editor (see Figure 4–45) enables the system administrator to manipulate camera (i.e., video source) data in the database. This editor is opened by expanding the Closed Circuit Television (CCTV)/Video Switch (VS) element of the Editor List Frame, then clicking on **Cameras**. The Administrative Editor will query the database and retrieve a list of cameras currently in the database.
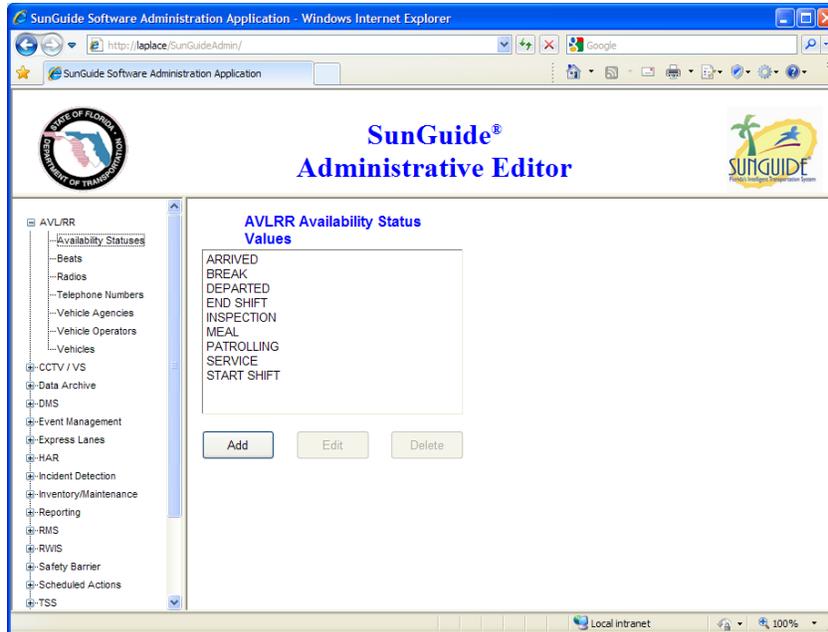
Figure 4–45 – Camera List

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified. The **Add** screen is shown in Figure 4–46.

Many of the dropdowns are populated with values from the database. Changes to selections for Address Types 1 and 2 cause dynamic changes to the page below these fields – labels and associated fields will be displayed based on Address Type 1 and 2 selections. The Camera Name field is editable only when adding a new camera.
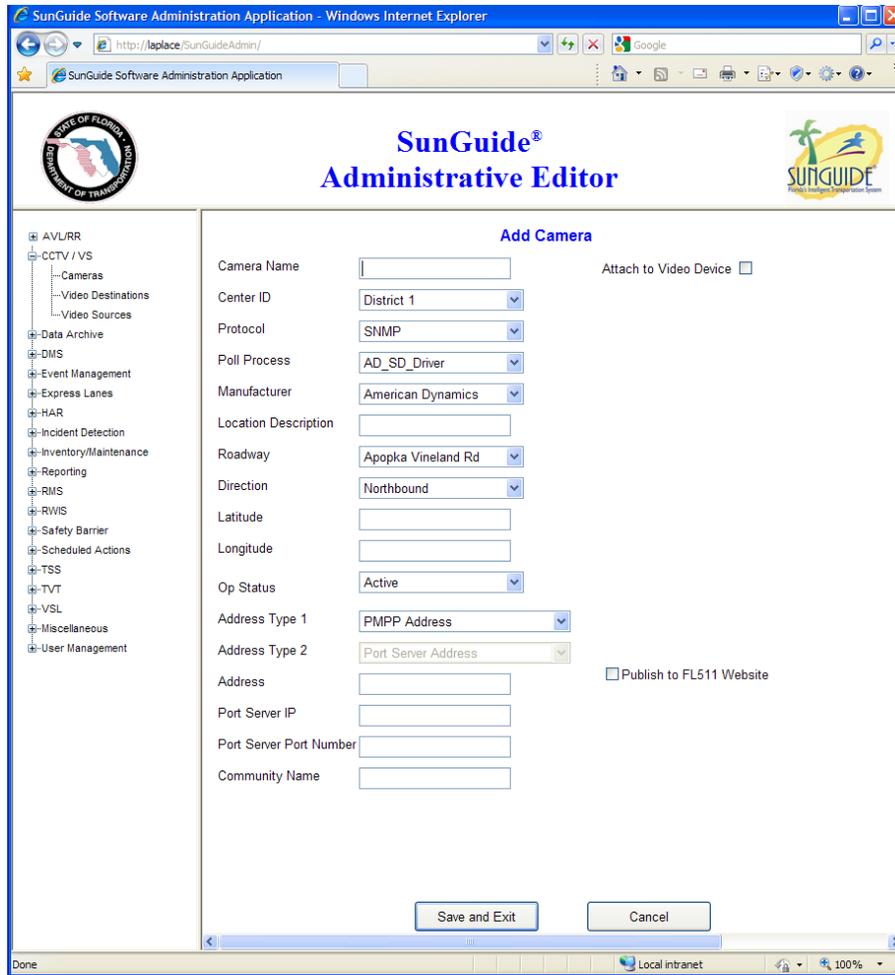
Figure 4–46 – Add Camera

The checkbox labeled "Publish Link to FL511 Website" on the various CCTV screens can be used to indicate whether or not the data should be displayed on the FL511 Website by the FL511 web application.

Port Server IP and Port Server Port Number are the IP address and port number for the camera "pan-tilt-zoom" control. This internet protocol number and port numbers are often of the port server to which the camera is attached.

Cameras may be attached to video devices. If they are not, the camera's address must be stored in the database. Figure 4–47 shows the camera editor page when no device is attached.
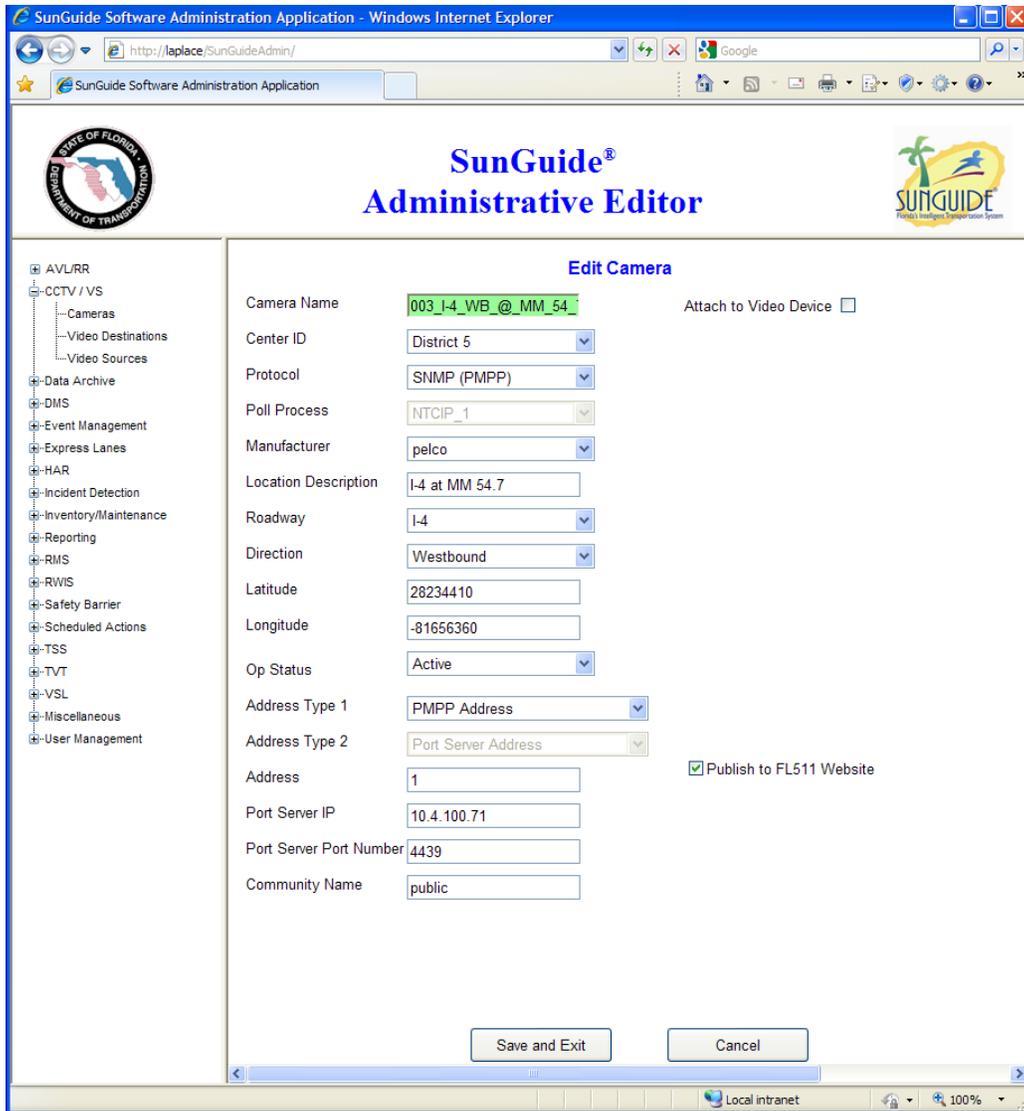
Figure 4–47 – Edit Camera

If the camera is attached to a video device, the administrator must specify whether this device is an encoder or a switch. Figure 4–48 shows the page when an encoder is attached.

Figure 4–48 – Edit Camera with Encoder

Operations may be cancelled without altering the database by clicking on the **Cancel** button. Alternatively, the selections on the screen can be submitted to the database via selection of the **Save and Exit** button. When saving, required fields will be validated, and error messages will be displayed on the page when necessary. Users will be notified of errors encountered in accessing the database via informational messages sent to the Status Logger; messages will also appear on the page when needed. Critical errors will cause this page to remain in focus, forcing the user to manually cancel the operation. Non-critical errors as well as successful database access will result in browser redirection to the previous list page. If a new camera was created, the user will see the name of this new camera in the list on the list page.

4.4.2.2 Video Destinations

The Video Destination Editor (Figure 4–49) enables the system administrator to manipulate video destination data in the database. This editor is opened by expanding the CCTV/VS element of the Editor List Frame, then clicking on **Video Destinations**. The Administrative Editor will query the database and retrieve a list of the video destinations currently in the database.
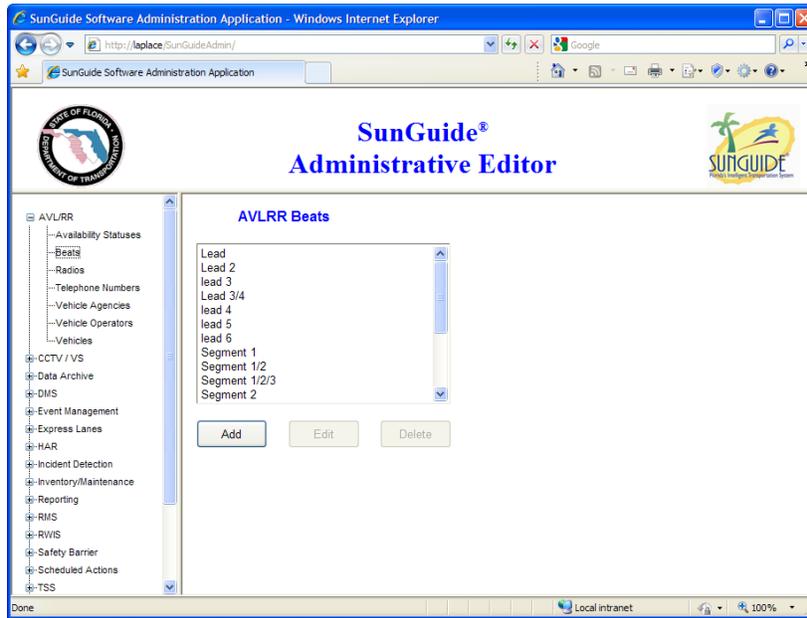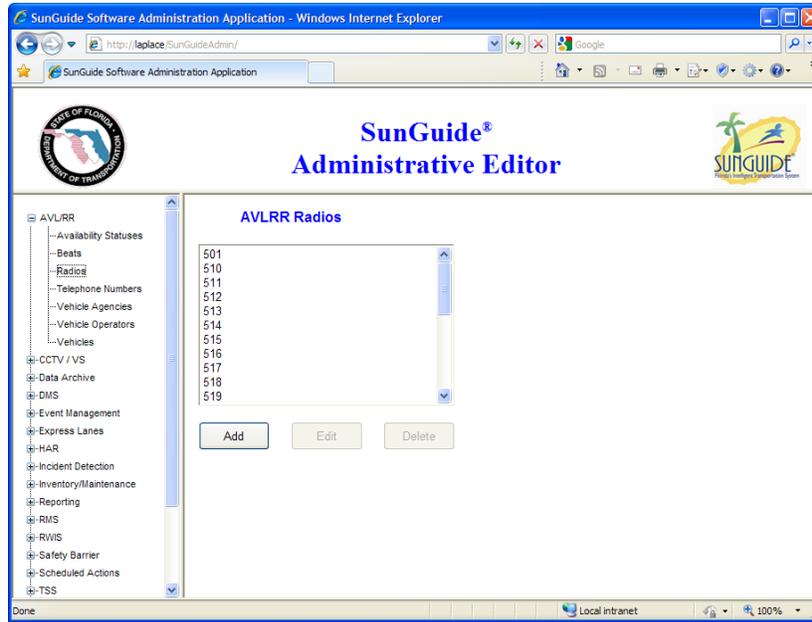
Figure 4–49 – Video Destination List

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified. The **Add** and **Edit** options both route to the same page, with only a few differences in the display.

Figure 4–50 shows a decoder as the video device type, along with encoder-related fields. Selecting a device type will cause the display to change dynamically.
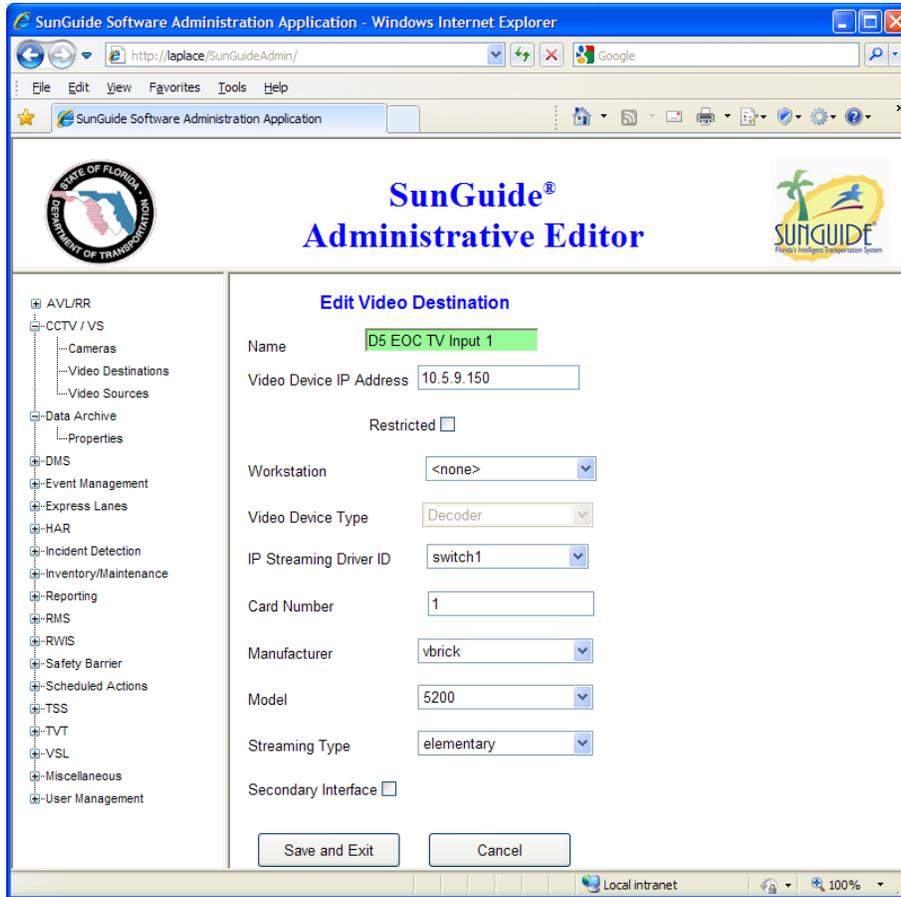
Figure 4–50 – Edit Video Destination

The Manufacturer and Model dropdowns are populated with values from the database. Selection of a manufacturer causes the model list to be re-populated with values applicable to the current manufacturer selection. The Name field is editable only when adding a new video destination.

Operations may be cancelled without altering the database by clicking on the **Cancel** button. Alternatively, the selections on the screen can be submitted to the database via selection of the **Save and Exit** button. When saving, required fields will be validated, and error messages will be displayed on the page when necessary. Users will be notified of errors encountered in accessing the database via informational messages sent to the Status Logger; messages will also appear on the page when needed. Critical errors will cause this page to remain in focus, forcing the user to manually cancel the operation. Non-critical errors as well as successful database access will result in browser redirection to the previous list page. If a new video destination was created, the user will see the name of this new destination in the list on the list page.

4.4.2.3 Video Sources Editor

The Video Source Editor (Figure 4–51) enables the system administrator to manipulate video sources data in the database. This editor is opened by expanding the CCTV/VS element of the Editor List Frame, then clicking on **Video Sources**. The Administrative Editor will query the database and retrieve a list of the video sources currently in the database.
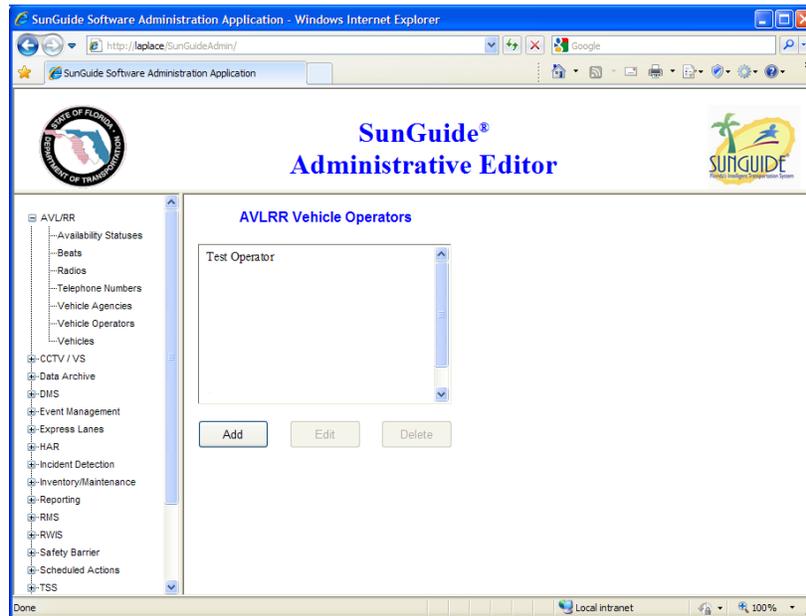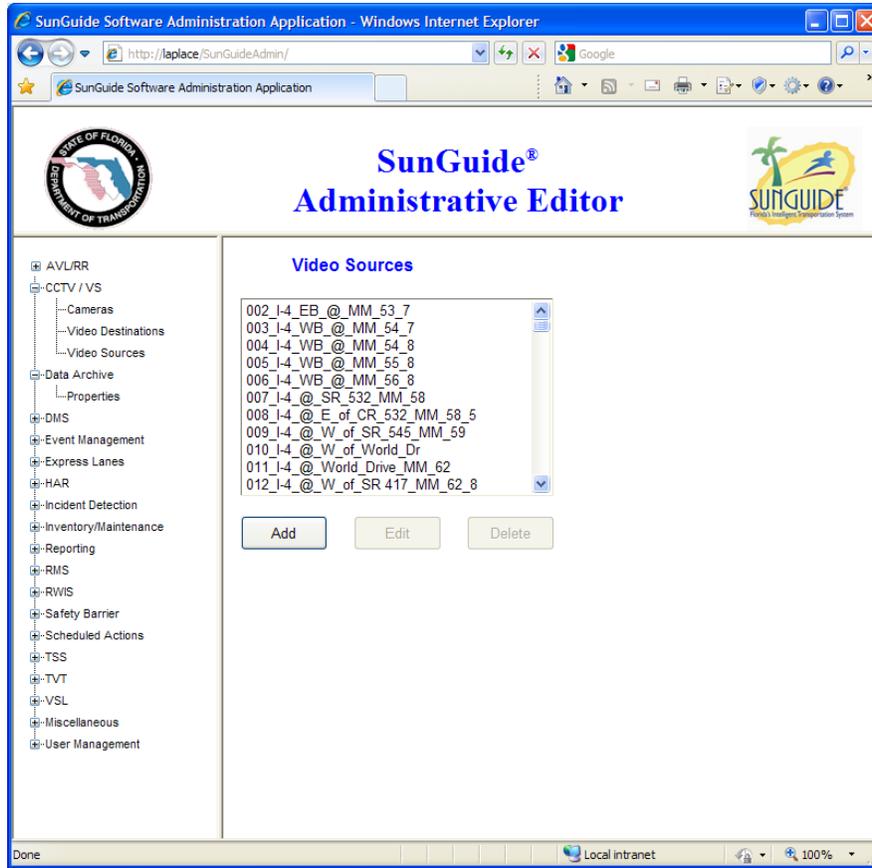
Figure 4–51 – Video Sources List

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified. The **Add** and **Edit** options both route to the same page, with only a few differences in the display.

Figure 4–52 shows an encoder as the video device type, along with encoder-related fields. Selecting a video device type will cause the display to change dynamically.
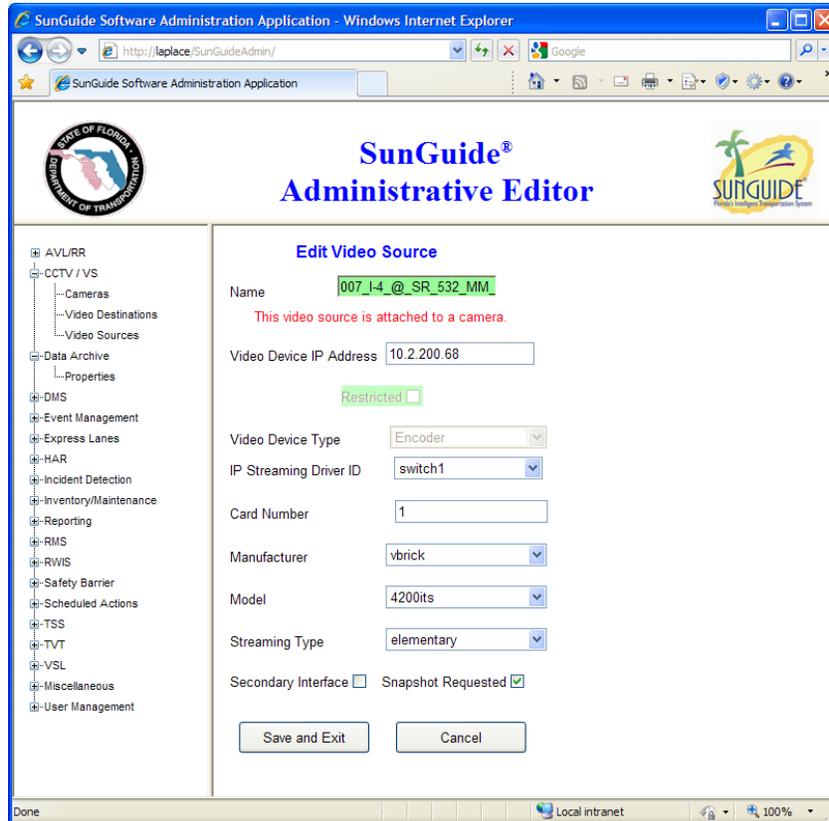
Figure 4–52 – Edit Video Source

The Manufacturer and Model drop downs are populated with values from the database. Selection of a manufacturer causes the model list to be re-populated with values applicable to the current manufacturer selection. The Name field is editable only when adding a new video destination.

Operations may be cancelled without altering the database by clicking on the **Cancel** button. Alternatively, the selections on the screen can be submitted to the database via selection of the **Save and Exit** button. When saving, required fields will be validated, and error messages will be displayed on the page when necessary. Users will be notified of errors encountered in accessing the database via informational messages sent to the Status Logger; messages will also appear on the page when needed. Critical errors will cause this page to remain in focus, forcing the user to manually cancel the operation. Non-critical errors as well as successful database access will result in browser redirection to the previous list page. If a new video destination was created, the user will see the name of this new destination in the list on the list page.

4.4.2.4 Adding Video Codecs

The video switch driver looks into the IpVideoDevices.xml file to determine the compatibility between encoders and decoders. Video codecs can be added by editing this file. The configuration file has embedded comments about how entries are to be constructed. The comments do assume the reader is familiar with SNMP, IP video switching, and the capabilities of the specific devices being defined. There is an entry for each combination of encoder and

decoder make/model/cardNumber/secondaryInterface values. There is an optional xml node in the decoderStatus list that specifies Stream Type. The presence of this node indicates that the specified stream type is the only compatible type. After this file is edited, the video switching, CCTV subsystem and CCTV drivers should be restarted for the changes to take effect.

4.4.3 Data Archive Editor

The Data Archive Editor enables the system administrator to manipulate properties of the Data Archive subsystem. This editor is opened by expanding the Data Archive element of the Editor List Frame, then clicking on **Properties** (see Figure 4–53). The Administrative Editor will query the database and retrieve a list of the Data Archive properties currently in the database.

Figure 4–53 – Data Archive Properties

Once a name is selected in the list, the **Edit** buttons is enabled. Upon selecting **Edit**, the page will redirect to another page allowing properties to be modified. Figure 4–54 shows an example of modifying a property. Once the administrator modifies the selected property, the information is stored to the database by pressing the **Save and Exit** button.
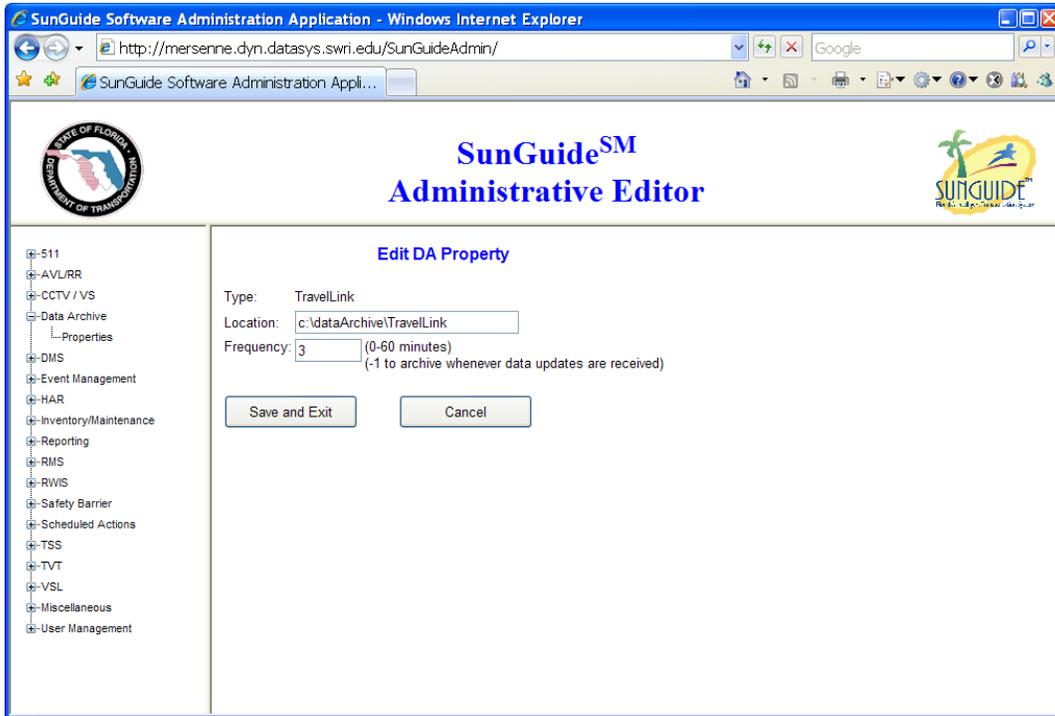
Figure 4–54 – Edit Data Archive Property

4.4.4 DMS Editor

The following sections describe the editors that are DMS related.

4.4.4.1 Approved Words

The Approved Word Editor (see Figure 4–55) enables the system administrator to add or remove approved words for DMS messages to/from the database. This editor is opened by expanding the DMS element of the Editor List Frame, then clicking on **Approved Words**. The Administrative Editor will query the database and retrieve a list of approved words currently in the database.
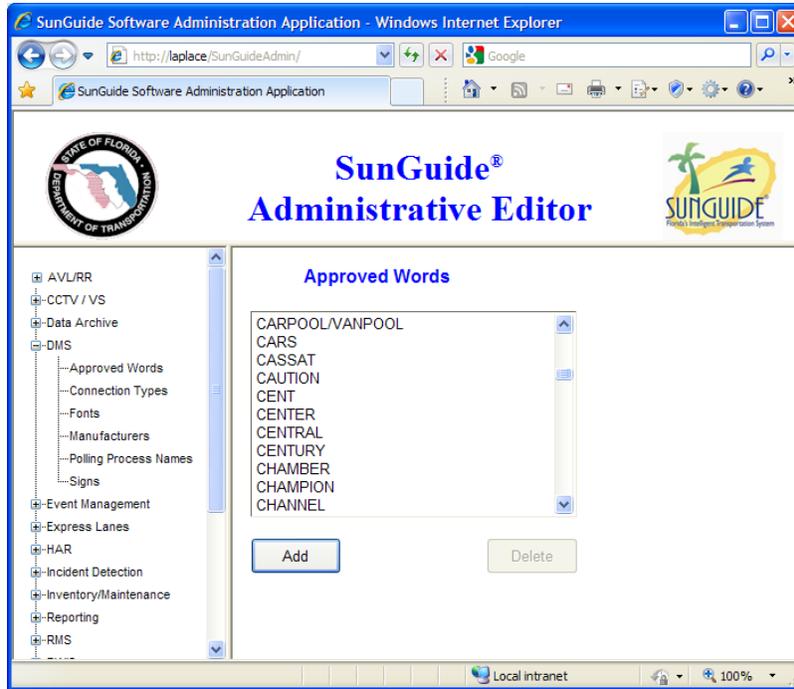
Figure 4–55 – Approved Word List

The **Add** button is always enabled; once a word is selected in the list, the **Delete** button is also enabled. Upon selecting **Add**, the page will redirect to another page (see Figure 4–56) allowing detailed data to be entered.
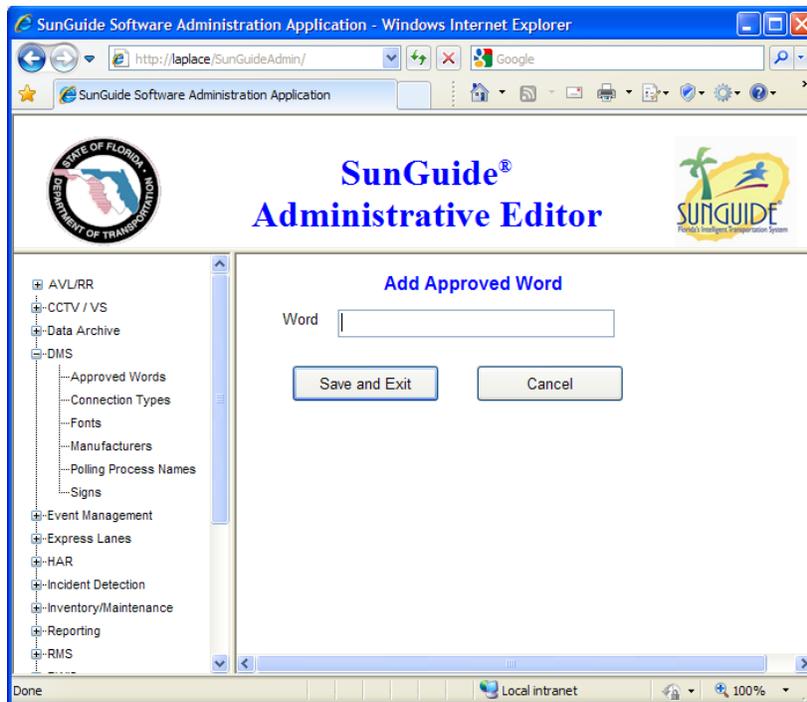
Figure 4–56 – Edit Approved Word

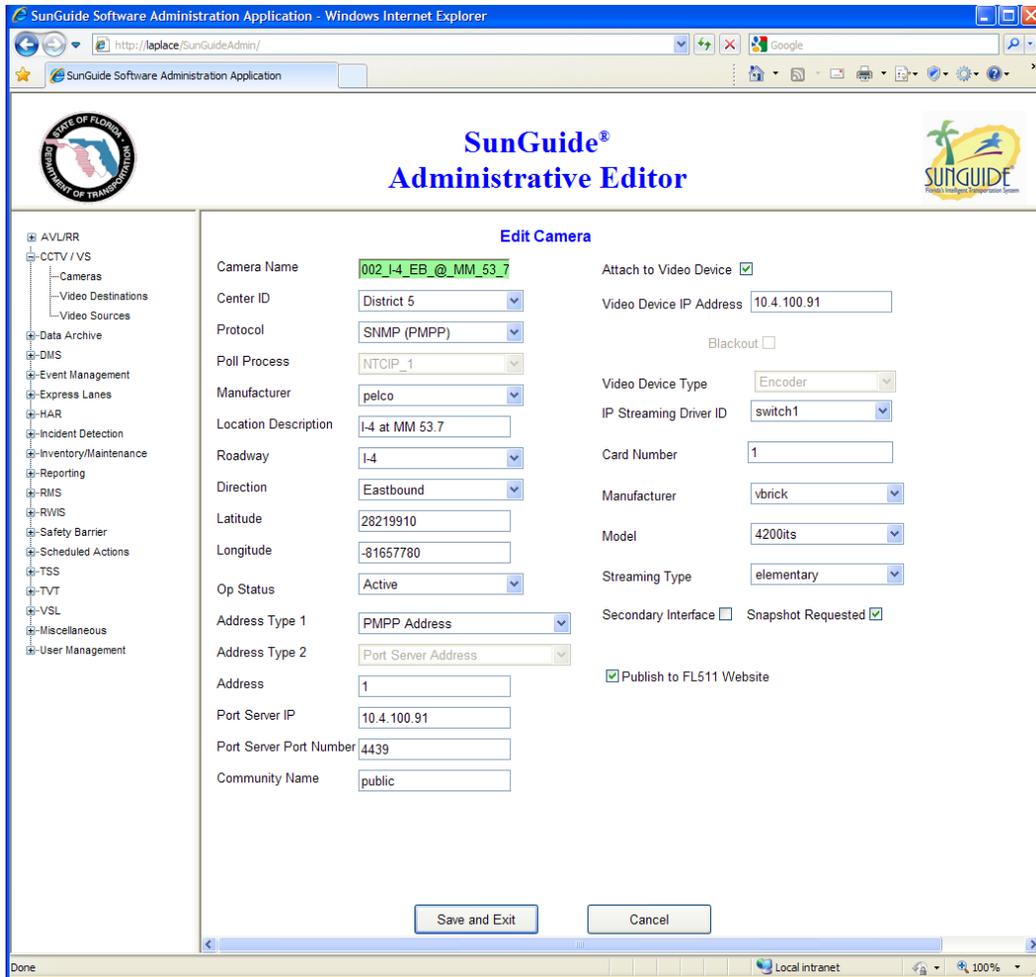The only operation the administrator may perform here is to enter a new word. This operation may be cancelled without altering the database by clicking on the **Cancel** button. Alternatively, the data on the screen can be submitted to the database via selection of the **Save and Exit** button. When saving, the required word field will be validated, and error messages will be displayed on the page when necessary. Users will be notified of errors encountered in accessing the database via informational messages sent to the Status Logger; messages will also appear on the page when needed. Critical errors will cause this page to remain in focus, forcing the user to manually cancel the operation. Non-critical errors as well as successful database access will result in browser redirection to the previous list page. If a new word was created, the user will see the name of this new word in the list on the list page.

4.4.4.2 Connection Type Editor

Connection types no longer have any values which are configured in SunGuide. This section will be removed in an upcoming release.

4.4.4.3 Font Editor

The Font Editor (see Figure 4–57) enables the system administrator to manipulate fonts used by Dynamic Message Signs. This editor is opened by expanding the DMS element of the Editor List Frame, then clicking on Fonts. The Administrative Editor will query the database and retrieve a list of fonts currently in the database.
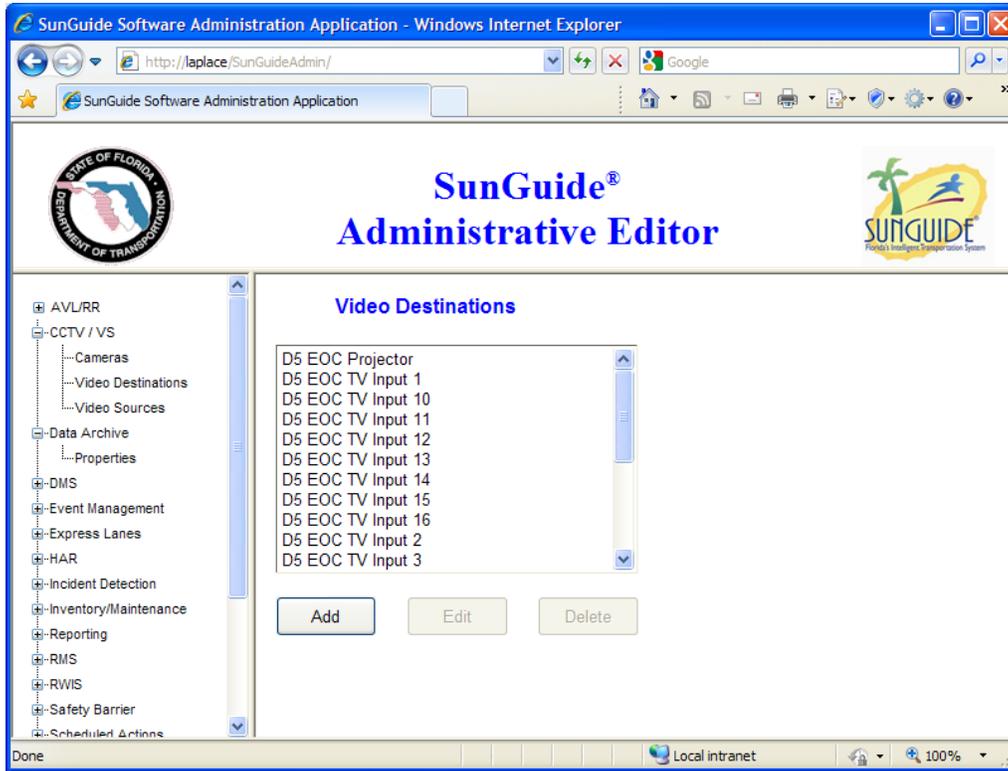

Figure 4–57 – Font List

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page (see Figure 4–58) allowing detailed data to be entered/modified. The **Add** and **Edit** options both open the same page, with only a few differences in the display.
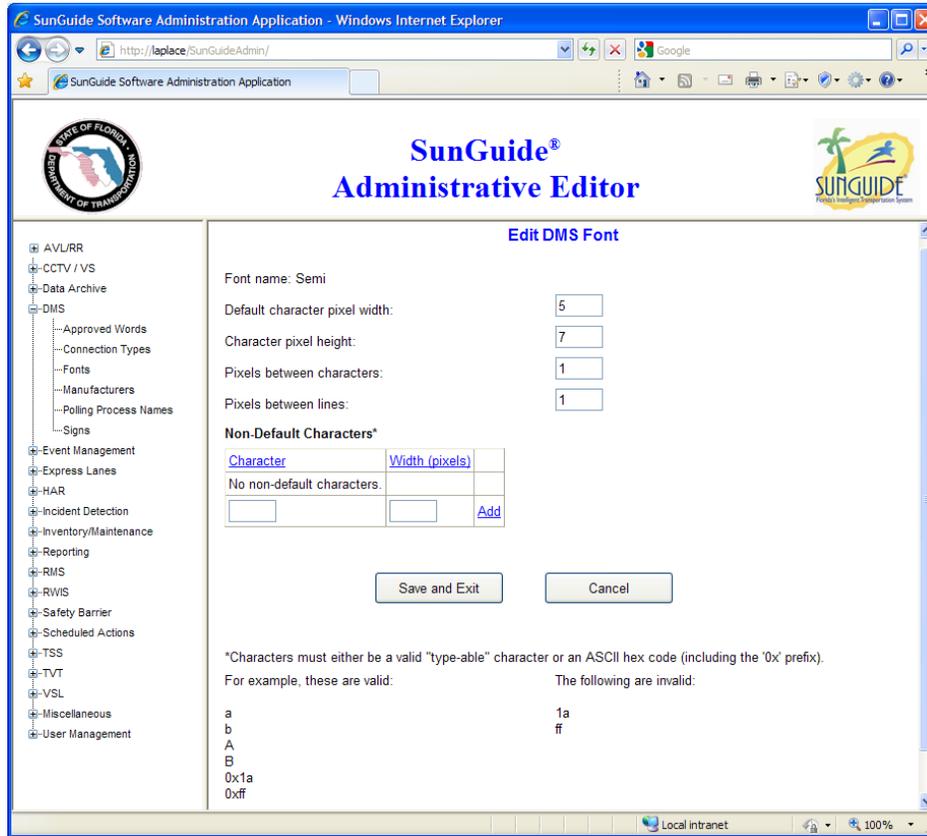
Figure 4–58 – Edit Font

The default width and height for characters in the font may be specified on this page, as well as the spacing between characters horizontally and lines vertically. All values are specified as pixels. For any characters which are wider or narrower than the default width, an entry in the Non-Default Characters table may be added by entering a character and its width into the last row and pressing the Add link. Existing entries in the table may be modified by clicking the Change Width link or deleted by clicking the Remove link.

4.4.4.4 Manufacturer Editor

The Manufacturer Editor (see Figure 4–59) enables the system administrator to manipulate manufacturers assigned to Dynamic Message Signs. This editor is opened by expanding the DMS element of the Editor List Frame, then clicking on Manufacturers. The Administrative Editor will query the database and retrieve a list of manufacturers currently in the database.
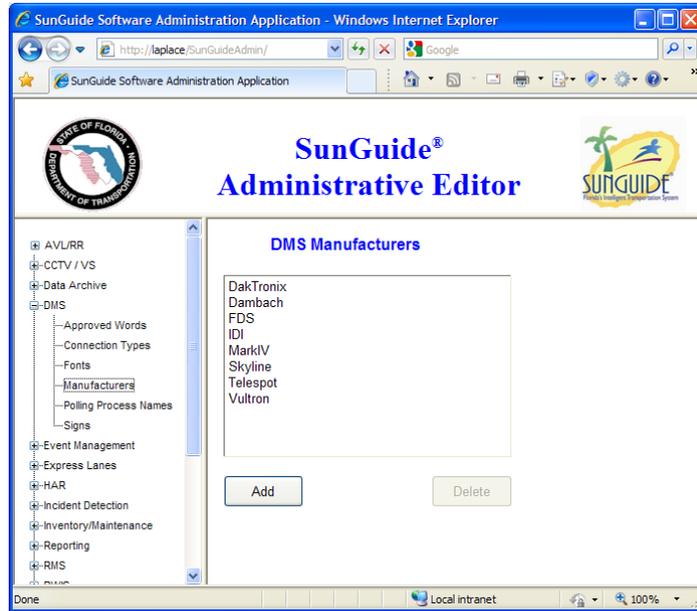
Figure 4–59 – Manufacturer List

The **Add** button is always enabled; once a name is selected in the list, the **Delete** button is also enabled. Manufacturers cannot be edited. Changes must be performed by removing the old entry and adding a new one. Upon selecting **Add**, the page will redirect to another page (see Figure 4–60) allowing a name to be entered.

Figure 4–60 – Add Manufacturer

4.4.4.5 Polling Process Name Editor

The Polling Process Name Editor (see Figure 4–61) enables the system administrator to manipulate driver names used by Dynamic Message Signs. This editor is opened by expanding the DMS element of the Editor List Frame, then clicking on Polling Process Names. The

Administrative Editor will query the database and retrieve a list of driver names currently in the database.
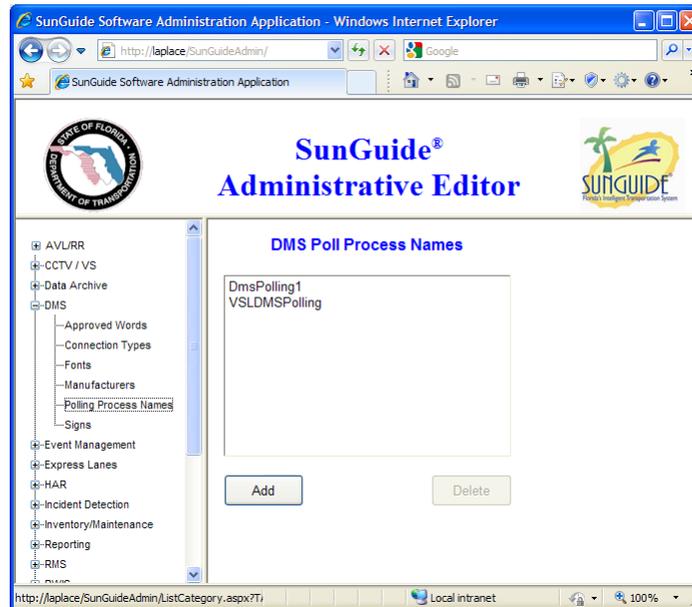
**Figure 4–61 – Polling Process List**

The **Add** button is always enabled; once a name is selected in the list, the **Delete** button is also enabled. Driver names cannot be edited. Changes must be performed by removing the old entry and adding a new one. Upon selecting **Add**, the page will redirect to another page (see **Error! Reference source not found.**Figure 4–62) allowing a name to be entered.
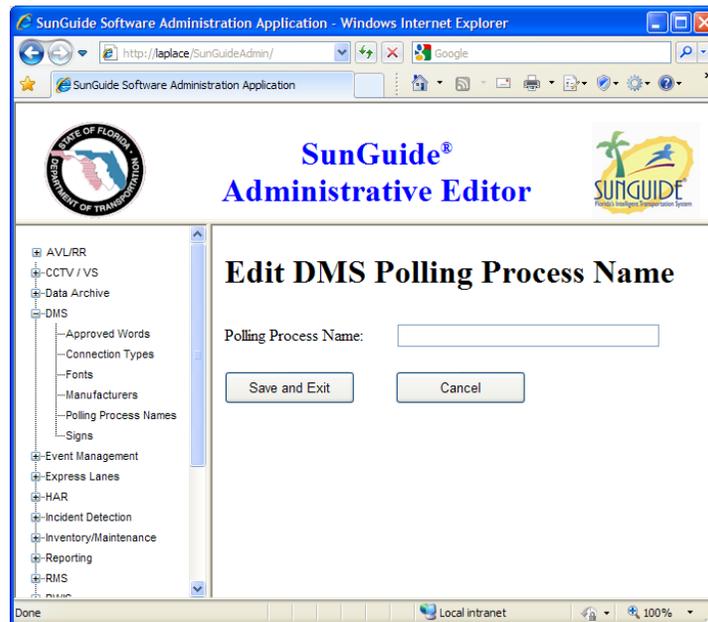
Figure 4–62 – Add Polling Process

4.4.4.6 Sign Editor

The Sign Editor (see Figure 4–63) enables the system administrator to manipulate Dynamic Message Sign (DMS) data in the database. This editor is opened by expanding the DMS element of the Editor List Frame, then clicking on **Signs**. The Administrative Editor will query the database and retrieve a list of signs currently in the database.

Figure 4–63 – Sign List

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page (see Figure 4–64) allowing detailed data to be entered/modified. The **Add** and **Edit** options both route to the same page, with only a few differences in the display.
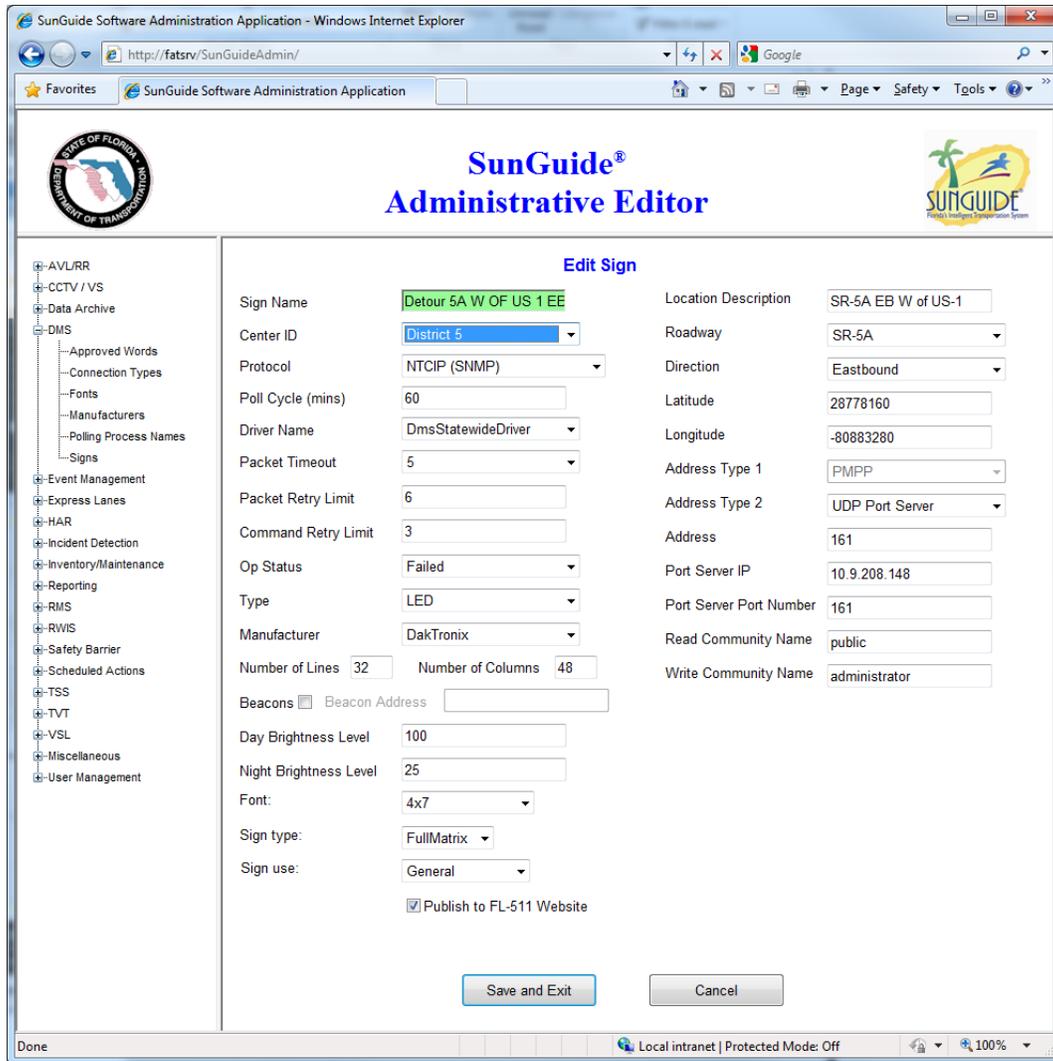
Figure 4–64 – Edit Sign

Many of the dropdowns are populated with values from the database. Changes to selections for Address Types 1 and 2 cause dynamic changes to the page below these fields – labels and associated fields will be displayed based on Address Type 1 and 2 selections. The Sign Name field is editable only when adding a new sign. The checkbox labeled "Publish Link to FL511 Website" can be used to indicate whether or not the data should be displayed on the FL511 Website by the FL511 web application.

Operations may be cancelled without altering the database by clicking on the **Cancel** button. Alternatively, the selections on the screen can be submitted to the database via selection of the **Save and Exit** button. When saving, required fields will be validated, and error messages will be displayed on the page when necessary. Users will be notified of errors encountered in accessing the database via informational messages sent to the Status Logger; messages will also appear on the page when needed. Critical errors will cause this page to remain in focus, forcing the user to manually cancel the operation. Non-critical errors as well as successful database access will result in browser redirection to the previous list page. If a new sign was created, the user will see the name of this new sign in the list on the list page.

4.4.5 Event Management Editor

The following sections describe the editors that are Event Management (EM) related.

4.4.5.1 Activity Types

The Activity Type editor (see Figure 4–65) enables the administrator to add, modify and delete Activity Types from the database. Activity Types are used for the description of activities that can be performed by Road Rangers and SIRV vehicles. The Activity Type editor is selected by expanding the Event Management element and clicking Activity Types.

The **Add** button is always enabled; once an activity types is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to the Activity Type Configuration page allowing detailed data to be entered/modified.
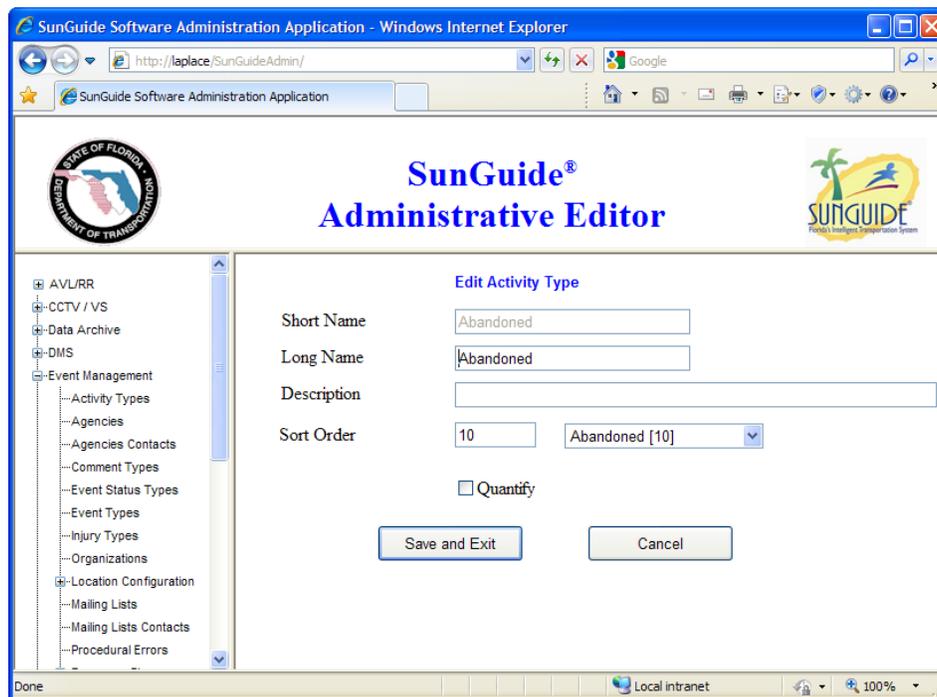
Figure 4–65 – Edit Activity Type

Each activity must have the following fields filled in:

- Short Name – unique name for the activity type (read only in edit mode)

- Long Name – display name for the activity type

- Description (optional) – additional description for the activity type

- Sort Order – number indicating the position of the activity type within the activity list. The activity types and their order are displayed in the dropdown list next to the sort order text box

- Quantify checkbox – indicates whether the activity is quantifiable which allows the operator to specify a quantity during data entry.

Once all data fields are filled in the administrator can save the data by pressing the **Save and Exit** button committing all changes to the database or cancelling by pressing the **Cancel** button.

4.4.5.2 Agencies

The Agency editor (see Figure 4–66) enables the administrator to add, modify and delete Agencies from the database. Agencies are used to categorize contacts as well as specify which agencies can act as event responders and notifiers. The Agency editor is selected by expanding the Event Management element and clicking the Agencies item.
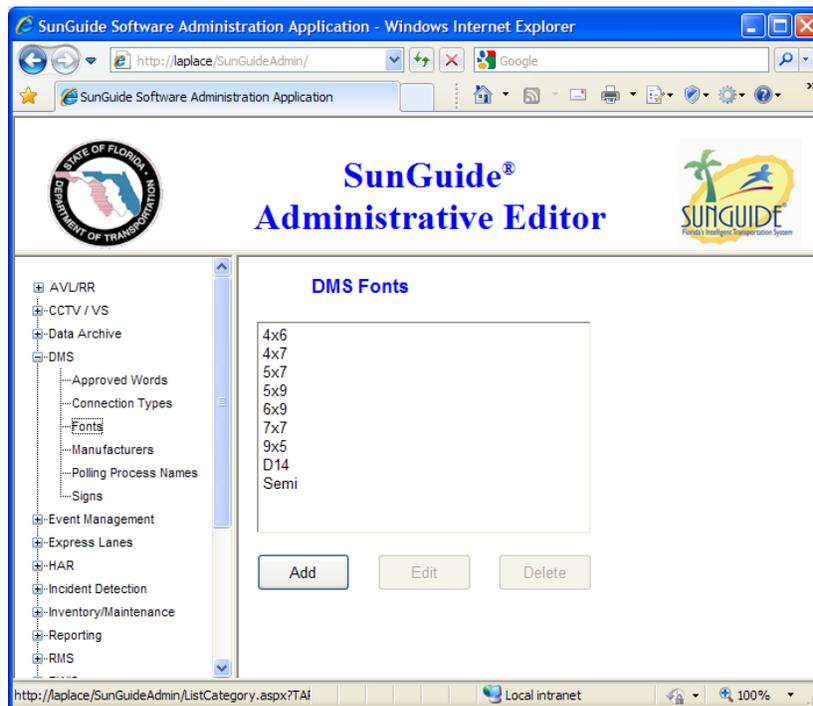
The **Add** button is always enabled; once an agency is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to the Agency Configuration page allowing detailed data to be entered/modified.
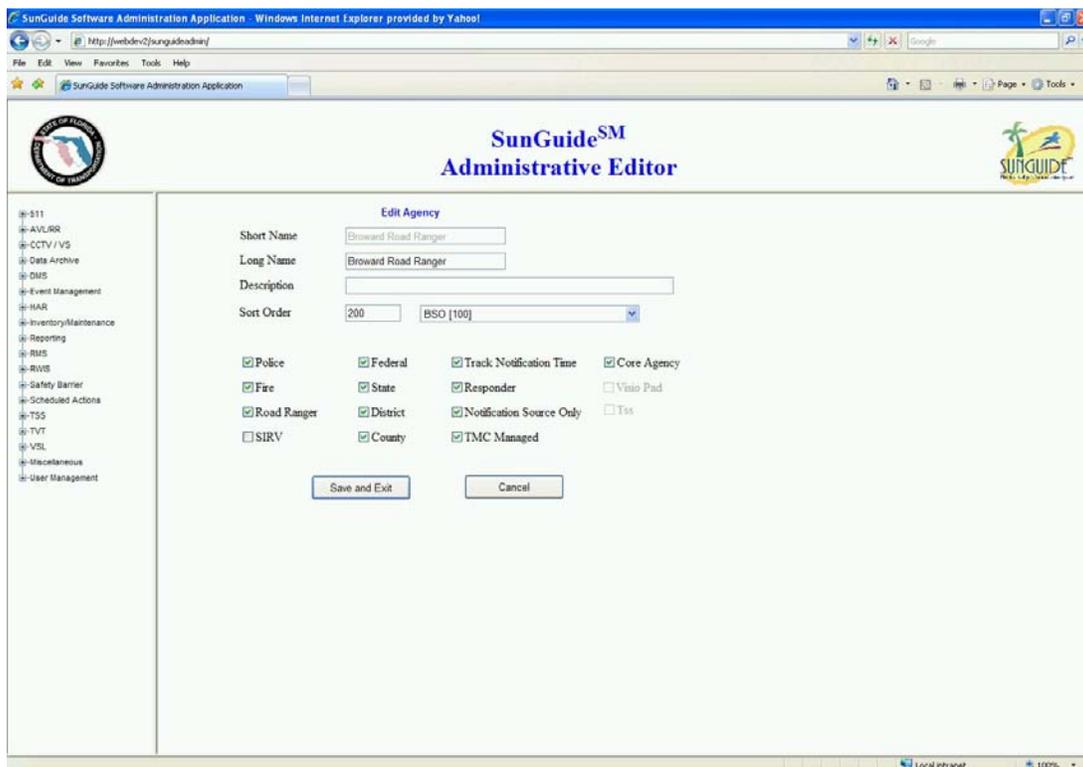
Figure 4–66 – Edit Agencies

Each agency must have the following fields filled in:

- Short Name – unique name for the agency (read-only in edit mode)

- Long Name – display name for the agency

- Description (optional) – additional description for the agency

- Sort Order – number indicating the position of the agency within the agency list. The agency and its order are displayed in the dropdown list next to the sort order text box.

- Police – checkbox indicates if the agency is the police department

- Fire – checkbox indicates if the agency is the fire department

- Road Ranger – checkbox indicates if the agency is a Road Ranger agency

- SIRV – checkbox indicates if the agency is a SIRV agency.

- Federal – checkbox indicates if the agency is a federal level agency

- State – checkbox indicates if the agency is a state level agency

- District – checkbox indicates if the agency is a district level agency

- County – checkbox indicates if the agency is a county level agency

- Track Notification Time

- Responder – checkbox indicates if the agency is a responder (is displayed in the responder list for the event

- Notification Source Only – checkbox indicates if the agency is a notification source only (only the notification time can be set

- TMC Managed – checkbox indicates if the agency is managed by the TMC

- Core Agency – checkbox indicates if the agency displayed in the expanded or collapsed part of the Responder List.

- Visio Pad – checkbox indicates if the agency is categorized as VisioPad. A single agency in the agency list can be categorized as VisioPad

- TSS – checkbox indicates if the agency is categorized as TSS. A single agency in the agency list can be categorized as TSS.

Once all data fields are filled in the administrator can save the data by pressing the **Save and Exit** button committing all changes to the database or cancelling by pressing the **Cancel** button.

4.4.5.3 Agencies Contacts

The Agency Contacts editor (see Figure 4–67) enables the administrator to add, modify and delete contacts belonging to a specific agency. The Agency Contact editor is selected by expanding the Event Management element and clicking the Agencies Contacts item.

In order to add, modify or delete an agency contact the administrator must select an agency for the contact at which point the user is redirected to the Agency Contact Configuration Page. Once the agency is selected the following fields must be filled in for each contact:

- First Name – first name for the contact

- Last Name – last name for the contact

- Email – email for the contact

- Phone – phone number for the contact

- Mobile – mobile (cell) phone number for the contact

- Pager – pager number for the contact

- Fax – fax number for the contact

- Sensitive checkbox – the sensitive information checkbox is used during the sending of emails from response plans. Contacts with the sensitive checkbox checked will receive any sensitive information in the response plan email.

Once all data fields are filled in the administrator can save the data by pressing the **Save and Exit** button committing all changes to the database or cancelling by pressing the **Cancel** button.
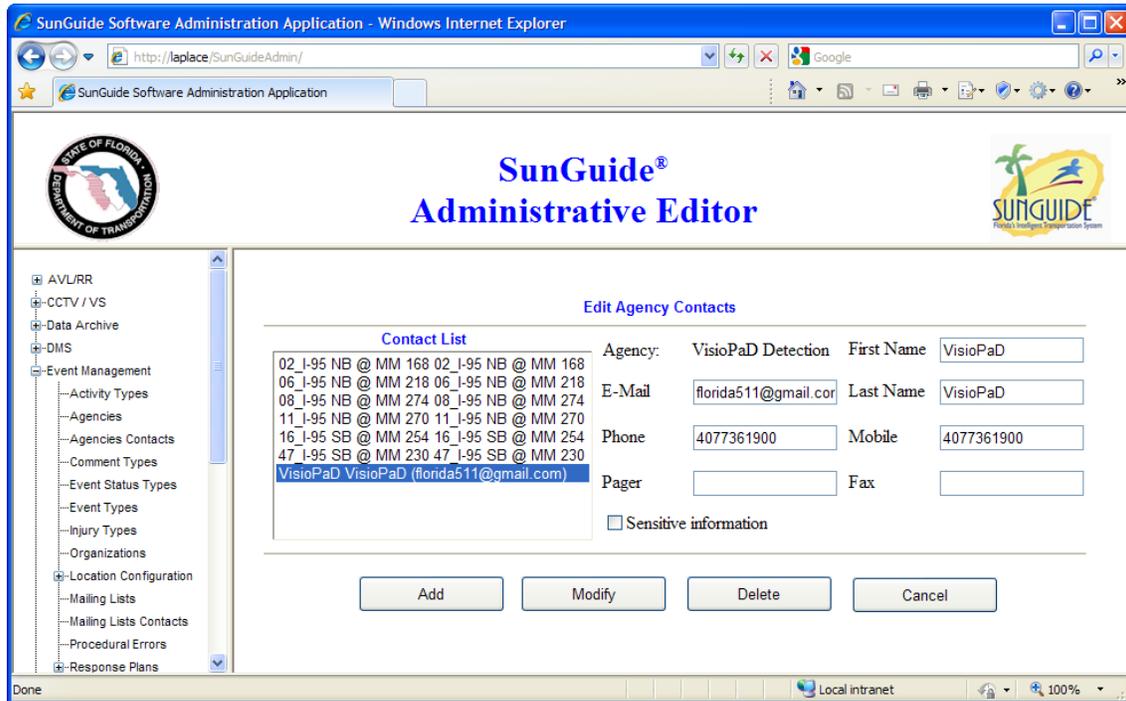
Figure 4–67 – Edit Agency Contacts

4.4.5.4 Comment Types

The Comment Type (see Figure 4–68) editor enables the administrator to add, modify and delete comment types to the database. The Comment Types are used for the classification of comments created using the Event Details screen or by the Road Rangers using the tablet application. The Comment Type editor is selected by expanding the Event Management element and clicking the Comment Types item.
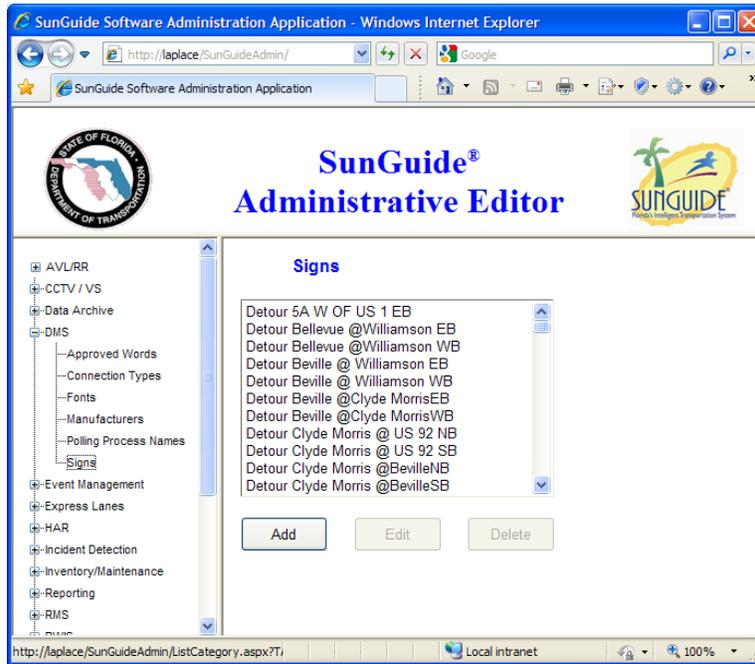
The **Add** button is always enabled; once a comment type is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to the Comment Type Configuration page allowing detailed data to be entered/modified.
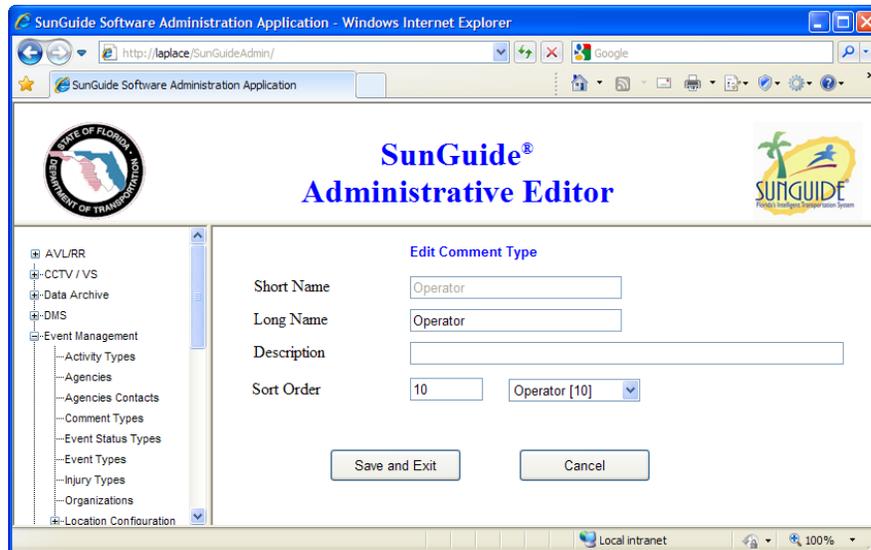
Figure 4–68 – Edit Comment Type

The following fields must be filled in for the comment type:

- Short Name – unique name for the comment type (read-only in edit mode)

- Long Name – display name for the comment type

- Description (optional) – additional description for the comment type

- Sort Order – number indicating the position of the comment type within the comment type list. The comment type and its order are displayed in the dropdown list next to the sort order text box.

Once all data fields are filled in the administrator can save the data by pressing the **Save and Exit** button committing all changes to the database or cancelling by pressing the **Cancel** button.

4.4.5.5 Event Status Types

The Event Status Types editor (see Figure 4–69) enables the administrator to add, modify and delete event status types to the database. Event Status Types are used to classify the event status into categories such as Active, Closed or Unconfirmed, etc. The Event Status Types editor is selected by expanding the Event Management element and clicking the Event Status Types item.

The **Add** button is always enabled; once an event status is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to the Event Status Configuration page allowing detailed data to be entered/modified.

The following fields must be filled in for each event status:

- Short Name – unique name for the event status (read-only in edit mode)

- Long Name – display name for the event status

- Description (optional) – additional description for the event status

- Sort Order – number indicating the position of the event status within the event status list. The event status and its order are displayed in the dropdown list next to the sort order text box.

- Management Radio Button List – consists of one of Active Management, Passive Management, Closed or None. The administrator must select one of the options indicating whether the event is active or closed

- Confirmed checkbox – indicates if the event is confirmed

- Valid checkbox – indicates if the event is valid

- Performance Measures checkbox – indicates whether the event status should be included in performance measure calculations

Once all data fields are filled in the administrator can save the data by pressing the **Save and Exit** button committing all changes to the database or cancelling by pressing the **Cancel** button.
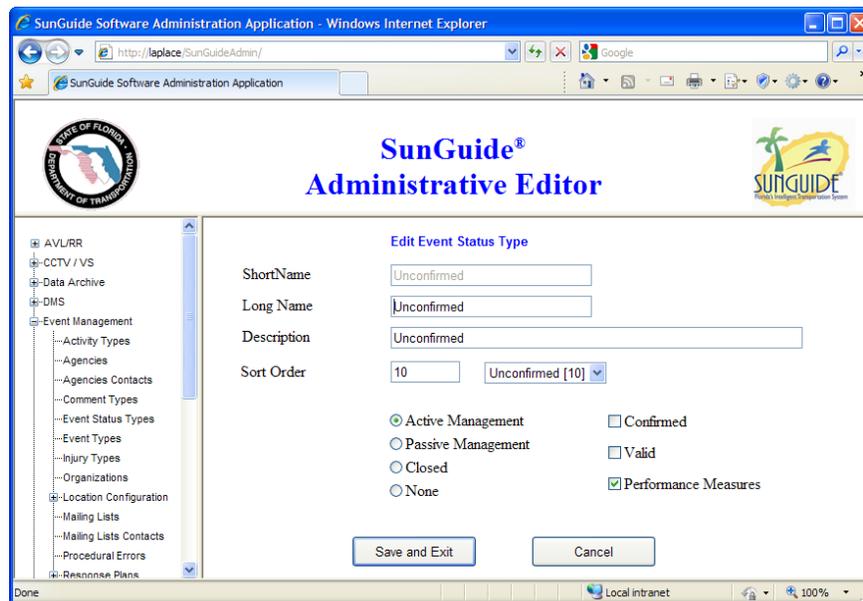
Figure 4–69 – Edit Event Status

4.4.5.6 Event Types

The Event Types editor (see Figure 4–70) enables the administrator to view the event types. With the standardization of an ATIS provider for the entire state the ability to alter event types by the SunGuide administrator was changed to be read-only and not editable. Only the sort order can be modified by a SunGuide deployment. The Event Types editor is selected by expanding the Event Management element and clicking the Event Types item. The dialog in Figure 4–70 will display the list of Event Types.
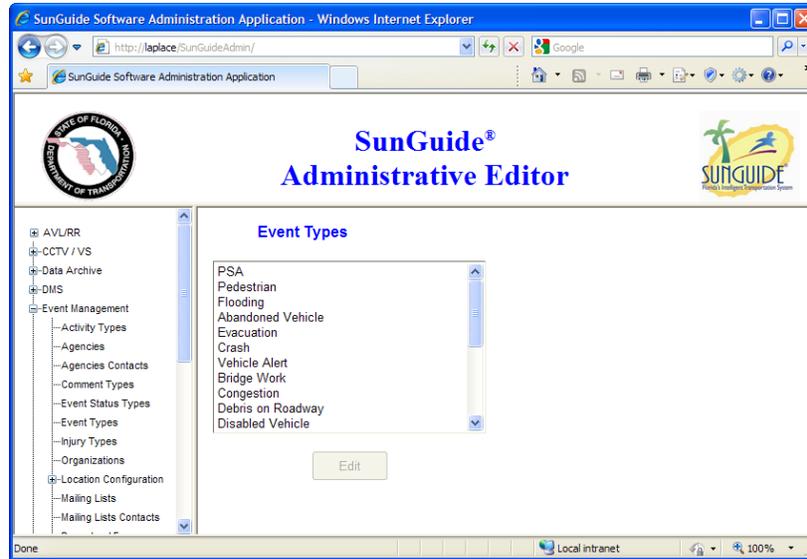
Figure 4–70 – Event Type List View

If the administrator selects an Event Type and selects **View** the dialog showing in Figure 4–71 will be displayed. The administrator can modify the sort order for local preference. The options to **Save and Exit** are available or **Cancel** which will return the user to the Event Types list screen.
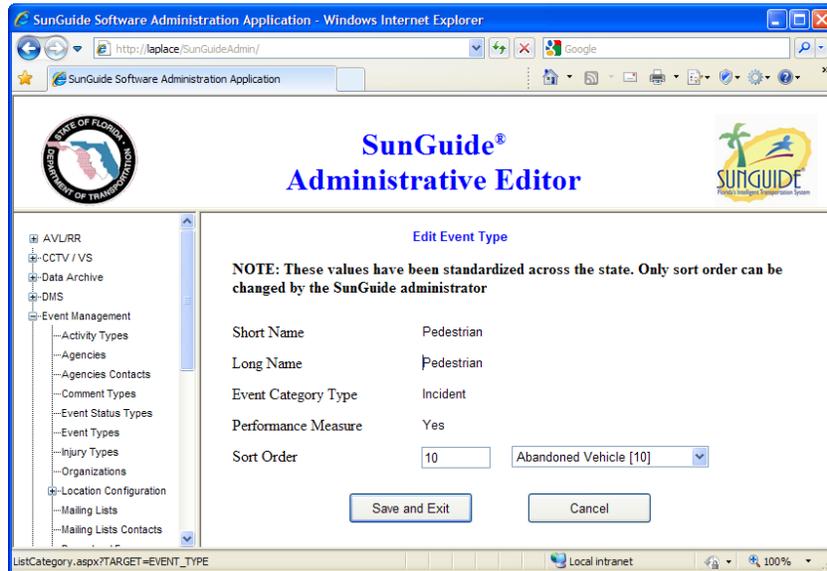
Figure 4–71 – View Event Type

The Event Type is also used during the display of event icons on the map. Figure 4–72 contains a graphical listing of the icons that will be displayed.

Figure 4–72 – Event Type – icons

4.4.5.7 Injury Types

The Injury Types editor (see Figure 4–73) enables the administrator to add, modify and delete injury types to the database. Injury Types specify the injuries that occurred in the event. The Injuries Types editor is selected by expanding the Event Management element and clicking the Injury Types item.

The **Add** button is always enabled; once an injury type is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to the Injury Type Configuration page allowing detailed data to be entered/modified.

Figure 4–73 – Edit Injury Type

The following fields must be filled in for each event status:

- Short Name – unique name for the injury type (read-only in edit mode)
- Long Name – display name for the injury type

- Description (optional) – additional description for the injury type

- Sort Order – number indicating the position of the injury type within the injury type list. The injury type and its order are displayed in the dropdown list next to the sort order text box.

- Fatal checkbox – indicates if the injury type is a fatality.

Once all data fields are filled in the administrator can save the data by pressing the **Save and Exit** button committing all changes to the database or cancelling by pressing the **Cancel** button.

4.4.5.8 Organizations

The Organizations editor (see Figure 4–74) enables the administrator to add, modify and delete organizations to the database. Organizations are used to categorize events in the event of a multiple TMCs using the same installation of SunGuide. The Organization editor is selected by expanding the Event Management element and clicking the Organization item.

The **Add** button is always enabled; once an organization is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to the Organization Configuration page allowing detailed data to be entered/modified.

Figure 4–74 – Edit Organization

The following fields must be filled in for each organization:

- Short Name – unique name for the organization (read-only in edit mode)

- Long Name – display name for the organization

- Description (optional) – additional description for the organization

- Sort Order – number indicating the position of the organization within the organization list. The organization and its order are displayed in the dropdown list next to the sort order text box.

Once all data fields are filled in the administrator can save the data by pressing the Save and Exit button committing all changes to the database or cancelling by pressing the Cancel button.

4.4.5.9 Locations

The Locations editor (see Figure 4–75) enables the administrator to add, modify and delete locations to the database. Locations are defined as points along a roadways for a specific direction and cross street (reference point); a location is a 5-tuple of county, roadway, direction, reference point (or crossstreet), and relationship to exit (or alternatively mile marker). The Location editor is selected by expanding the Event Management element, the Location Configuration element and clicking the Locations item. See the discussion in Section 8.4 about entering location information.

The configuration of locations involves selecting the area of the roadway network that contains the location. The administrator uses the county, roadway and direction dropdown lists to filter the locations.
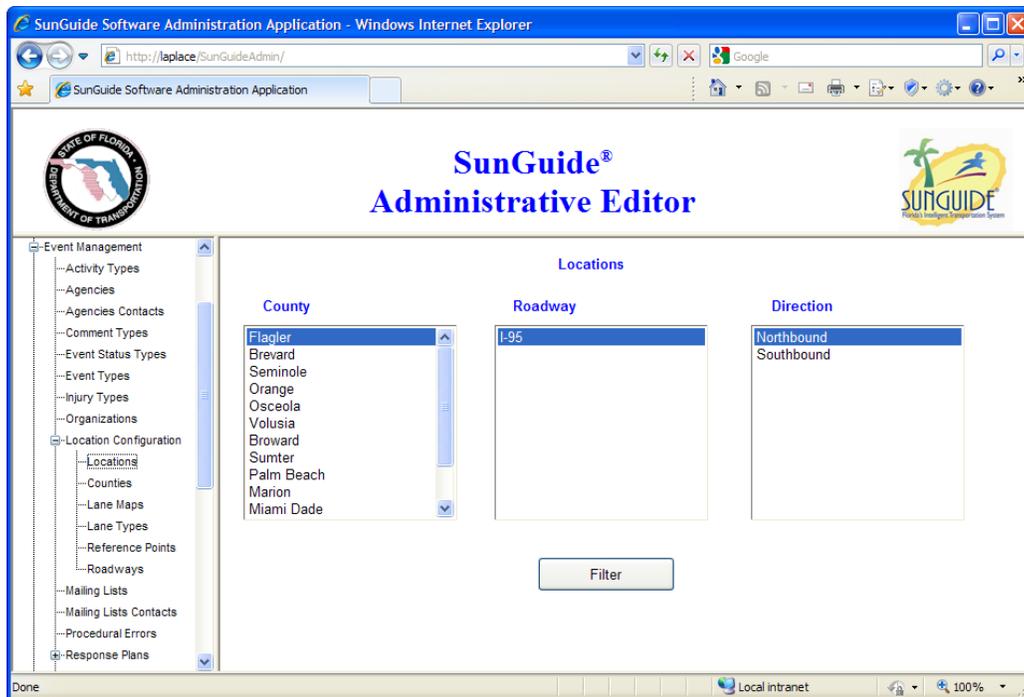
Figure 4–75 – Location Filter
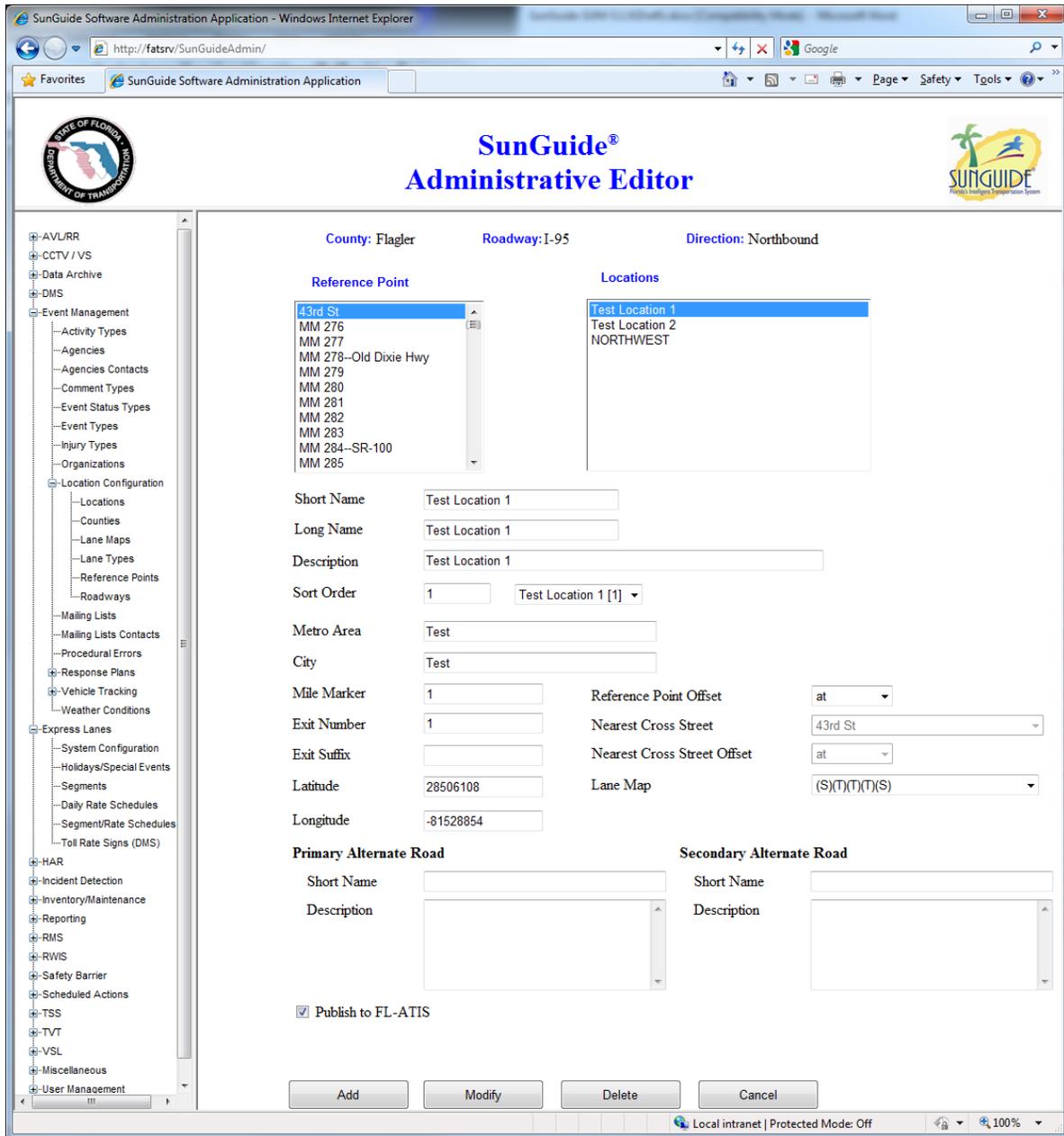
Figure 4–76 – Location Editor

Once the county, roadway and direction are selected by the administrator, a reference point must be chosen for the location. Reference points are grouped into two categories within the dropdown list:

- Assigned – reference points with one or more locations already assigned

- Not Assigned – no locations are defined for the selected reference point.

Once a reference point is selected from the dropdown list, locations can be added, modified or deleted using the Location dropdown list and associated fields. The following fields must be filled in for each location:

- Short Name – unique name for the location (read-only in edit mode)

- Long Name – display name for the location

- Description (optional) – additional description for the location

- Sort Order – number indicating the position of the location within the location list for the given county/roadway/direction. The location and its order are displayed in the dropdown list next to the sort order text box. This location sort order number is unique to each location within a specific county, roadway, and direction. The numbers should increase along a roadway for a direction within a county, i.e. for a northbound direction, the sort order should increase as one progresses from the south to the north. It does not matter what the relationships are between NB and SB numbers.

- Mile Marker (optional)

- Exit Number (optional)

- Exit Suffix (optional)

- Latitude/Longitude – micro-degrees

- Reference Point Offset Type – select from a list of offsets

- Nearest Cross street – if the selected Reference Point is not marked as a cross street, the administrator must select a valid cross street

- Nearest Cross street offset – select from a list of offsets

- Lane Map – select from a list of predefined lane maps.

- Primary Alternate Road (used to send detour/reroute information to the FDOT ATIS system)

  o Short Name: the identifier for the primary alternate road

  o Description: textual description of the alternate road

- Secondary Alternate Road (used to send detour/reroute information to the FDOT ATIS system):

  o Short Name: the identifier for the secondary alternate road

  o Description: textual description of the secondary road

- Publish to FL-ATIS – Whether events at the location should be published to the FDOT ATIS system

4.4.5.10 Counties

The County editor (see Figure 4–77) enables the administrator to add, modify and delete counties to the database. The County editor is selected by expanding the Event Management element, the Location Configuration element and clicking the County item.

The **Add** button is always enabled; once a county is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to the County Configuration page allowing detailed data to be entered/modified.
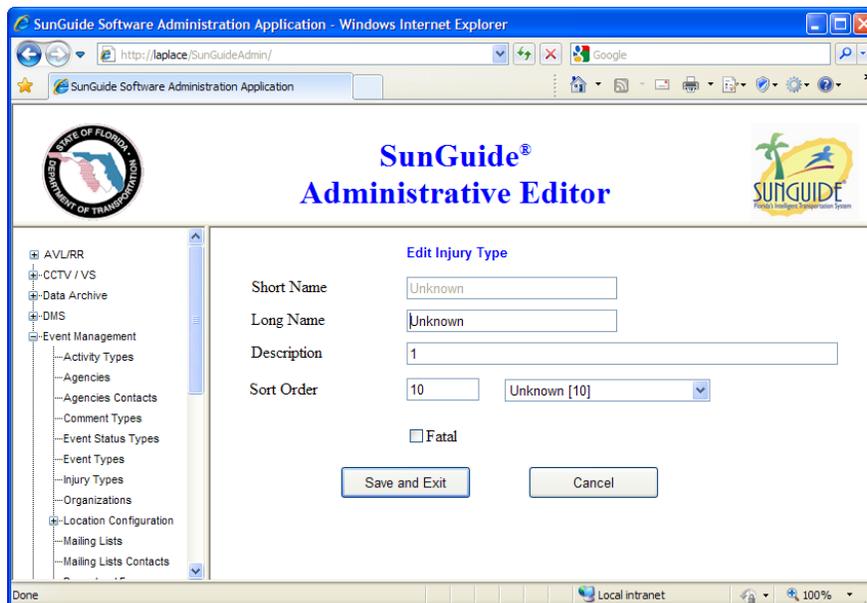
Figure 4–77 – Edit County

The following fields must be filled in for each county:

- Short Name – unique name for the county (read-only in edit mode)

- Long Name – display name for the county

- Description (optional) – additional description for the county

- Sort Order – number indicating the position of the county within the county list. The county and its order are displayed in the dropdown list next to the sort order text box.

- Performance Measures checkbox – indicates whether the event type should be included in performance measure calculations

Once all data fields are filled in the administrator can save the data by pressing the Save and Exit button committing all changes to the database or cancelling by pressing the Cancel button.

4.4.5.11 Lane Maps

The Lane Maps editor enables the administrator to add, modify and delete lane maps to the database. Lane Maps are used to describe the lane configuration and consist of lane types. The Lane Maps editor is selected by expanding the Event Management element, the Location Configuration element and clicking the Lane Maps item.

The **Add** button is always enabled; once a lane map is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to the Lane Map page allowing detailed data to be entered/modified.
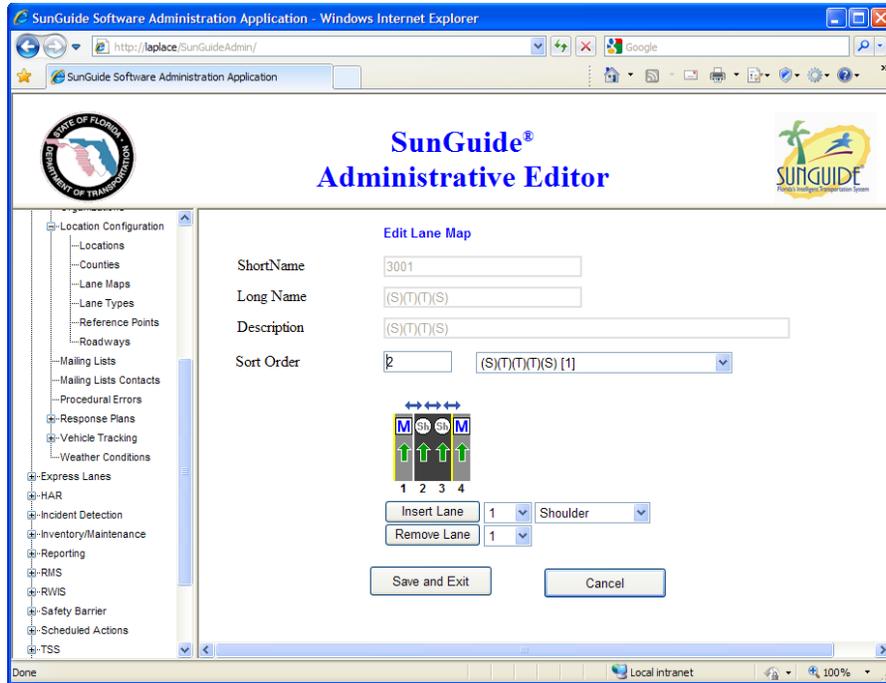
Figure 4–78 – Edit Lane Map

The administrator can build lane maps using the graphical display (above). The administrator can insert, remove and order lanes within the control and save the lane map to the database using the **Save and Exit** button.

4.4.5.12 Lane Types

The Lane Types editor (see Figure 4–79) enables the administrator to add, modify and delete lane types to the database. Lane Types are used to describe the different lanes that can be displayed in the system. The Lane Types editor is selected by expanding the Event Management element, the Location Configuration element and clicking the Lane Types item.

The **Add** button is always enabled; once a lane type is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to the Lane Type page allowing detailed data to be entered/modified.

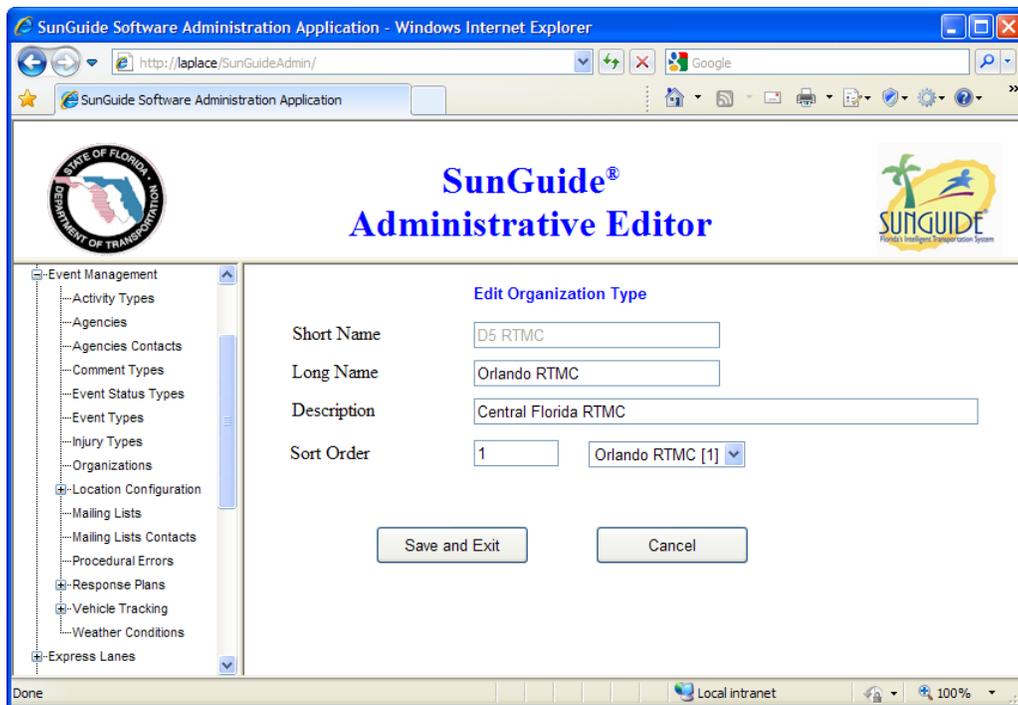**Figure 4–79 – Edit Lane Type**

The following fields must be filled in for each lane type:

- Short Name – unique name for the lane type (read-only in edit mode)

- Long Name – display name for the lane type

- Description (optional) – additional description for the lane type

- Sort Order – number indicating the position of the lane type within the lane type list. The lane type and its order are displayed in the dropdown list next to the sort order text box.

- Lane Type Classification List – the administrator must classify the lane type as one of the following: Travel Lane, Entry Lane, Exit Lane, Shoulder, Gore, HOV, or Express (Lanes). The classification is used for graphical representation of the lane in the lane map.

Once all data fields are filled in the administrator can save the data by pressing the Save and Exit button committing all changes to the database or cancelling by pressing the Cancel button.

4.4.5.13 Reference Points

The Reference Points editor (see Figure 4–80) enables the administrator to add, modify and delete reference points to the database. Reference Points are used as references along the roadway (cross streets). The Reference Point editor is selected by expanding the Event Management element, the Location Configuration element and clicking the Reference Point item.

When an operator creates an event, the location of the event is selected from a drop down list of preconfigured locations. Locations utilize the latitude and longitude associated with the locations associated reference point. Thus, the precision at which an event's location can be

specified relies on the distance between reference points, i.e. if reference points along a section of highway are 20 miles apart, then an event between them will be associated at one or the other giving a maximum error of 10 miles. Thus, it is important to avoid long gaps between reference points; some SunGuide deployments have chosen to utilize geographic features (river crossings), or mileposts to avoid this problem.

The **Add** button is always enabled; once a reference point is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to the Reference Point page (see Figure 4–80) allowing detailed data to be entered/modified.
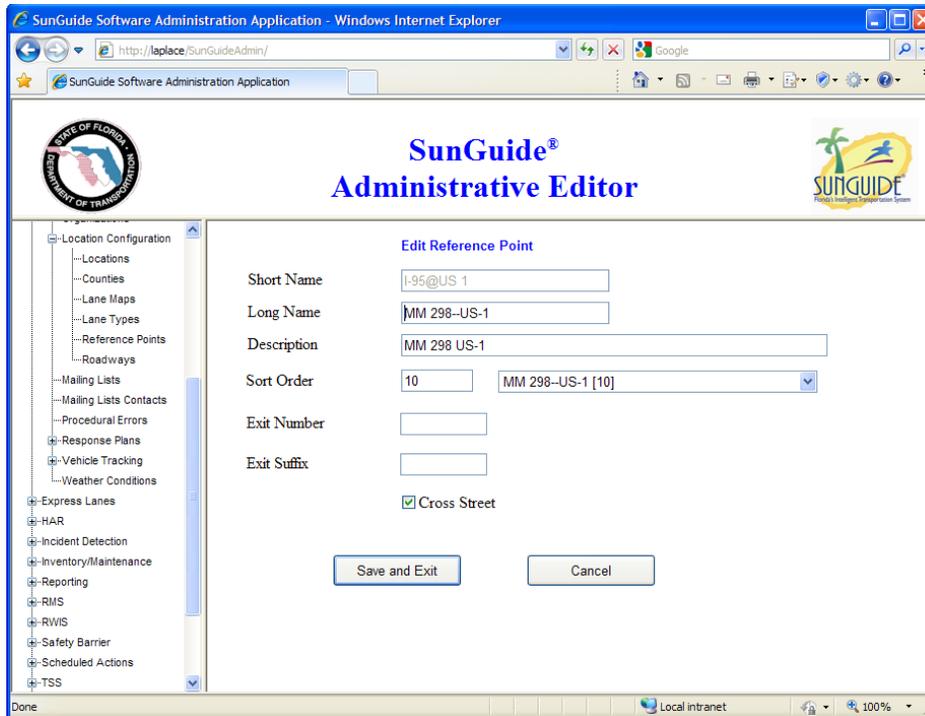
Figure 4–80 – Edit Reference Point

The following fields must be filled in for each reference point:

- Short Name – unique name for the reference point (read-only in edit mode)

- Long Name – display name for the reference point

- Description (optional) – additional description for the reference point

- Sort Order – number indicating the position of the reference point within the reference point list. The reference point and its order are displayed in the dropdown list next to the sort order text box.

- Exit Number (optional) – optional exit number for the reference point

- Exit Suffix (optional) – optional exit suffix for the reference point

- Cross Street checkbox – indicates if the reference point is a cross street. This classification allows the administrator to distinguish between cross streets and other points of interest such as rivers or landmarks

Once all data fields are filled in the administrator can save the data by pressing the Save and Exit button committing all changes to the database or cancelling by pressing the Cancel button.

4.4.5.14 Roadways

The Roadways editor (see Figure 4–81) enables the administrator to add and edit roadways in the database. The Roadways editor is selected by expanding the Event Management element, the Location Configuration element and clicking the Roadways item.

The **Add** button is always enabled; once a roadway is selected in the list, the **Edit** button is also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to the Roadway page allowing detailed data to be entered/modified.
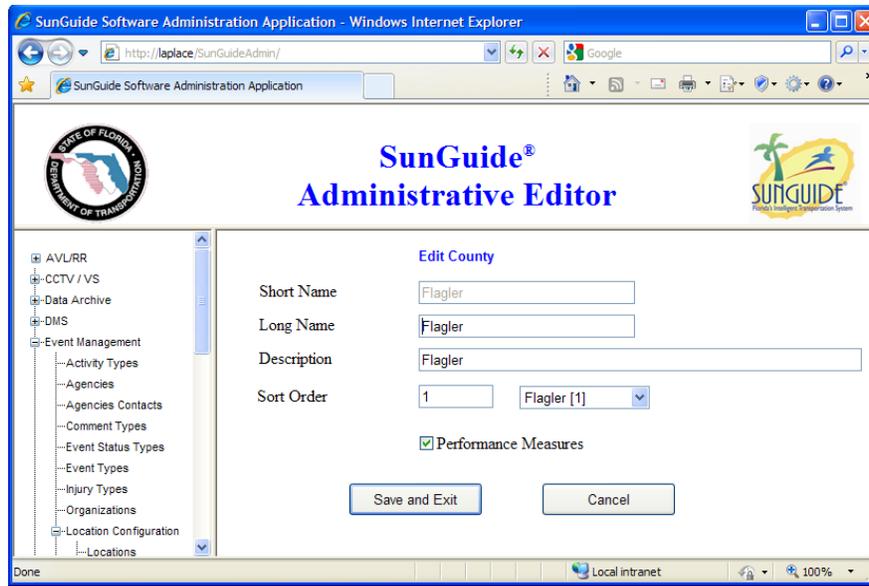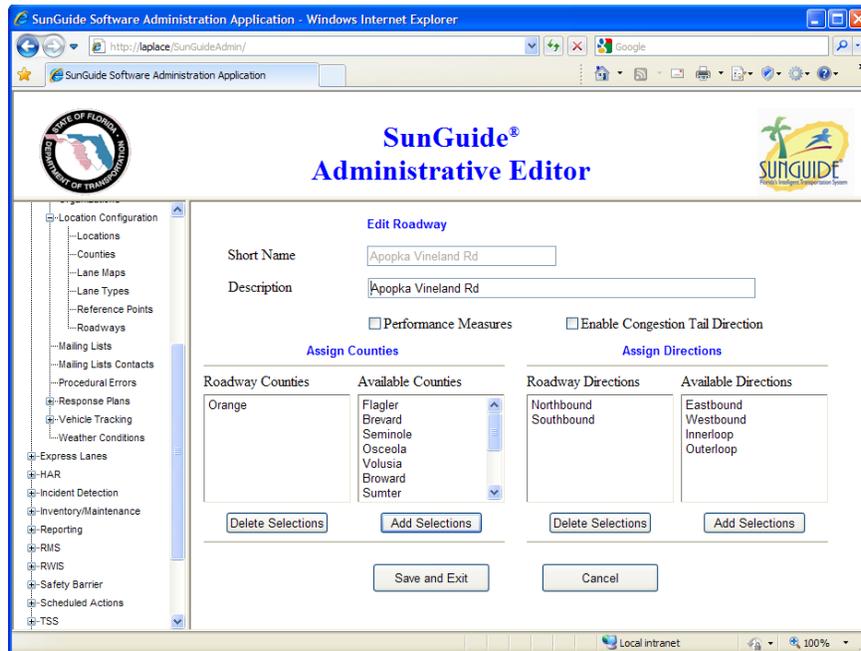

Figure 4–81 – Roadways

The following fields must be filled in for each roadway:

- Short Name – unique name for the reference point (read-only in edit mode)

- Description (optional) – additional description for the reference point

- Performance Measures – whether the roadway should be included in performance measures

- Enable Congestion Tail Direction – whether events on this roadway should allow the direction of the congestion tail to be changed (for instance, on a roadway which changes from being North/South to being East/West)

- Assign Counties – assign the counties for the roadway by using the Add/Delete selection buttons

- Assign Directions – assign the directions for the roadway by using the Add/Delete selection buttons

Once all data fields are filled in the administrator can save the data by pressing the Save and Exit button committing all changes to the database or cancelling by pressing the Cancel button.

4.4.5.15 Mailing Lists

The Mailing Lists editor (see Figure 4–82) enables the administrator to add, modify and delete mailing lists in the database. Mailing lists are used to send out notifications (emails) to users during the activation of response plans. The Mailing List editor is selected by expanding the Event Management element, and clicking the Mailing List item.

The **Add** button is always enabled; once a mailing list is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to the Mailing List page allowing detailed data to be entered/modified.
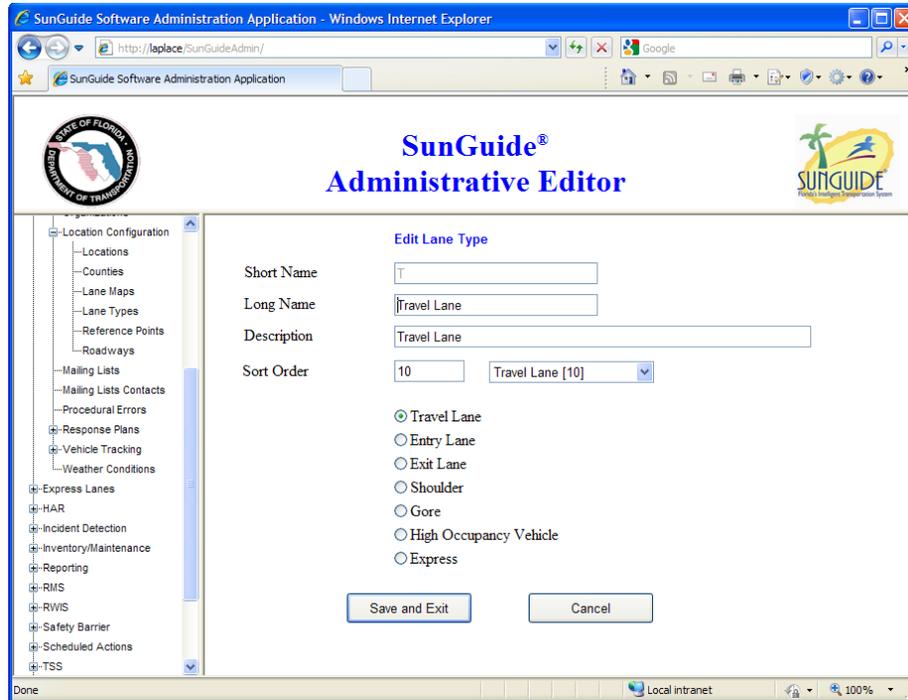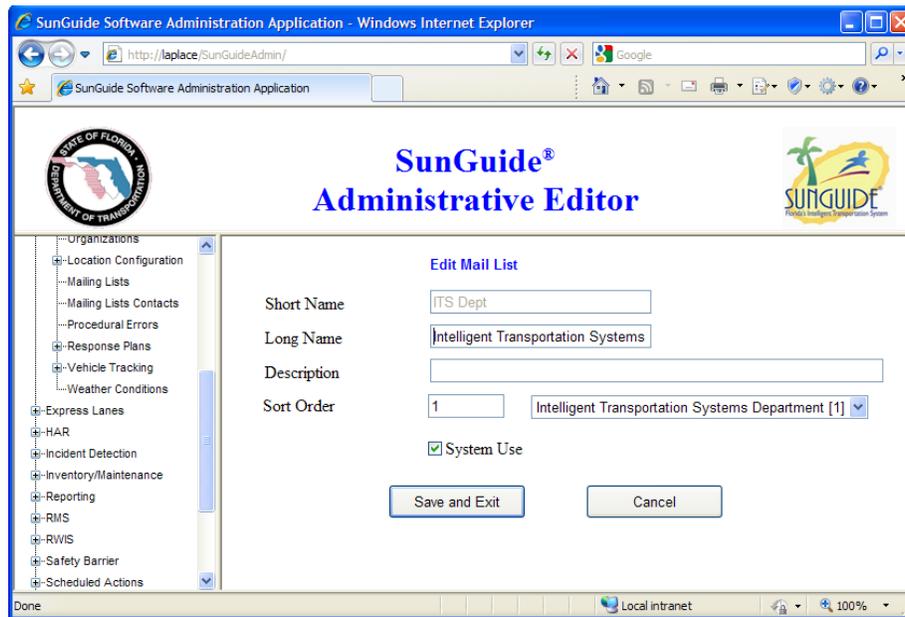

Figure 4–82 – Mailing Lists

The following fields must be filled in for each mailing list:

- Short Name – unique name for the mailing list (read-only in edit mode)

- Long Name – display name for the mailing list

- Description (optional) – additional description for the mailing list

- Sort Order – number indicating the position of the mailing list within the mailing list. The mailing list and its order are displayed in the dropdown list next to the sort order text box.

- System Use checkbox – classifies the Maillist as system use.

Once all data fields are filled in the administrator can save the data by pressing the **Save and Exit** button committing all changes to the database or cancelling by pressing the **Cancel** button.

4.4.5.16 Mailing List Contacts

The Mailing List Contact editor (see Figure 4–83) enables the administrator to add and delete contacts from mailing lists. The Mailing List Contact editor is selected by expanding the Event Management element, and clicking the Mailing List Contacts item.
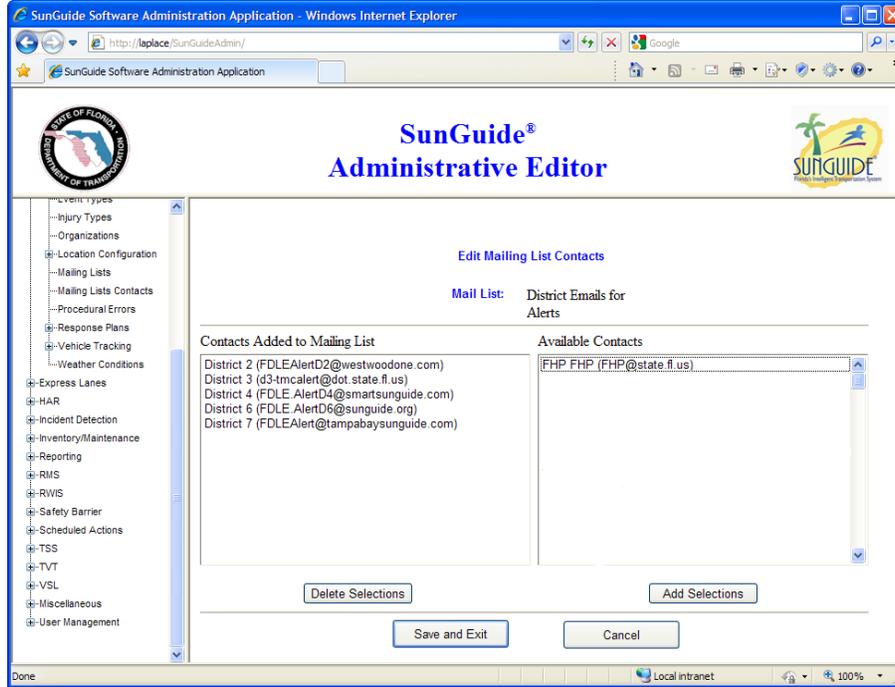
Figure 4–83 – Edit Mailing List Contacts

Once a Mailing List is chosen, contacts (previously configured) can be added to the group by using the Add/Delete Selection Buttons. The data can be saved by pressing the **Save and Exit** Button or can be cancelled by pressing the **Cancel** Button.

4.4.5.17 Procedural Errors

The Procedural Errors editor (see Figure 4–84) enables the administrator to add, modify and delete Procedural Errors from the database. Procedural Errors types are used to categorize errors performed by Road Rangers or SIRV vehicles. The Procedural Error editor is selected by expanding the Event Management element, and clicking the Procedural Errors item.

The **Add** button is always enabled; once a procedural error is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to the Procedural Errors page allowing detailed data to be entered/modified.
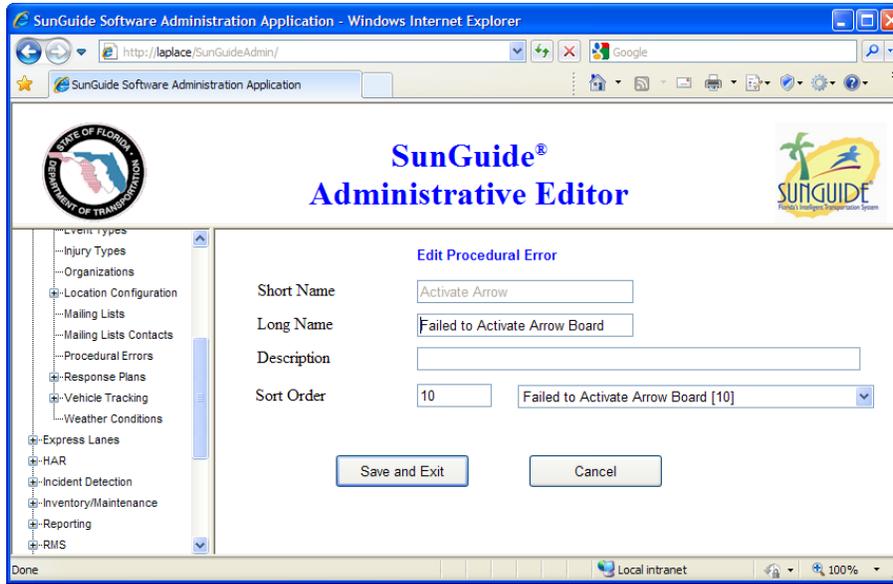
Figure 4–84 – Edit Procedural Errors

The following fields must be filled in for each procedural error:

- Short Name – unique name for the procedural errors (read-only in edit mode)

- Long Name – display name for the procedural errors

- Description (optional) – additional description for the procedural errors

- Sort Order – number indicating the position of the reference point within the reference point list. The reference point and its order are displayed in the dropdown list next to the sort order text box.

Once all data fields are filled in the administrator can save the data by pressing the **Save and Exit** button committing all changes to the database or cancelling by pressing the **Cancel** button.

4.4.5.18 Abbreviations

The Abbreviations editor (see Figure 4–85) enables the administrator to add, modify and delete word abbreviations for response plan messages. When a response plan message will not fit on a device, abbreviations configured here will be applied to attempt to allow the message to fit with minor adjustments. The Abbreviation editor is selected by expanding the Event Management element, expanding the Response Plans element, and clicking the Abbreviations item.

The **Add** button is always enabled; once an abbreviation is selected in the list shown in Figure 4–85, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to the Abbreviation edit page allowing detailed data to be entered/modified.
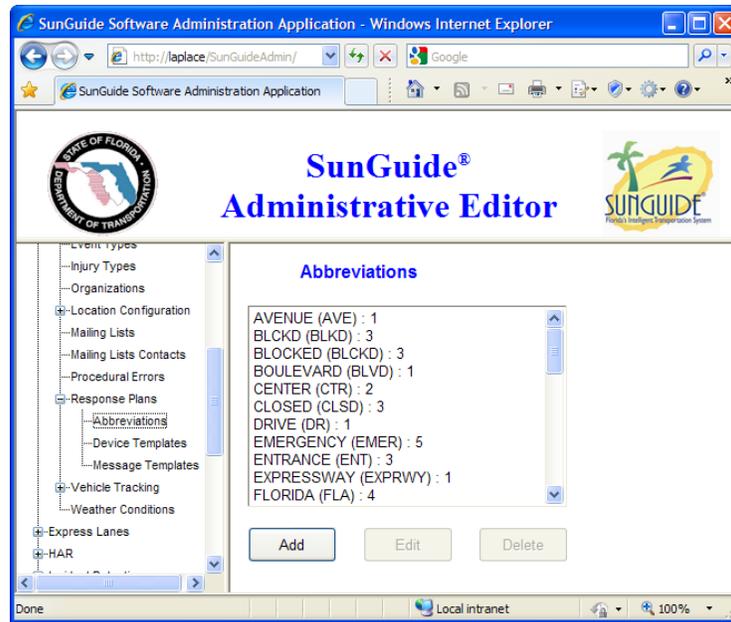
Figure 4–85 – Response Plan Abbreviation List

The Abbreviation edit page, shown in Figure 4–86, allows a user to enter a word which may be abbreviated, an approved abbreviation for that word, and a priority at which the abbreviation should be applied. When applying abbreviations, those with priority one will be applied first, then if the message is still too large, priority two will be applied, and so forth. Abbreviations with a priority of zero are always applied, whether the message would otherwise fit or not. If the Add to Approved Words check box is selected, the abbreviation will be added to the list of approved words in the DMS subsystem. Once the entry is complete, pressing the **Save and Exit** button will commit the change and return to the list of abbreviations. **Cancel** returns to the list without saving any modifications.
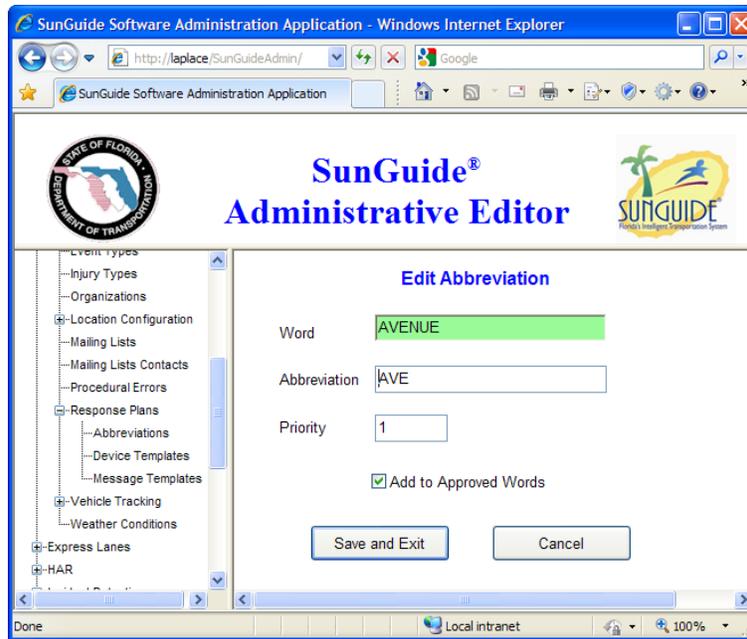
Figure 4–86 – Edit Response Plan Abbreviation

4.4.5.19 Device Templates

The Device Template editor (see Figure 4–87) enables the administrator to add, modify and delete device templates for response plan messages. Device templates specify which message templates should be used for specific devices under a variety of event conditions. The Device Template editor is selected by expanding the Event Management element, expanding the Response Plans element, and clicking the Device Templates item.

The **Add** and **Edit** buttons is always enabled; once an abbreviation is selected in the list shown in Figure 4–87, the **Delete** button is also enabled. The list will always contain the Default DMS, Default HAR, and Default TAM entries; these cannot be deleted. If a particular DMS or HAR does not have a specific device template configured, any messages for that device will be based on the appropriate default for the device type. Upon selecting either **Add** or **Edit**, the page will redirect to the Device Template edit page allowing detailed data to be entered/modified.
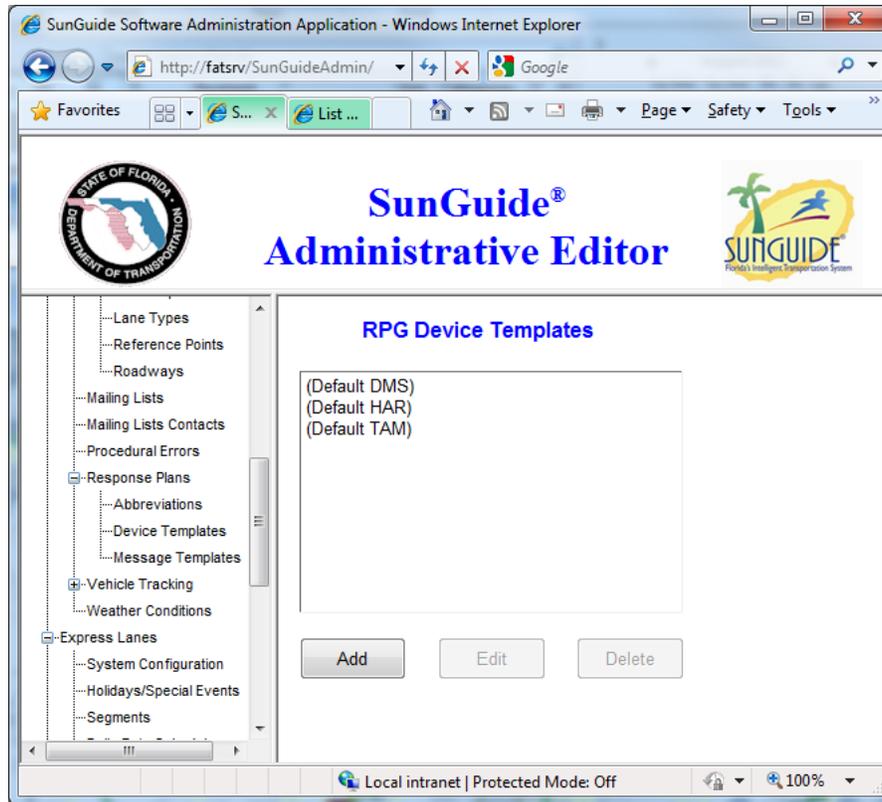
Figure 4–87 – Response Plan Device Template List

The Device Template editor, shown in Figure 4–88, allows an administrator to specify the message templates to be used for a device (or as a default for all devices of a particular type) in various event conditions. For each condition (events occurring on the same roadway as the device, on the same roadway but on a ramp, on another roadway, on another roadway's ramp, for complete road closures, and for Amber alerts) a message template may be selected, or an option to Use Default may be selected. (Use Default may not be selected for the Default DMS, Default HAR, or Default TAM templates.) Once the entry is complete, pressing the **Save and Exit** button will commit the change and return to the list of device templates. **Cancel** returns to the list without saving any modifications.
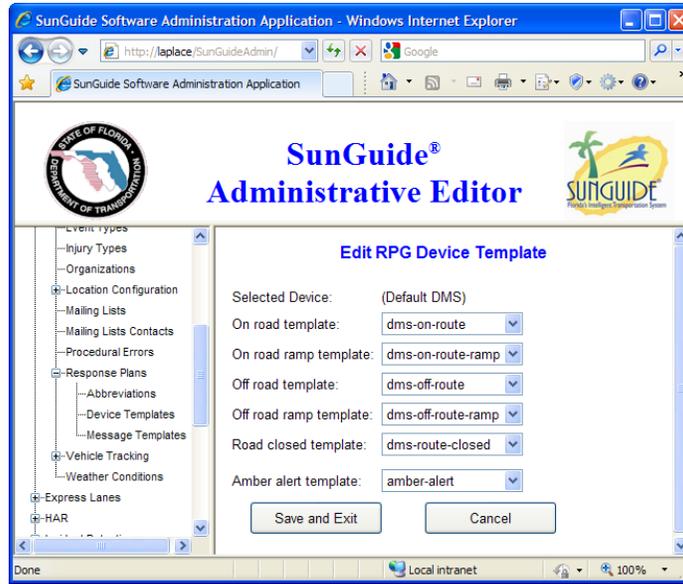
Figure 4–88 – Edit Response Plan Device Template

4.4.5.20 Message Templates

The Message Template editor (see Figure 4–89) enables the administrator to add, modify and delete templates for response plan messages. These templates are populated with data regarding an event, which forms the messages which will be recommended for devices. The Message Template editor is selected by expanding the Event Management element, expanding the Response Plans element, and clicking the Message Templates item.

The **Add** button is always enabled; once a message template is selected in the list shown in Figure 4–89, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to the Message Template edit page allowing detailed data to be entered/modified.
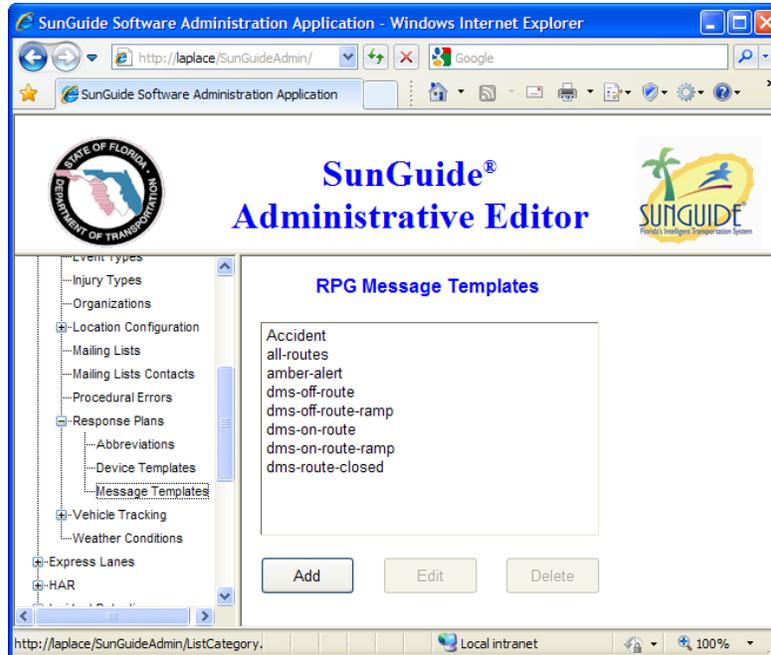
Figure 4–89 – Response Plan Message Template List

The Message Template editor, shown in Figure 4–90, allows an administrator to specify the wording to be used for messages generated by the template. A template is composed of a series of tags, shown in order the Template Text list. These tags may represent static text, spaces, and page breaks; or event data such as type, cross street, roadway and direction, vehicle details, and other properties. Each tag is represented by a link on the right side of the dialog. Clicking on one of these links inserts the tag into the list of tags. The list may be ordered by selecting an included tag and pressing the up and down arrows to the right of the list, or by pressing the **Delete** button to remove that tag. A sample display of the message based on the tags is displayed at the top of the dialog for reference. Once the entry is complete, pressing the **Save and Exit** button will commit the change and return to the list of device templates. **Cancel** returns to the list without saving any modifications.
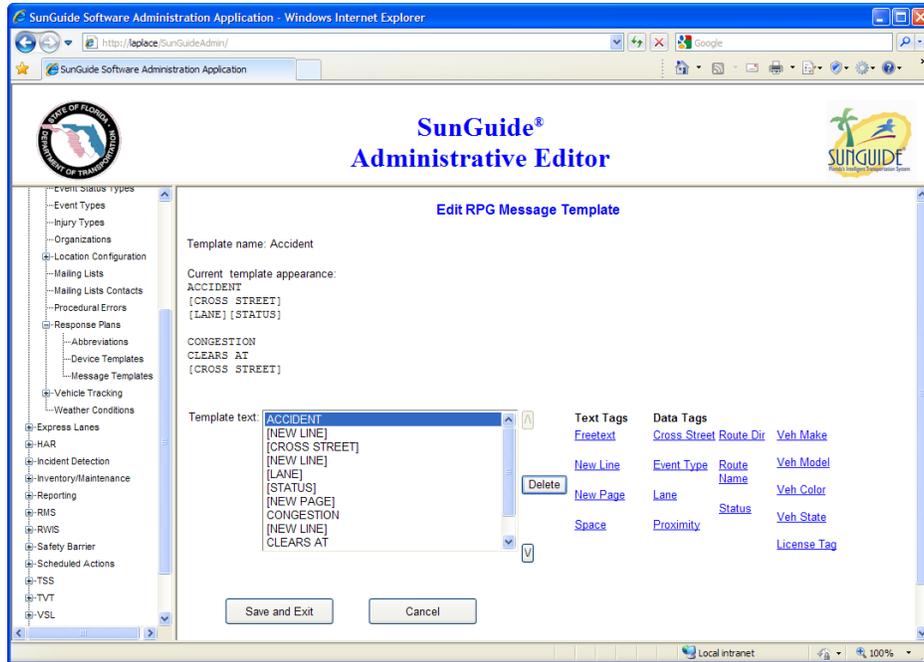
Figure 4–90 – Edit Response Plan Message Template

4.4.5.21 Colors

The Colors editor (see Figure 4–91) enables the administrator to add, modify and delete Colors from the database. Colors are used for the selecting of colors of involved vehicles. The Colors editor is selected by expanding the Event Management element, the Vehicle Tracking element and clicking the Colors item.

The **Add** button is always enabled; once a color is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to the Colors page allowing detailed data to be entered/modified.
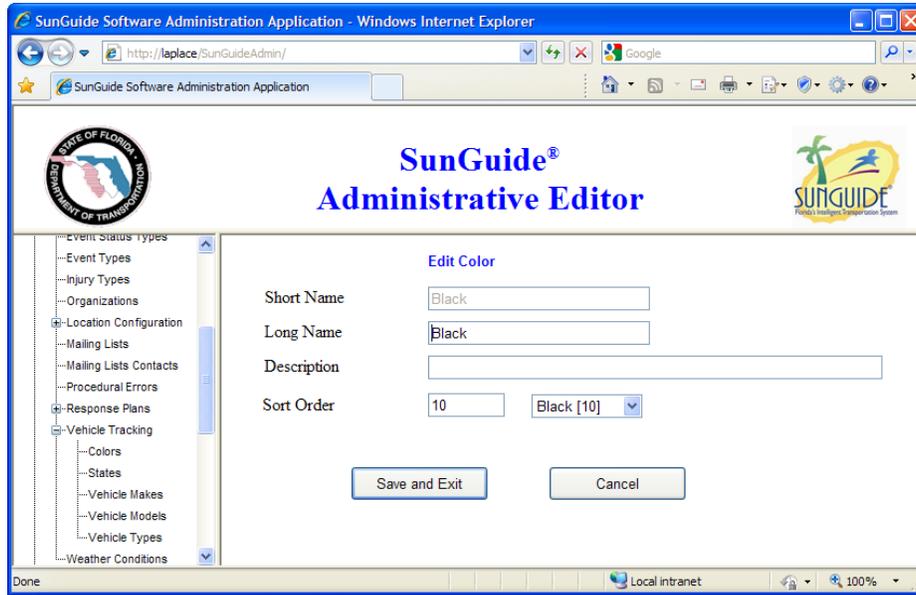
Figure 4–91 – Edit Colors

The following fields must be filled in for each color:

- Short Name – unique name for the colors (read-only in edit mode)

- Long Name – display name for the procedural errors

- Description (optional) – additional description for the procedural errors

- Sort Order – number indicating the position of the reference point within the reference point list. The reference point and its order are displayed in the dropdown list next to the sort order text box.

Once all data fields are filled in the administrator can save the data by pressing the **Save and Exit** button committing all changes to the database or cancelling by pressing the **Cancel** button.

4.4.5.22 States

The States editor (see Figure 4–92) enables the administrator to add, modify and delete States (or Provinces) from the database. The state is used for the selecting of state (license plate) of involved vehicles. The States editor is selected by expanding the Event Management element, the Vehicle Tracking element and clicking the States item.

The **Add** button is always enabled; once a state is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to the State page allowing detailed data to be entered/modified.

Figure 4–93 – Edit Vehicle Makes

The following fields must be filled in for each vehicle make:

- Short Name – unique name for the vehicle make (read-only in edit mode)

- Long Name – display name for the vehicle make

- Description (optional) – additional description for the vehicle make

- Sort Order – number indicating the position of the vehicle make within the vehicle make list. The vehicle make and its order is displayed in the dropdown list next to the sort order text box.

Once all data fields are filled in the administrator can save the data by pressing the **Save and Exit** button committing all changes to the database or cancelling by pressing the **Cancel** button.

When creating a new make that will represent truck makes, the word 'Truck' must be part of the name. This will ensure that the make will correctly identify the SAE for incidents involving trucks. The word truck should likewise be avoided in make names that should not be identified with SAE incidents involving trucks.

4.4.5.24 Vehicle Models

The Vehicle Models editor (see Figure 4–94) enables the administrator to add, modify and delete Vehicle Models from the database. The Vehicle Models editor is selected by expanding the Event Management element, the Vehicle Tracking element and clicking the Vehicle Models item.

The **Add** button is always enabled; once a vehicle model is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to the Vehicle Models page allowing detailed data to be entered/modified.
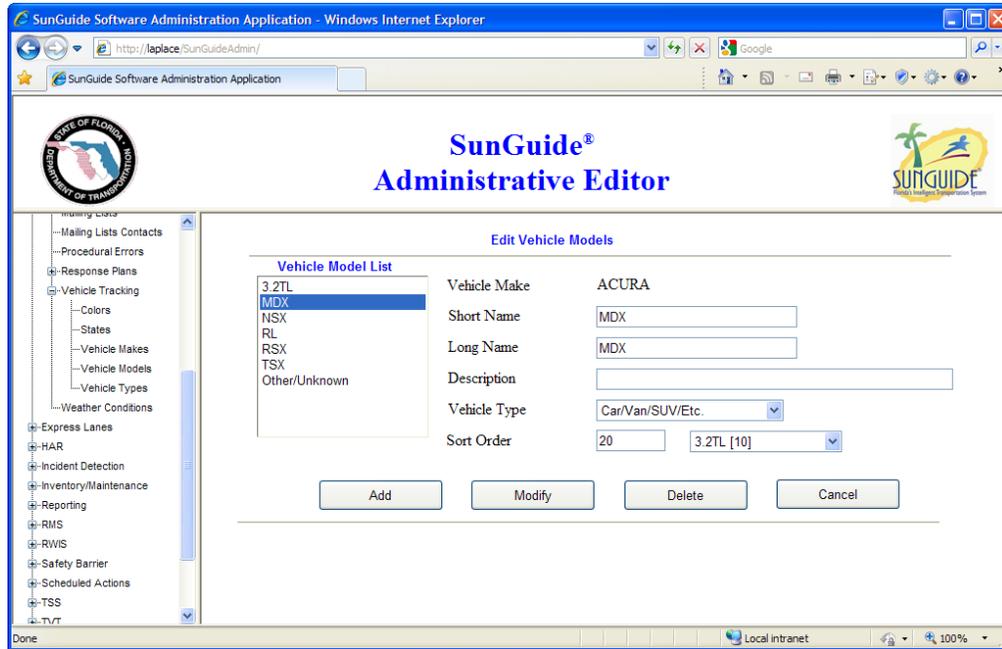
Figure 4–94 – Edit Vehicle Models

Once the administrator selects the Vehicle Make from the dropdown list, the vehicle models are displayed. The following fields must be filled in for each vehicle make:

- Short Name – unique name for the vehicle model

- Long Name – display name for the vehicle model

- Description (optional) – additional description for the vehicle model

- Sort Order – number indicating the position of the vehicle model within the vehicle model list. The vehicle model and its order is displayed in the dropdown list next to the sort order text box.

Once all data fields are filled in the administrator can save the data by pressing the **Save and Exit** button committing all changes to the database or cancelling by pressing the **Cancel** button.

4.4.5.25 Vehicle Types

The Vehicle Types editor (see Figure 4–95) enables the administrator to view the vehicle types. With the standardization of an ATIS provider for the entire state the ability to alter vehicle types by the SunGuide administrator was changed to be read-only and not editable. The Vehicle Type editor is selected by expanding the Event Management element, Vehicle Tracking element and clicking the Vehicle Types item. The dialog in Figure 4–95 will display the list of Vehicle Types.

Figure 4–95 – Vehicle Type List View

If the administrator selects a Vehicle Type and selects **View** the dialog showing in Figure 4–96 will be displayed. After viewing the details, the administrator can select **Return to List** to go back to the list of vehicle Types.

Figure 4–96 – View Vehicle Type

4.4.5.26 Weather Conditions

The Weather Conditions editor (see Figure 4–97) enables the administrator to set the default weather conditions in the database. The default conditions will be used during the creation of the event. The Weather Conditions editor is selected by expanding the Event Management element, the Vehicle Tracking element and clicking the Weather Conditions item.

The administrator can set the default condition for each of the condition types (road surface, weather, and lighting) by selecting from the condition list by pressing the **Set as Default** button.
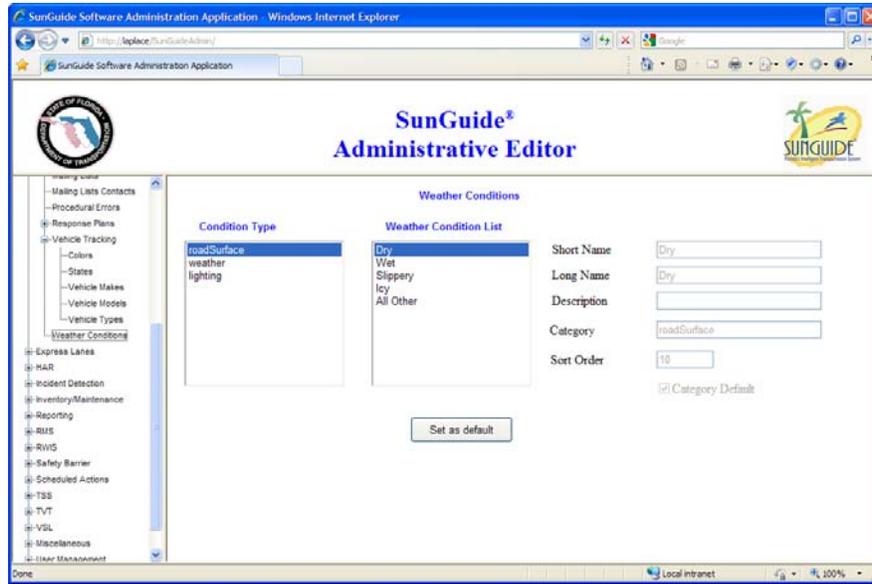
Figure 4–97 – Set Default Weather Conditions

4.4.6 Express Lanes Editor

The Express Lanes System Configuration Editor enables the system administrator to configure the Express Lanes system. Figure 4–98 shows the System Configuration screen. The system administrator can enter Toll Rate Open/Closed messages displayed during zero rate and closed modes, Lane Status messages displayed during zero rate, closed, and normal tolling modes, Set Segment Override Configuration, and set Maximum effective adjustment time, which is the maximum time an operator is allowed to "backdate" an override. The administrator may also toggle whether rate change alerts should be displayed on the SunGuide Operator Map. Additionally, a field is provided to specify a maximum rate update interval. This value is not used by the Pricing subsystem, but is provided to clients who may choose to use that value for their own purposes. This editor is opened by expanding the Express Lanes element of the Editor List frame, then clicking on System Configuration. The Administrative Editor will query the database and retrieve the current Express Lane System Configuration settings that were last saved to the database.
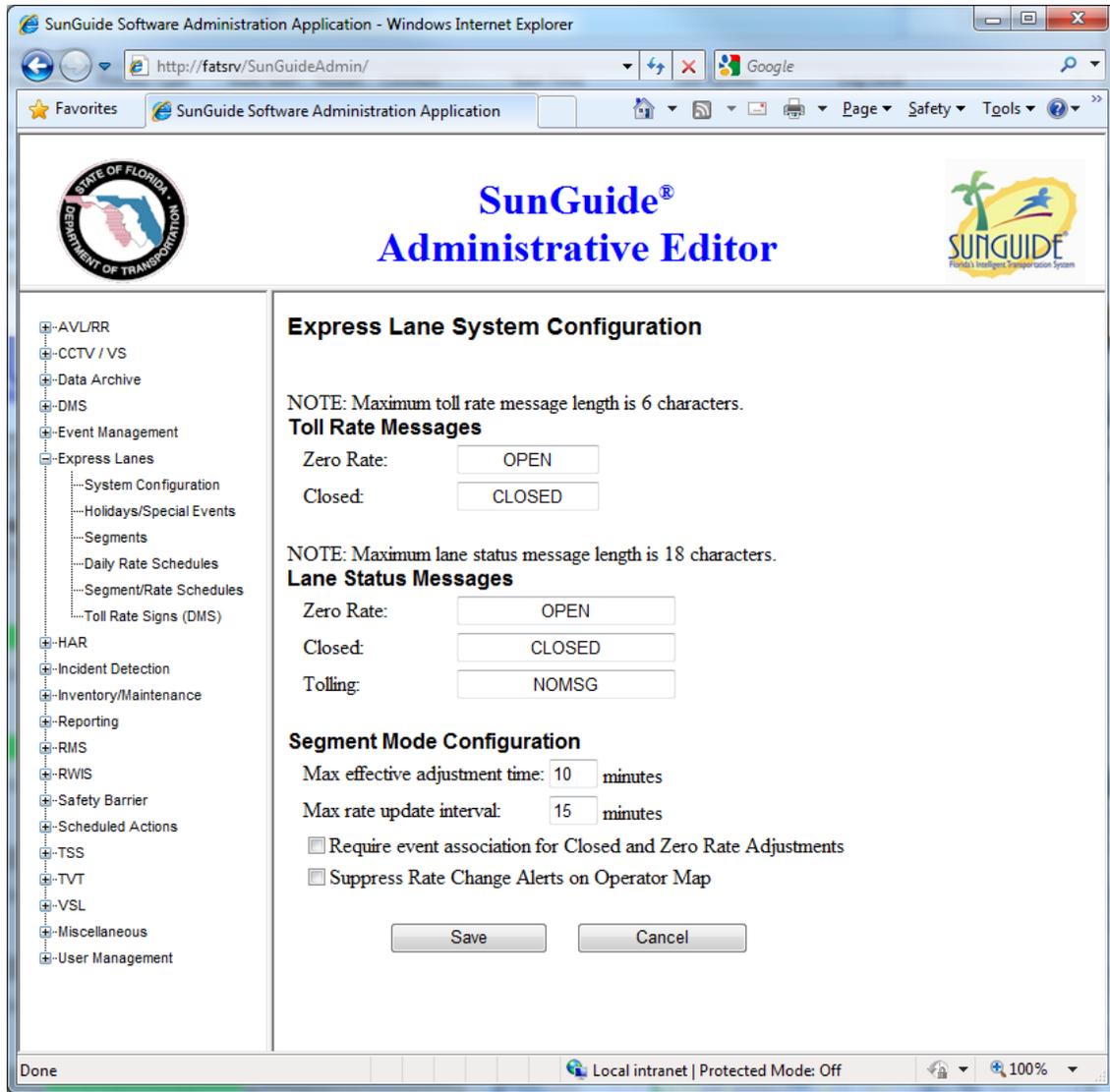
Figure 4–98 – Express Lanes System Configuration

The Express Lanes Holidays/Special Events Editor (see Figure 4–99) enables the system administrator to Add, Edit and Delete Holidays and Special events. This editor is opened by expanding the Express Lanes element of the Editor List frame, then clicking on Holidays/Special Events. The Administrative Editor will query the database and retrieve the current Holiday settings from the database.
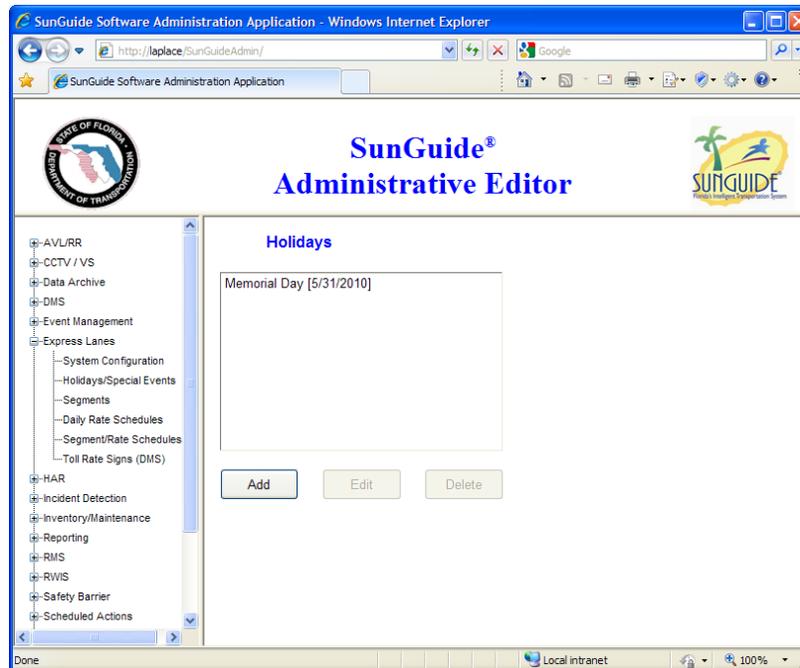
Figure 4–99 – Express Lanes Holiday / Special Events

The **Add** button is always enabled; once a Holiday or Special Event is selected, the **Edit** and **Delete** buttons are also enabled. Upon selecting either the **Add** or **Edit** options both route to the same page with only a few differences in the display.

Figure 4–100 shows an example of modifying a Holiday or Special Event. The administrator should complete all enabled fields, then click the **Save and Exit** or **Cancel** button. The administrator can set specific days to be considered as holidays, add single dates, or recurring dates.
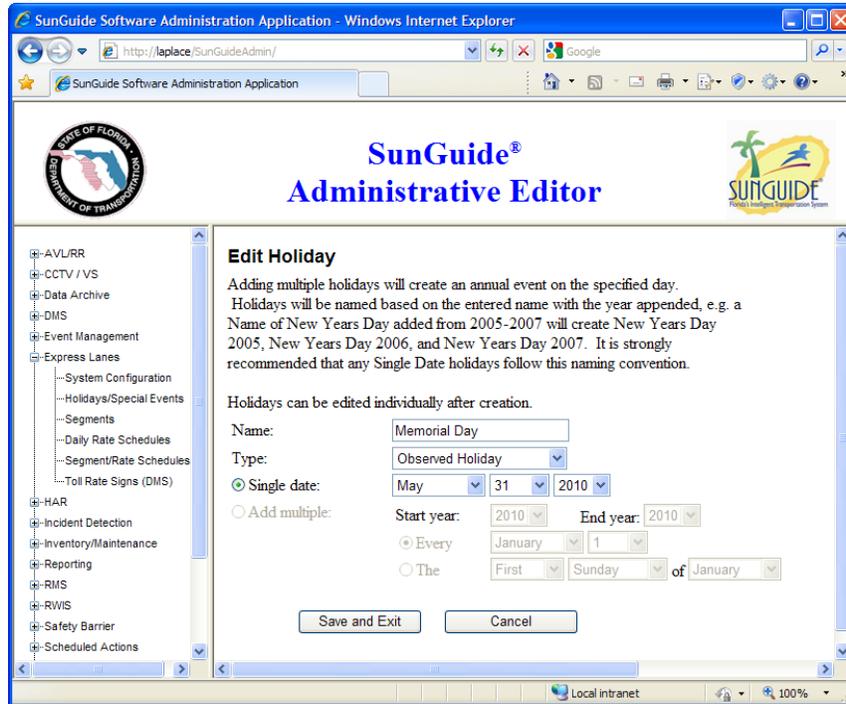
Figure 4–100 – Modify/Edit Holiday/Special Event

Special Events are considered the same as Holidays. Whenever a Special Event spans several days an event entry will be required for each of the individual dates associated with the Special Event.

The Express Segments Editor (see Figure 4–101) enables the system administrator to Add, Edit and Delete Express Lane segments. From this screen the system administrator can create and manage segments for Express Lanes, Associate Toll Rate Signs with Segments, and Displays can be marked as a Toll Gantry for a Segment. This editor is opened by expanding the Express Lanes element of the Editor List frame, then clicking on Segments. The Administrative Editor will query the database and retrieve all Express Lanes from the database.
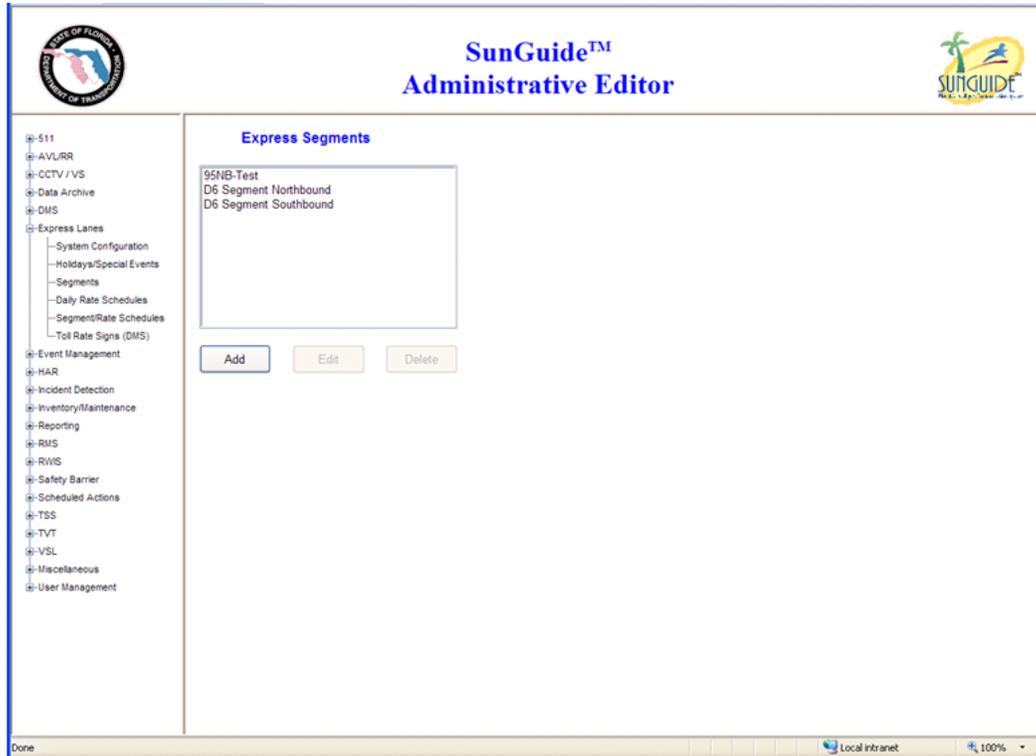
Figure 4–101 – Express Segments

The **Add** button is always enabled; once an Express Lane is selected, the **Edit** and **Delete** buttons are also enabled. Upon selecting either the **Add** or **Edit** options both route to the same page; in the **Edit** view, the name field will not be editable.

A unique Lane ID must be entered for the segment. This value is a required parameter when sending rate information to the FTE Middleware. The start and end points, along with the Roadway information, are used to associate events with the segment in the Toll Viewer application. The Turnpike ID and Gantry Name should be filled in with values provided by the Turnpike Authority. If this express lane immediately follows another express lane on the same roadway and direction, the upstream segment field may be completed. The maximum toll rate allowed for the segment must also be provided.

For purposes of displaying toll rate, gantry toll rate, and lane status signs to operators, each sign must be associated to a segment. The association is made by selecting a sign from the Available Toll Signs list or Available Lane Status Signs list and pressing the Add Sign button. The order of display of these signs may be altered by using up and down arrows that will appear next to the sign names if multiple signs are associated to the segment; this has no effect other than changing the order of display on the operator interface. If a particular sign is a gantry toll rate sign, and should not be updated until after the appropriate delay time on a rate change, the Gantry checkbox should be marked. All signs that do not have this box marked will be updated immediately upon rate changes.

Figure 4–102 shows an example of editing an Express Lane segment. The administrator should complete all fields, then click the **Save and Exit** or **Cancel** button.
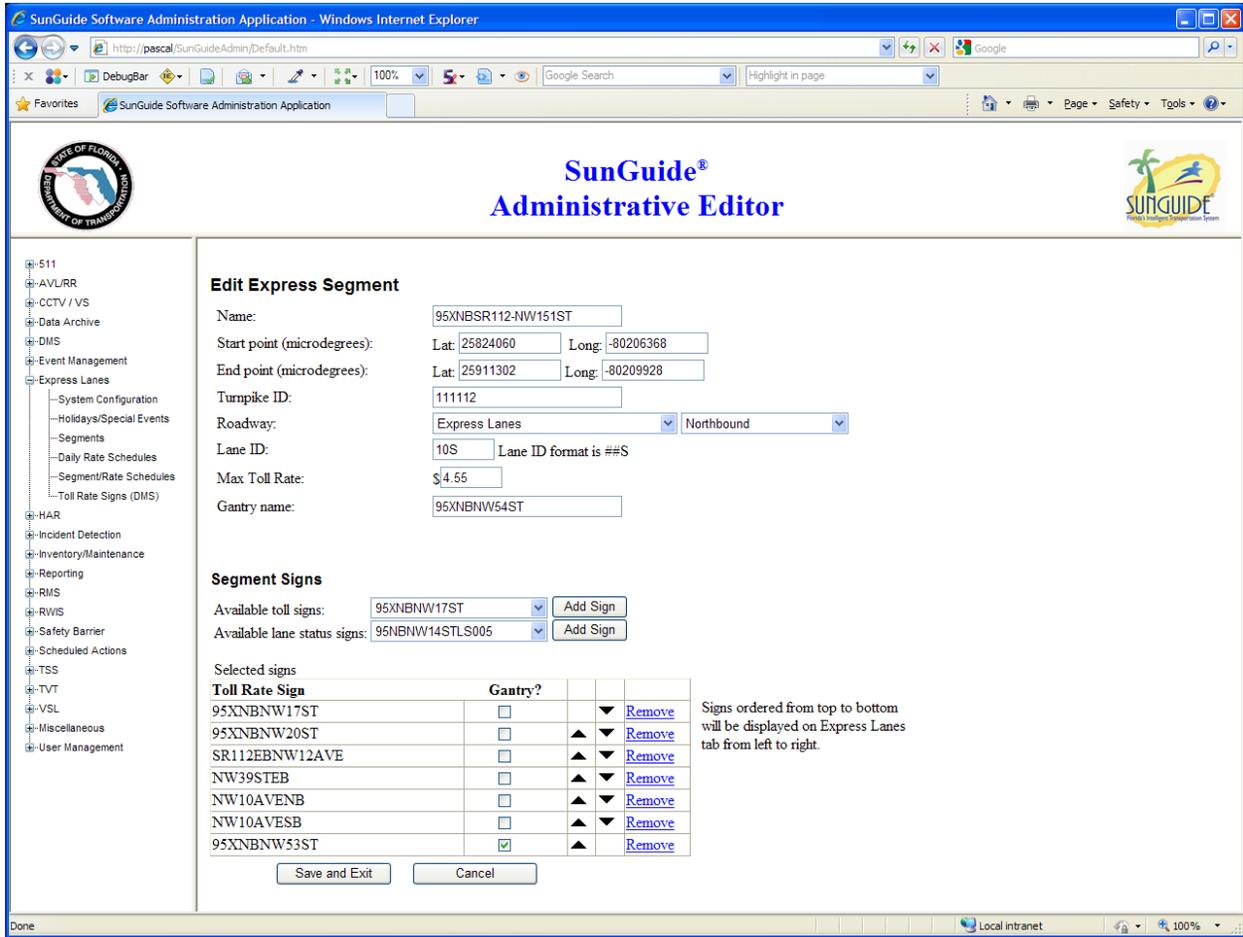
Figure 4–102 – Edit Express Segments

The Express Lanes Daily Rate Schedules Editor (see Figure 4–103) enables the system administrator to Add, Edit and Delete Daily Rate Schedules. This editor is opened by expanding the Express Lanes element of the Editor List frame, then clicking on Daily Rate Schedules. The Administrative Editor will query the database and retrieve all Daily Rate Schedules from the database. To "clone" (copy) an existing rate tables enter a new name in the **Save As** text box and press **Save as New**. To modify an existing rate, select the same time as the existing rate, enter a new rate, and press the **Add/Set Rate** button. Note that the midnight rate cannot be deleted; it may be changed to any desired rate, but a midnight rate must have a value and be present for all daily rate schedules. The system will by default set the midnight rate to zero but may be changed to any value as necessary. It is important to note that given rates will go into effect at the start time when a schedule is used.
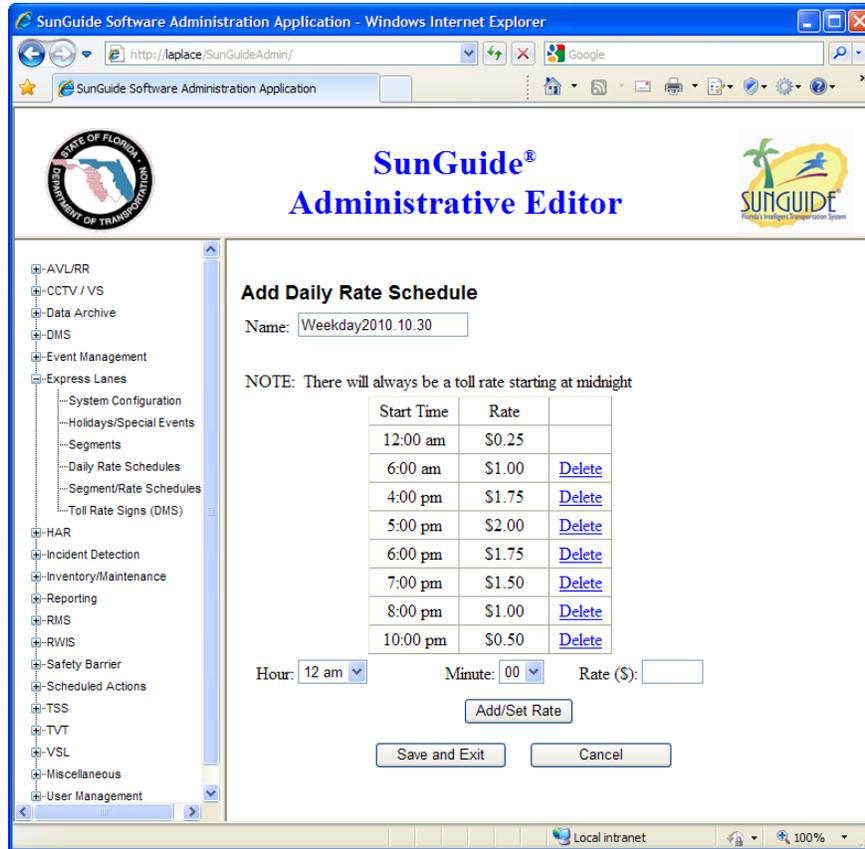
Figure 4–103 – Edit Daily Rate Schedules

The Segment/Rate Schedule Editor (see Figure 4–104) enables the system administrator to modifying a Segment/Rate Schedule. This editor is opened by expanding the Express Lanes element of the Editor List frame, then clicking on Segment/Rate Schedules. The Administrative Editor will query the database and retrieve all Segment/Rate Schedules from the database. The Add button is always enabled; once a Segment/Rate Schedule is selected, the **Edit** and **Delete** buttons are also enabled. Upon selecting either the **Add** or **Edit** options both route to the same page; in the Edit screen, the name may not be modified. Additionally, any Segment/Rate Schedules which have start times in the past may be viewed but not edited. The administrator should complete all fields, then click the **Save and Exit** or **Cancel** button.

When creating a new Segment/Rate Schedule, all combinations of day of week and day type must be selected. Schedules may not be saved unless all fields are completed. Schedules must also be assigned to express lane segments to take effect. Segments may be assigned to the schedule by selecting the segment from the list of Available Segments and pressing the Add Segment button.
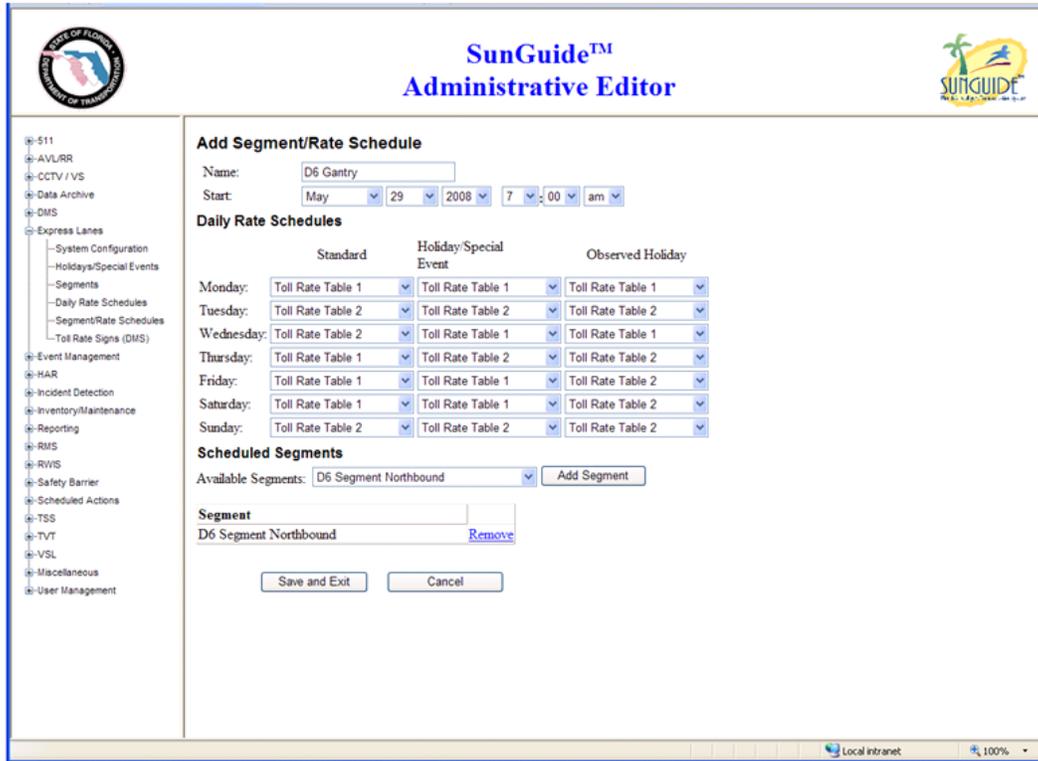
Figure 4–104 – Edit Segment/Rate Schedules

The Express Lanes Toll Rate Signs (DMS) Editor (see Figure 4–105) enables the system administrator to Add, Edit and Delete Toll Rate Signs (DMS). This editor is opened by expanding the Express Lanes element of the Editor List frame, then clicking on Toll Rate Signs (DMS). The Administrative Editor will query the database and retrieve all Toll Rate Signs (DMS) entries from the database.
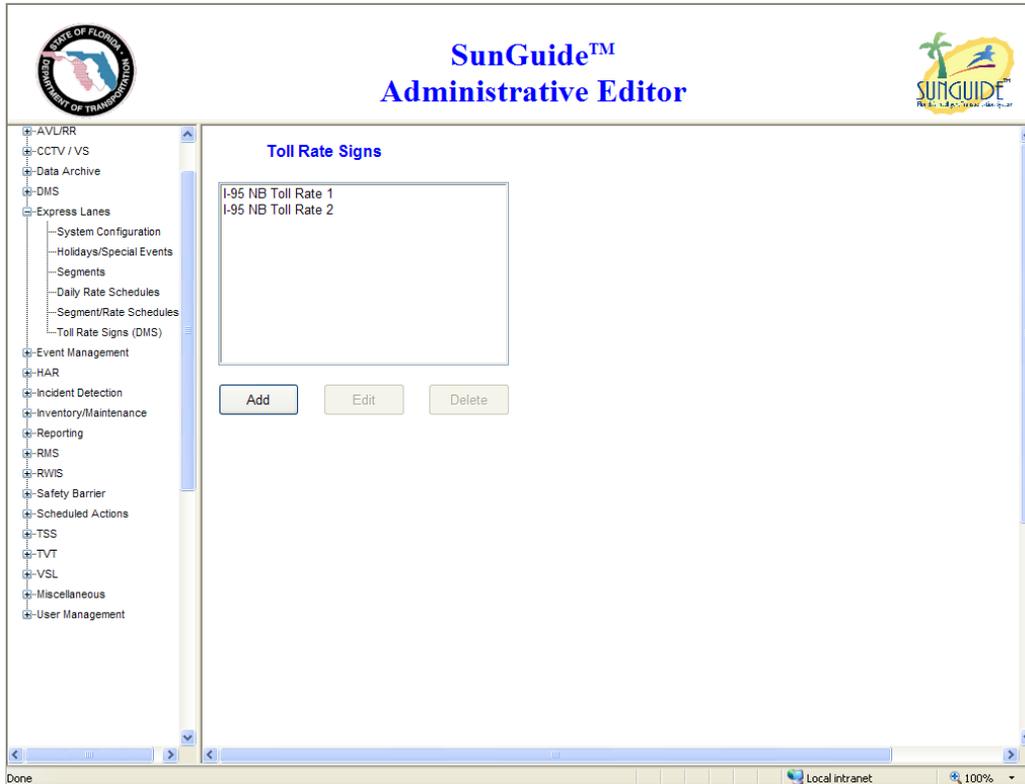
Figure 4–105 – Express Lanes Toll Rate Signs (DMS)

The **Add** button is always enabled; once a Toll Rate Signs (DMS) is selected, the **Edit** and **Delete** buttons are also enabled. Upon selecting either the **Add** or **Edit** options both route to the same page; in the Edit version of the page, the Name may not be modified.

A toll rate sign represents a single sign mounted along the express lane, possibly displaying toll rates to multiple destinations. Each sign may include one or more physical DMS devices. To add a physical DMS to a toll rate sign, select the DMS from the list of Available Toll Rate DMSs and press the Add DMS button. The DMSs should be listed in the order of their mounting on the sign, from top to bottom. The order may be adjusted using the arrows displayed next to the selected DMSs.

Once all DMSs for the sign have been added, each line of each DMS must be configured to indicate the static text displayed beside the DMS on the physical sign, and the list of express lane segments which should be used to calculate the toll displayed on the line (for example in "sign1:line1" sign1 indicates the name of the sign, and line1 indicates the line on the sign in which the text is to be displayed). For each line, select the radio button next to the line, enter the static text printed on the sign, then select one or more segments to add together to determine the toll rate to display on the DMS. (Multiples may be selected by holding the Control key and clicking each item.) Once the text and segments are selected, press the Update button to move the changes into the table. For toll rate signs, the static text is typically the name of the destination. For gantry toll rate signs, the static text will typically be "SunPass".

Figure 4–106 shows an example of modifying a Toll Rate Signs (DMS). The administrator should complete all fields, then click the **Save and Exit** or **Cancel** button.
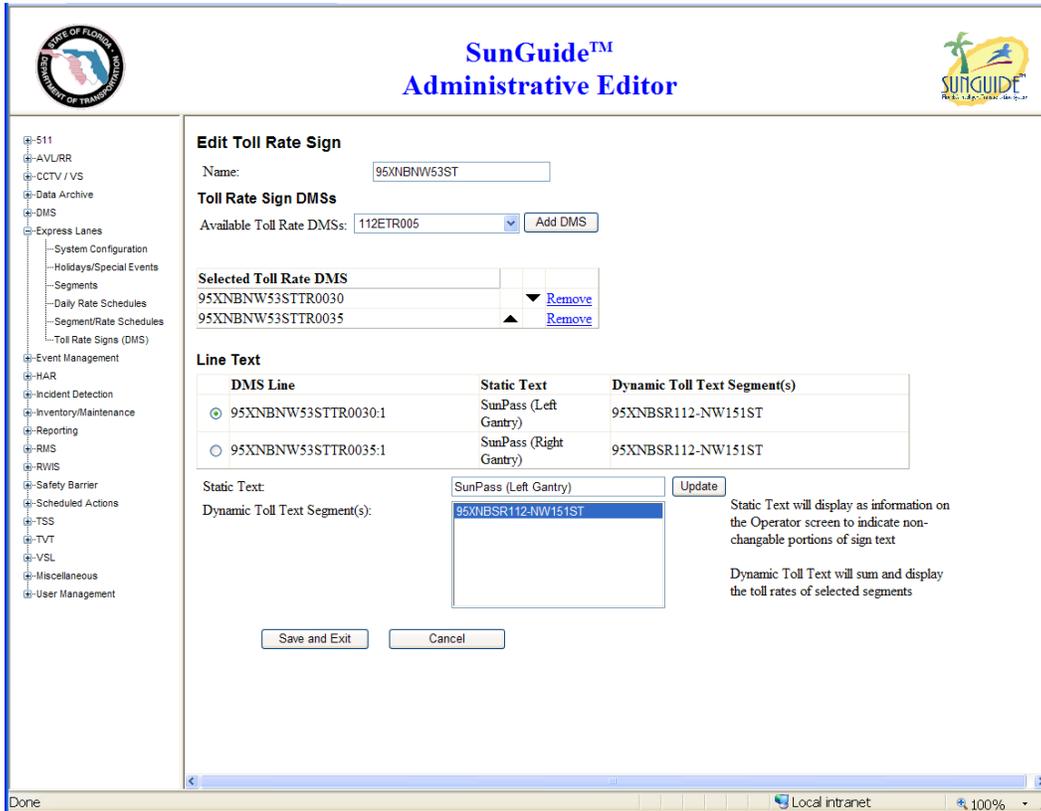
Figure 4–106 – Edit Express Lanes Toll Rate Signs

4.4.7 HAR Editor

The Highway Advisory Radio (HAR) Editor (see Figure 4–107) enables the system administrator to manipulate HAR data in the database. This editor is opened by expanding the HAR element of the Editor List Frame, then clicking on **Radio**. The Administrative Editor will query the database and retrieve a list of HAR devices currently in the database.

Figure 4–107 – HAR List

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page (see Figure 4–108) allowing detailed data to be entered/modified. The **Add** and **Edit** options both route to the same page, with only a few differences in the display.
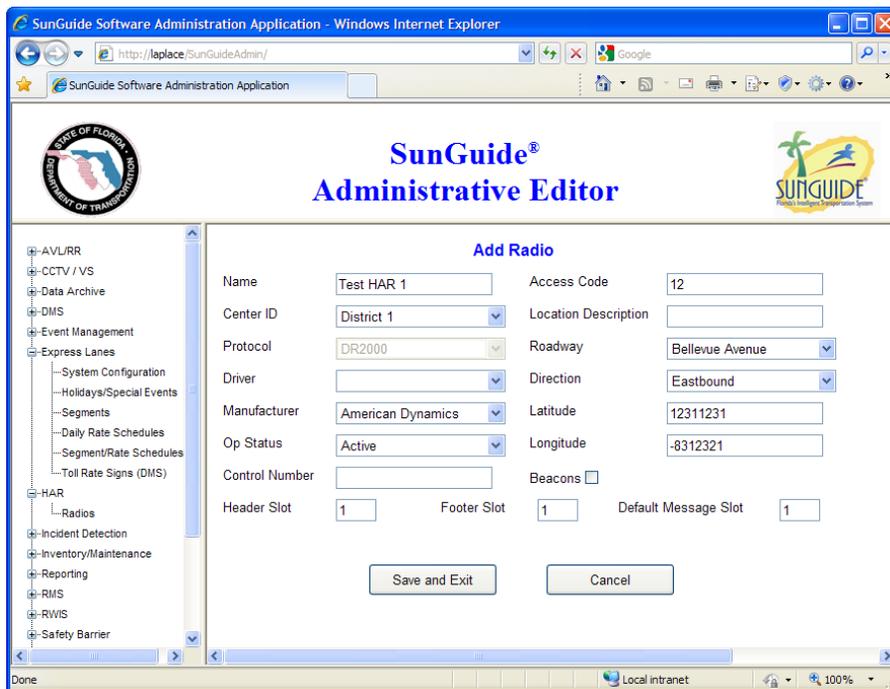
Figure 4–108 – Edit HAR Radio

Many of the dropdowns are populated with values from the database. Operations may be cancelled without altering the database by clicking on the **Cancel** button. Alternatively, the selections on the screen can be submitted to the database via selection of the **Save and Exit** button. When saving, required fields will be validated, and error messages will be displayed on the page when necessary. Users will be notified of errors encountered in accessing the database via informational messages sent to the Status Logger; messages will also appear on the page when needed. Critical errors will cause this page to remain in focus, forcing the user to manually cancel the operation. Non-critical errors as well as successful database access will result in browser redirection to the previous list page. If a new HAR was created, the user will see the name of this new HAR in the list on the list page.

4.4.8   Incident Detection Editor

The following sections describe the editors that are IDS related.

4.4.8.1 CitiLog Cameras

The Incident Detection Subsystem (IDS) CitiLog Camera Editor (see Figure 4–109) enables the administrator to manipulate CitiLog camera assignments in the database. This editor is opened by expanding the Incident Detection element of the Editor List Frame, then clicking on **CitiLog Cameras**. The Administrative Editor will query the database and retrieve a list of CitiLog cameras currently in the database.
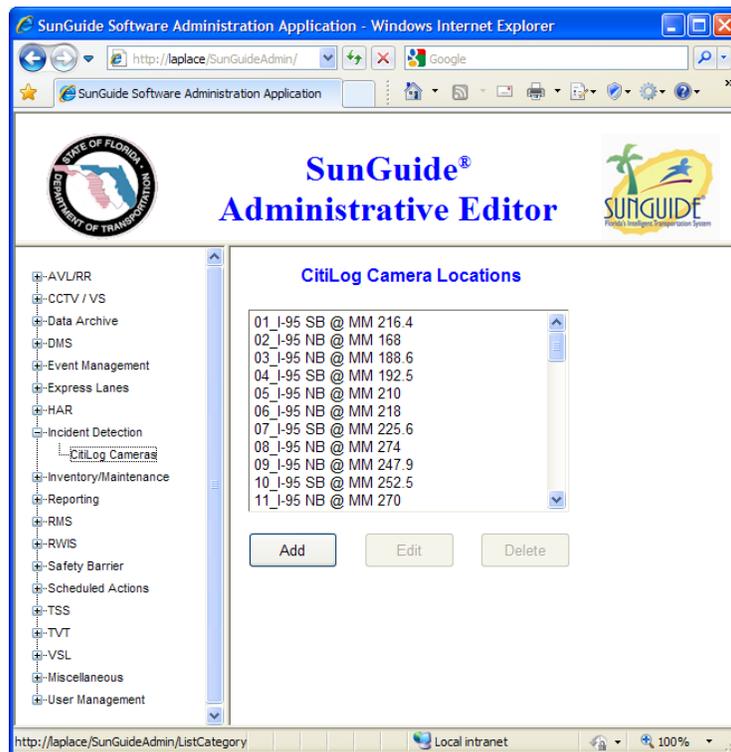
Figure 4–109 – CitiLog Camera List

The **Add** button is always enabled; if this button is selected a new CitiLog camera is added and the dialog shown in Figure 4–110 is displayed. The administrator may also select **Edit** to change

the values for a camera (a dialog similar to Figure 4–110 is displayed) or a device can be deleted by selecting **Delete**.
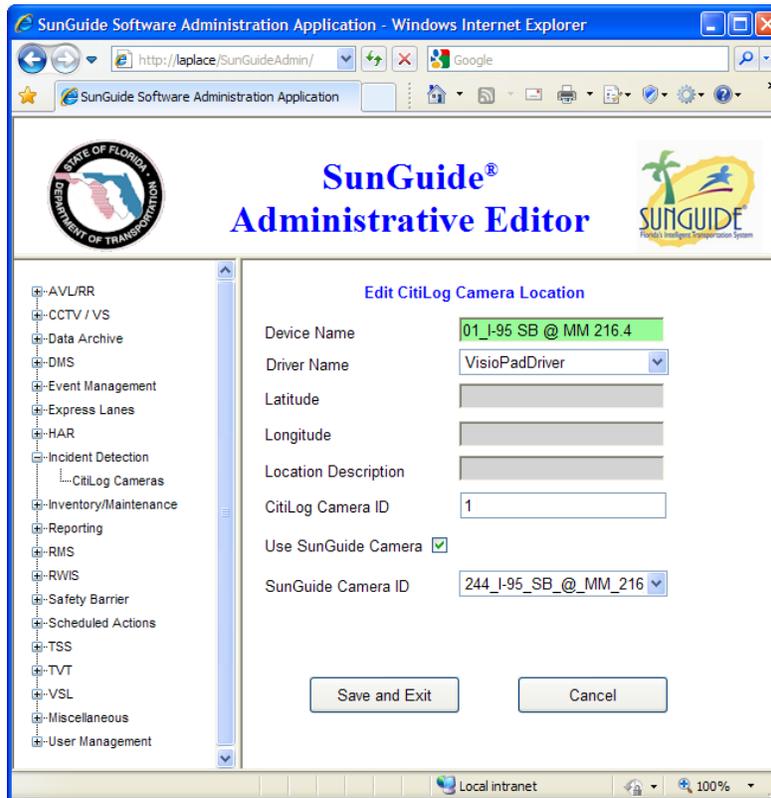
Figure 4–110 – Edit CitiLog Camera

When adding a new device, the device name may be specified.   The IDS driver which communicates with the CitiLog camera and the camera's CitiLog ID must also be specified. If the Use SunGuide Camera checkbox is selected, location information for the camera is automatically determined based on the selected SunGuide CCTV Camera.   Otherwise, the latitude, longitude, and description of the CitiLog Camera's location must be manually entered.

4.4.9 Inventory Management Editor

The following sections describe the editors that are IMS related.

4.4.9.1 Equipment

The Inventory and Maintenance Subsystem (IMS) Equipment Editor enables the administrator to manipulate equipment data in the database.   This editor is opened by expanding the Inventory/Maintenance element of the Editor List Frame, then clicking on **Equipment** (see Figure 4–111).   The Administrative Editor will query the database and retrieve a list of equipment currently in the database.
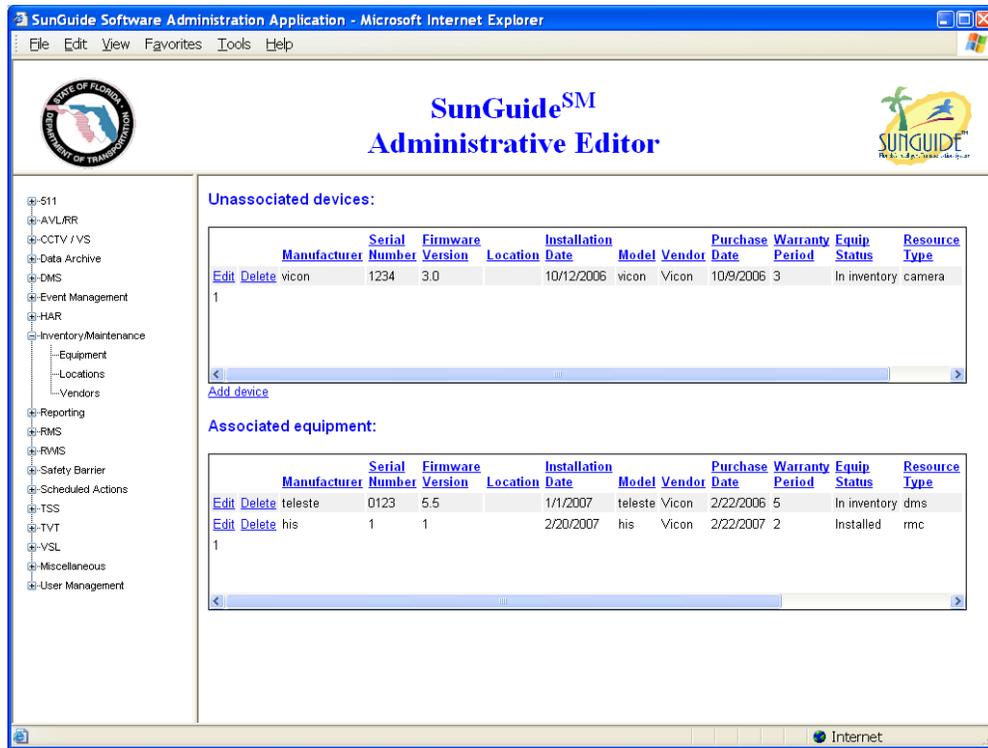
Figure 4–111 – IMS Equipment List

The **Add Device** button is always enabled; if this button is selected a new is added and the dialog shown in Figure 4–112 is displayed. The administrator may also select **Edit** to change the values for a device (a dialog similar to Figure 4–112 is displayed) or a device can be deleted by selecting **Delete**.
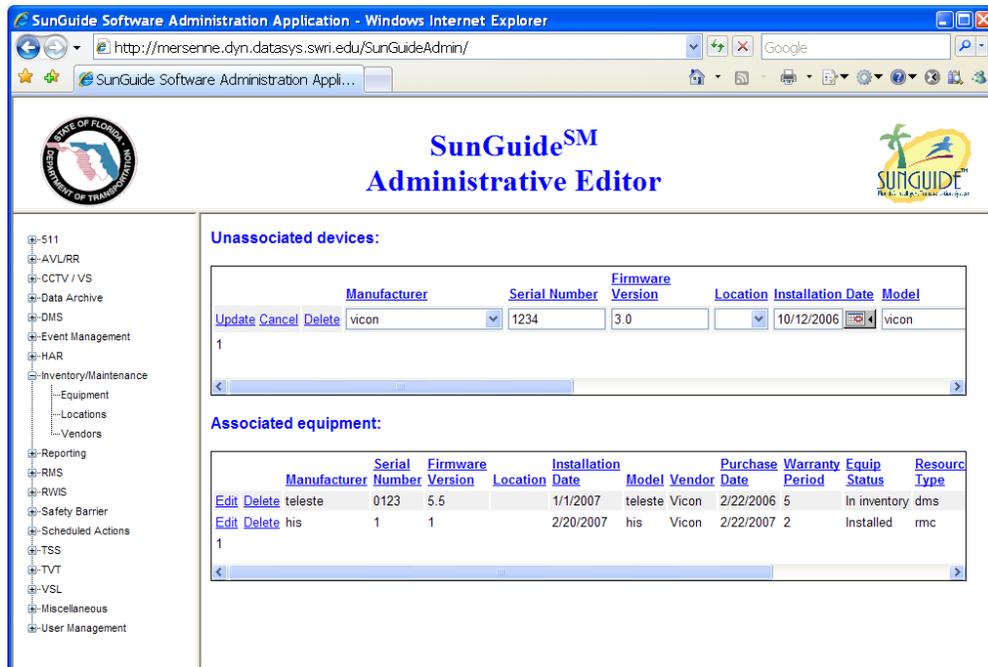
Figure 4–112 – Edit IMS Equipment

4.4.9.2 Locations

The IMS Locations Editor enables the administrator to manipulate equipment location data in the database. This editor is opened by expanding the Inventory/Maintenance element of the Editor List Frame, then clicking on **Locations** (see Figure 4–113). The Administrative Editor will query the database and retrieve a list of equipment locations currently in the database.
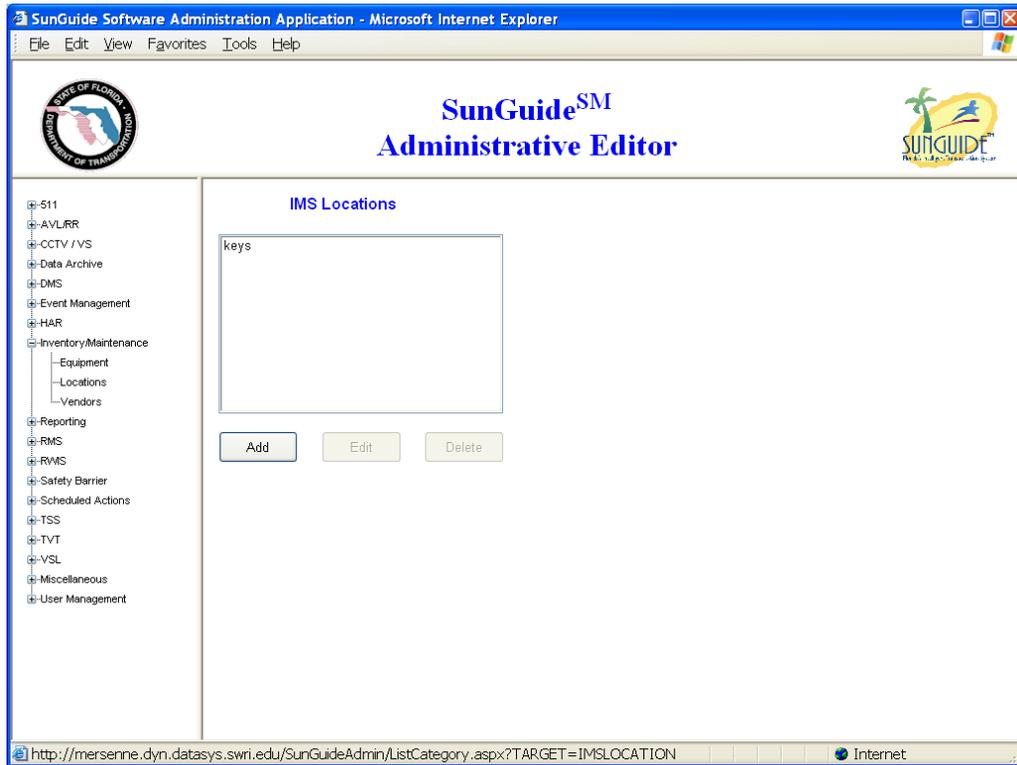
Figure 4–113 – IMS Locations List

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified. The **Add** and **Edit** options both route to the same page, with only a few differences in the display. Figure 4–114 shows an example of modifying a location. The user should enter all information to be stored in the database for this location, and then click the **Save and Exit** button.
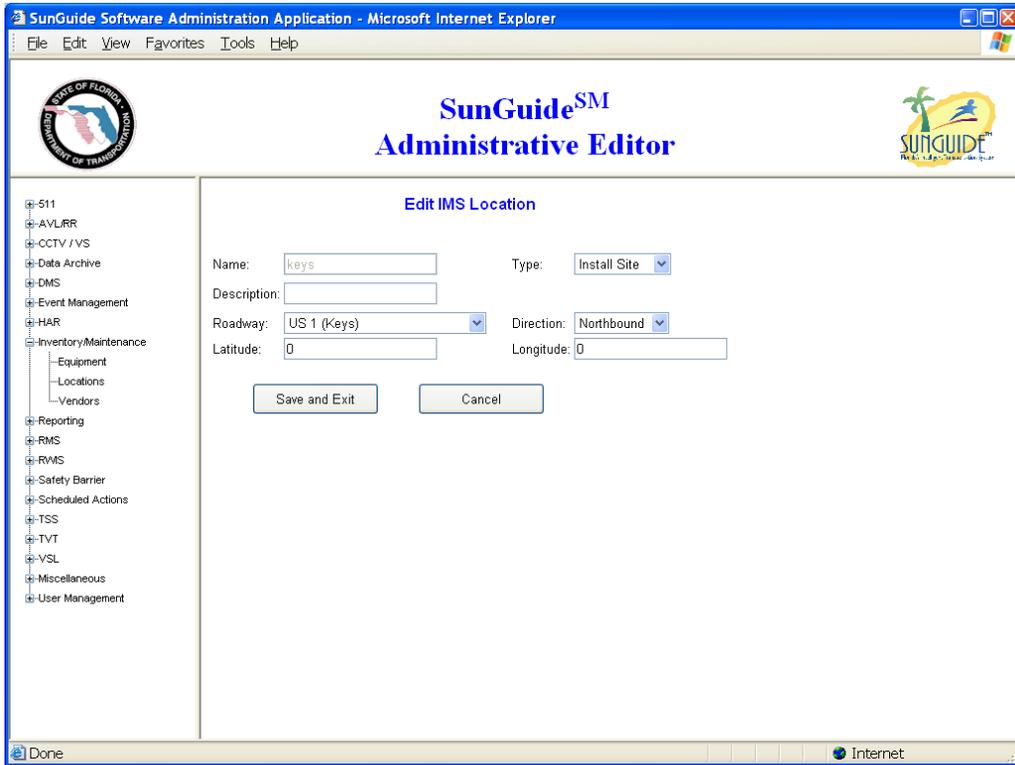
Figure 4–114 – Edit IMS Locations

4.4.9.2.1 Vendors

The IMS Vendors Editor enables the administrator to manipulate equipment vendor data in the database. This editor is opened by expanding the Inventory/Maintenance element of the Editor List Frame, then clicking on **Vendors** (see Figure 4–115). The Administrative Editor will query the database and retrieve a list of equipment vendors currently in the database.
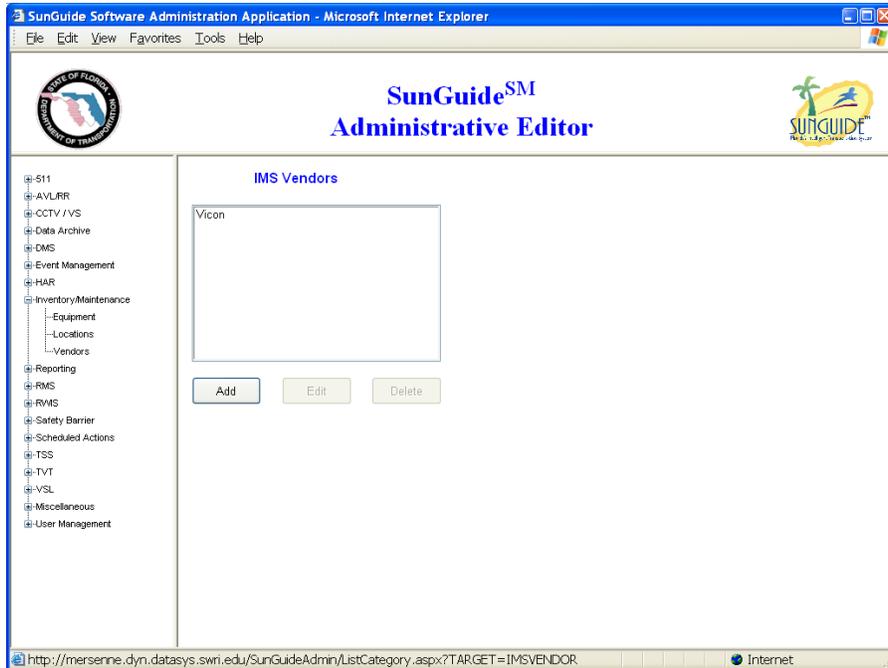
Figure 4–115 – IMS Vendor List
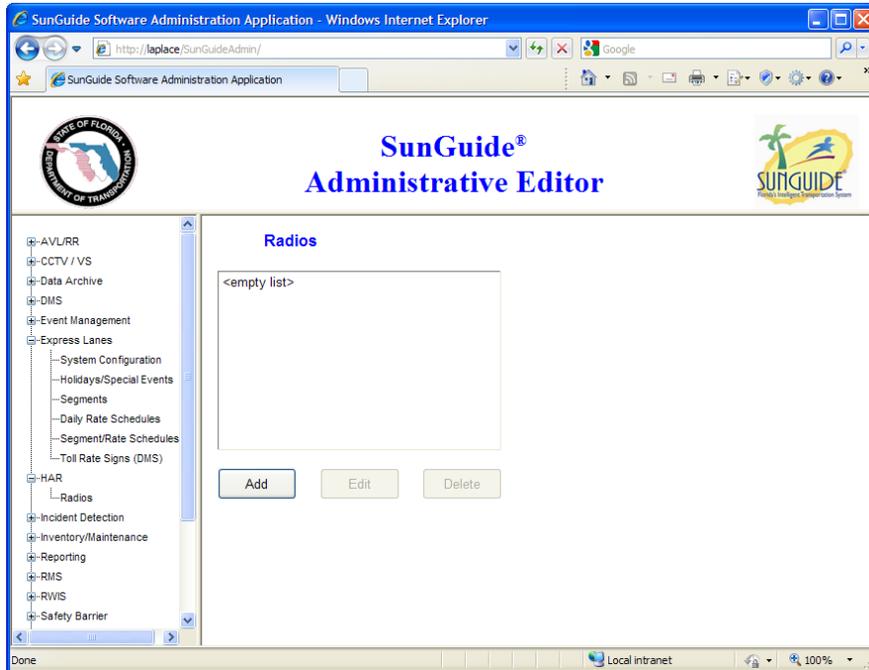
The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified. Figure 4–116 shows an example of adding a new vendor. The page displays with all fields enabled and blank. The user should enter all information to be stored in the database for this vendor, and then click the **Save and Exit** button.
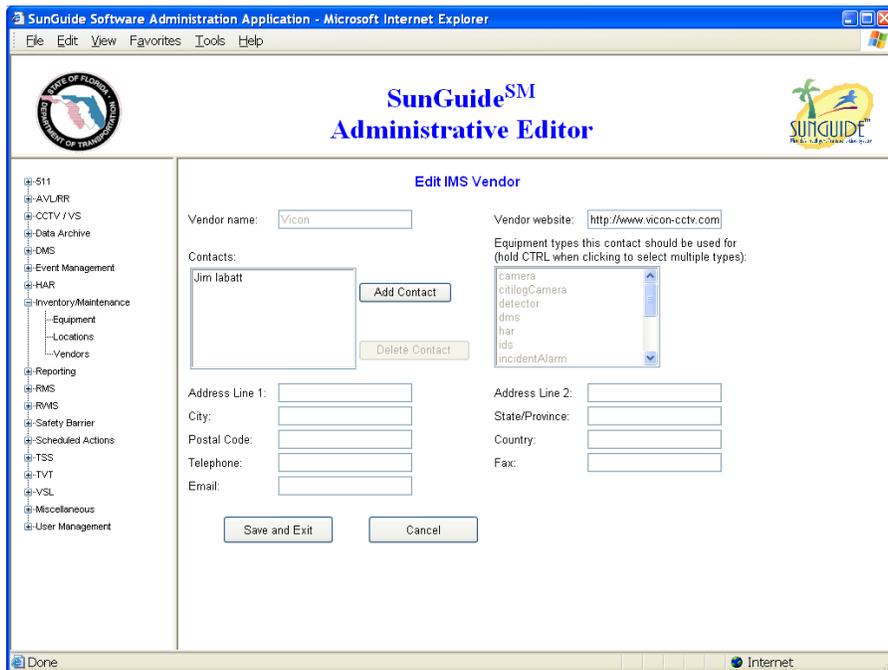
Figure 4–116 – Edit IMS Vendors

4.4.10 Reporting Editor

The Reporting Editor enables the system administrator to configure (add, edit, delete) groups of reports and configure in which groups individual reports appear. The editor is opened by expanding the Reporting element of the Editor List Frame, then clicking on either **Report Groups** or **Reports** (see Figure 4–117)
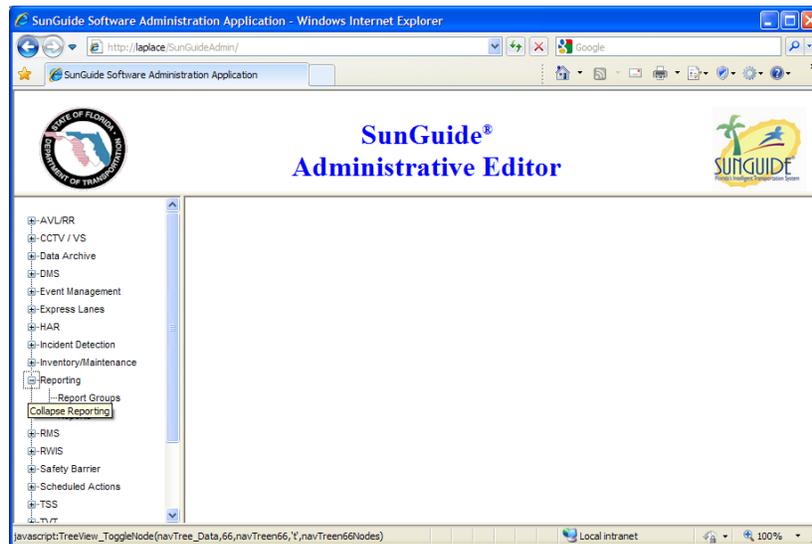
Figure 4–117 – Reporting Menu

4.4.10.1 Report Groups

On the Reports Tab of the operator interface, reports appear in logical groups to facilitate ease of navigation; by clicking on **Report Groups,** the system administrator is able to create new groups into which reports can be placed (see Figure 4–118 –).
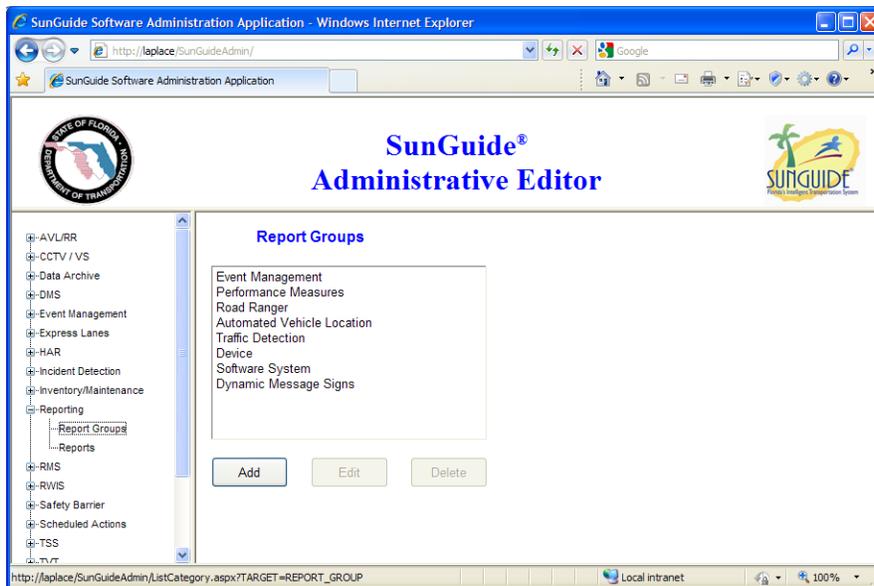
Figure 4–118 – Report Groups LIsting

The system administrator can take one of three actions:

- The system administrator can add a new report group by selecting **Add,** in Figure 4–119 a new report group is being added to the report group menu tree.
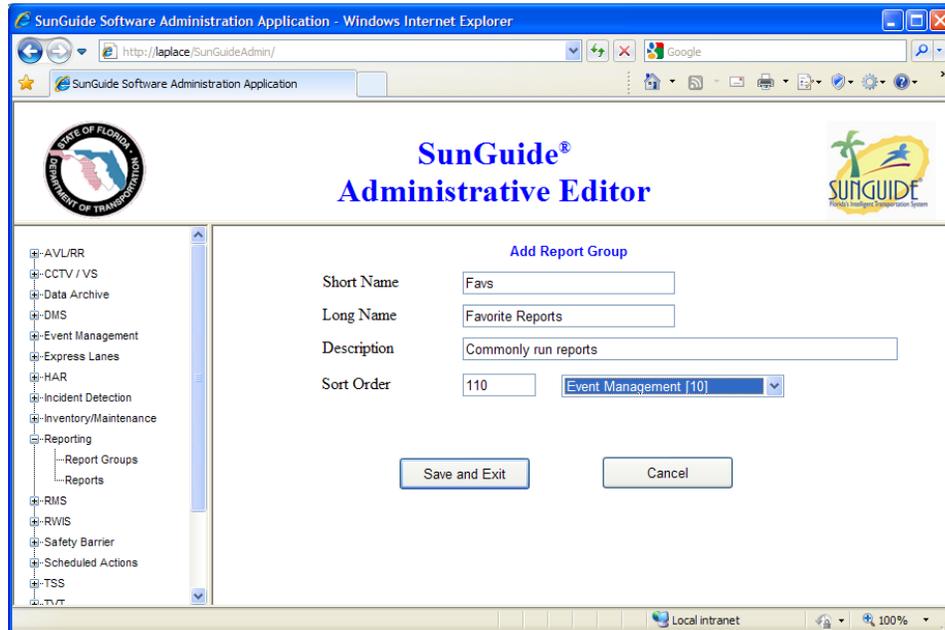
Figure 4–119 – Adding a Report Group

- The system administrator may edit the report group by selecting a report group and then clicking on the **Edit** button. Figure 4–120 shows how the previously entered "Favorite Reports" group may be edited to more accurately reflect what the report group is, i.e. "Monthly Reports." Note that the only field that cannot be edited is the Short Name.
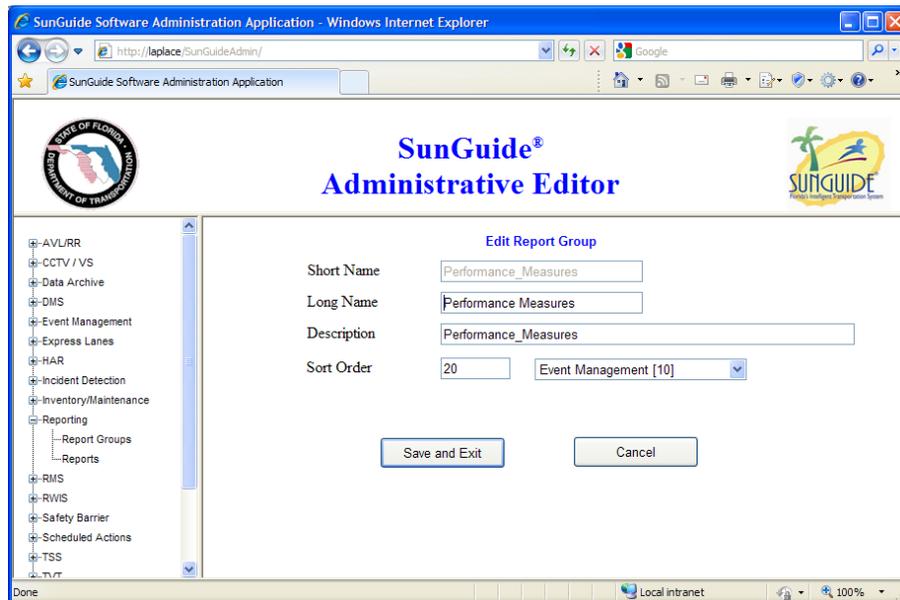
Figure 4–120 – Editing a Report Group

- The system administrator may delete a report group by selecting a report group and then clicking on the **Delete** button. A confirmation screen will be displayed that allows the administrator to confirm the delete or cancel the delete.

The fields are

- Short Name: is a database key field which must be unique among report group names,

- Long Name: is the name which will be displayed on the report menu tree

- Description: a description field

- Sort Order: sort order controls where in the report menu tree this new item will appear

4.4.10.2 Reports

The system administrator uses the **Reports** option on the Editor List Frame to control what reports appear in which report group. The first step is selecting a report group that has been created previously and clicking the Edit button (see Figure 4–121)

Figure 4–121 – Report Editing Screen

In the next screen, a list of the reports previously configured with then group is displayed and the system administrator may elect to add a report, modify a reports characteristics, delete a report from this group or cancel the operation. Reports may appear in more than one report group. In Figure 4–122 the administrator is adding a report to the newly created Monthly Reports group.
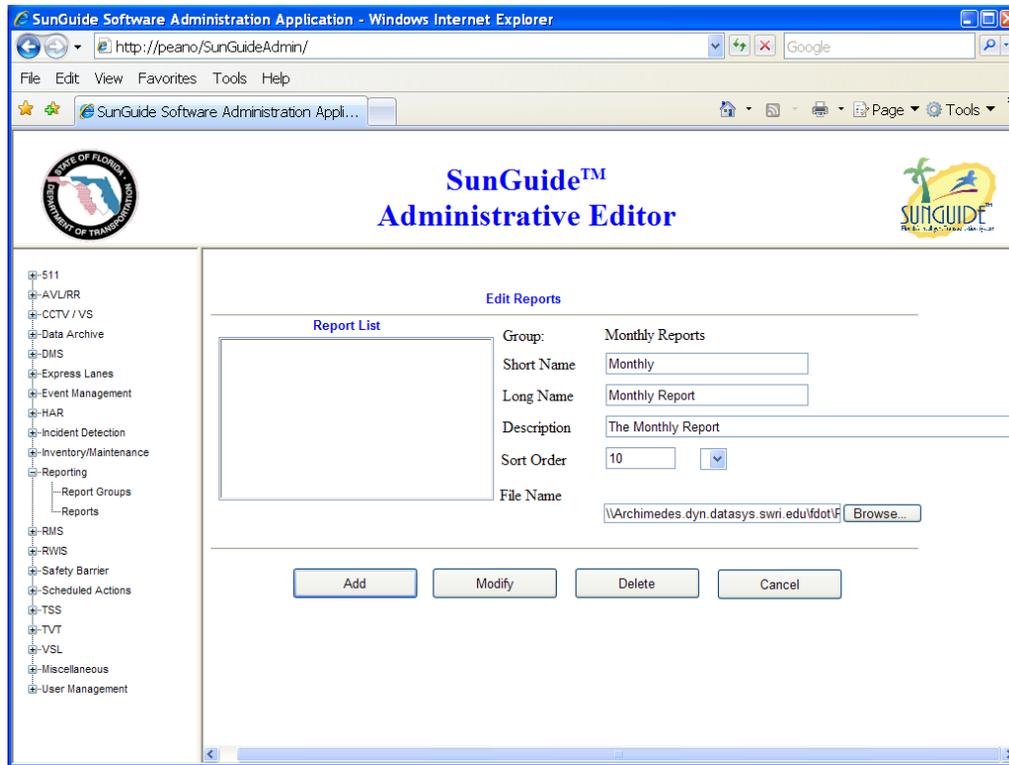
Figure 4–122 – Adding a Report to a Report Group

The fields are

- Report list: a list of reports previously added to this report list

- Group: chosen on the previous screen

- Short Name: a database key that must be unique

- Long Name: the name of the report as it will be displayed to the user

- Description: a field that describes what this report is

- Sort Order: an integer that controls the order the reports within this report group are displayed

- File Name: the Crystal Report ".rpt" file for the report

This operation is completed by clicking the **Add** button. Once a report has been added to the group clicking on the report name in the report list displays information about the report and makes the data available for modification or deletion.

4.4.11 Ramp Meter Editor

The following sections describe the editors that are RMS related. The system operates in checks and balances loop with the TSS system. If the two systems are out of sync or not connected to each other then fuzzy metering will not be possible.

The following figure contains a typical configuration of a segment of a Freeway and a Ramp.

Ramp Meter Configuration
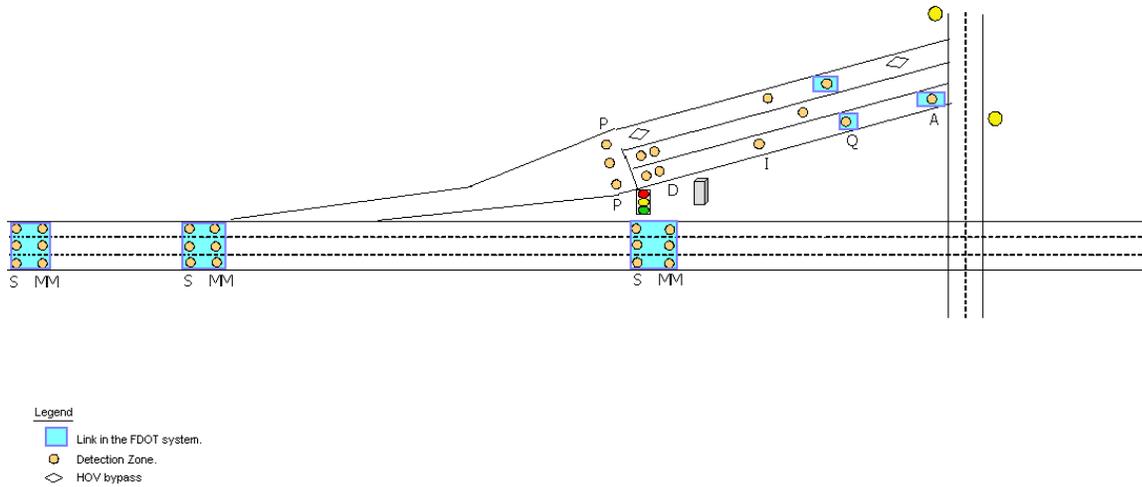
Figure 4–123 – Ramp Meter Configuration

Loop Naming Scheme

MM – Mainline Roadway

S – Speed Trap

P – Passage detection zone

D – Demand detection zone

I – Ramp Intermediate detection zone

Q – Ramp Queue detection zone

A – Advance Queue detection zone

It is required by the current architecture, to define several links on the ramp that will contain the different lane objects to obtain the granularity of the detection zone.

Initial detector configuration must be completed in order described for proper configuration:

- Add/Configure TSS detector in accordance with 4.4.15.
  - o Detector name and config info must be the same as the RM detector to be added in next step
  - o Map detector loops for Fuzzy Inputs (Mainline, Ramp Queue and Adv Ramp Queue). In the event that either a Ramp Queue or Adv. Ramp Queue is unavailable on the ramp, a detector must be mapped anyway. The firmware will then be configured to provide an input for this link but it will always return a value of 0. This allows the system to meter in Fuzzy in the event that either type of Ramp Queue is missing from the ramp.
  - o Detector loop number assignment must match the RM Firmware loop assignments.
- Add/Configure RM Detector

> o Add this detector only after the corresponding TSS detector has been added.
> o Name and configure detector data utilizing same data from corresponding TSS detector to include the name.
> o Once detector is added, assign fuzzy lanes. Fuzzy lanes must be assigned for mainline, ramp queue, adv. ramp queue, upstream, and downstream detectors. The upstream and downstream fuzzy lanes are not local to the controller. On the initial detector add process, a dummy fuzzy lane is added. Delete this lane during fuzzy lane configuration.

4.4.11.1 Fuzzy Lanes

The RMS Fuzzy Lanes Editor enables the administrator to manage the fuzzy lanes associated with a Ramp Meter controller. This editor is opened by expanding the RMS element of the Editor List Frame, then clicking on **Fuzzy Lanes** (see Figure 4–124). The Administrative Editor will query the database and retrieve a list of the Ramp Meter Controllers currently in the database.
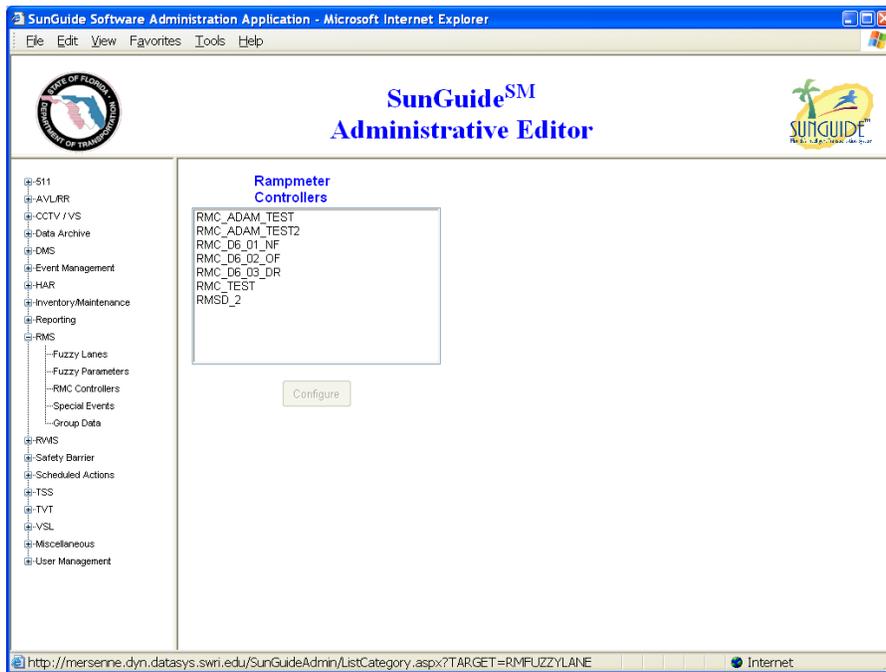

Figure 4–124 – RMS Fuzzy Lanes List

The **Configure** button is enabled once a controller is selected; once the button is selected the dialog shown in Figure 4–125 is displayed. This dialog will allow the administrator to edit the fields associated with the lanes controlled by the selected controller. The administrator should enter all information to be stored in the database for this fuzzy lane, then click the **Save** or **Cancel.**
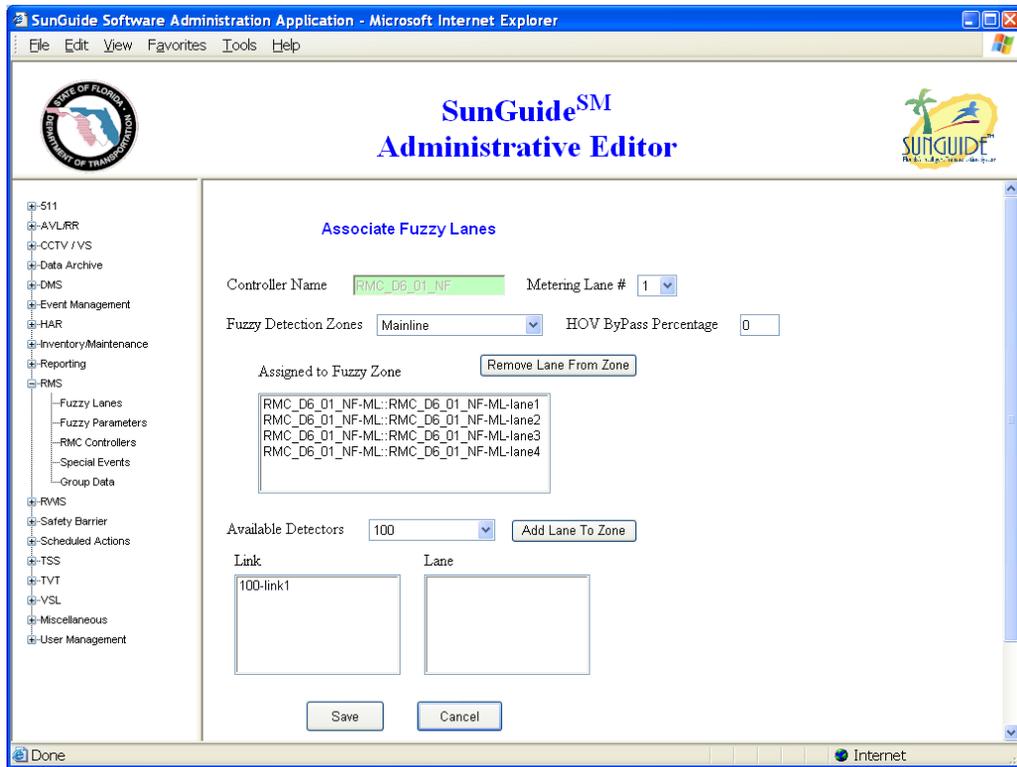
Figure 4–125 – Edit RMS Fuzzy Lanes

4.4.11.2 Fuzzy Parameters

The RMS Fuzzy Parameters Editor enables the administrator to manage the parameters associated with the fuzzy lanes of a Ramp Meter controller. This editor is opened by expanding the RMS element of the Editor List Frame, then clicking on **Fuzzy Parameters** (see Figure 4–126). The Administrative Editor will query the database and retrieve a list of the Ramp Meter Controllers currently in the database.

Figure 4–126 – RMS Fuzzy Parameters List

The **Edit** button is enabled once a controller is selected; once the button is selected the dialog shown in Figure 4–127 is displayed. This dialog will allow the administrator to edit the parameter fields associated with the lanes controlled by the selected controller. The administrator should enter all information to be stored in the database for this fuzzy parameter, then click the **Save** or **Cancel** button.

Figure 4–127 – Edit RMS Fuzzy Lanes

4.4.11.3 RMC Controllers

The RMC Controllers Editor enables the administrator to manage Ramp Meter controllers. This editor is opened by expanding the RMS element of the Editor List Frame, then clicking on **RMC Controllers** (see Figure 4–128). The Administrative Editor will query the database and retrieve a list of the Ramp Meter Controllers currently in the database.
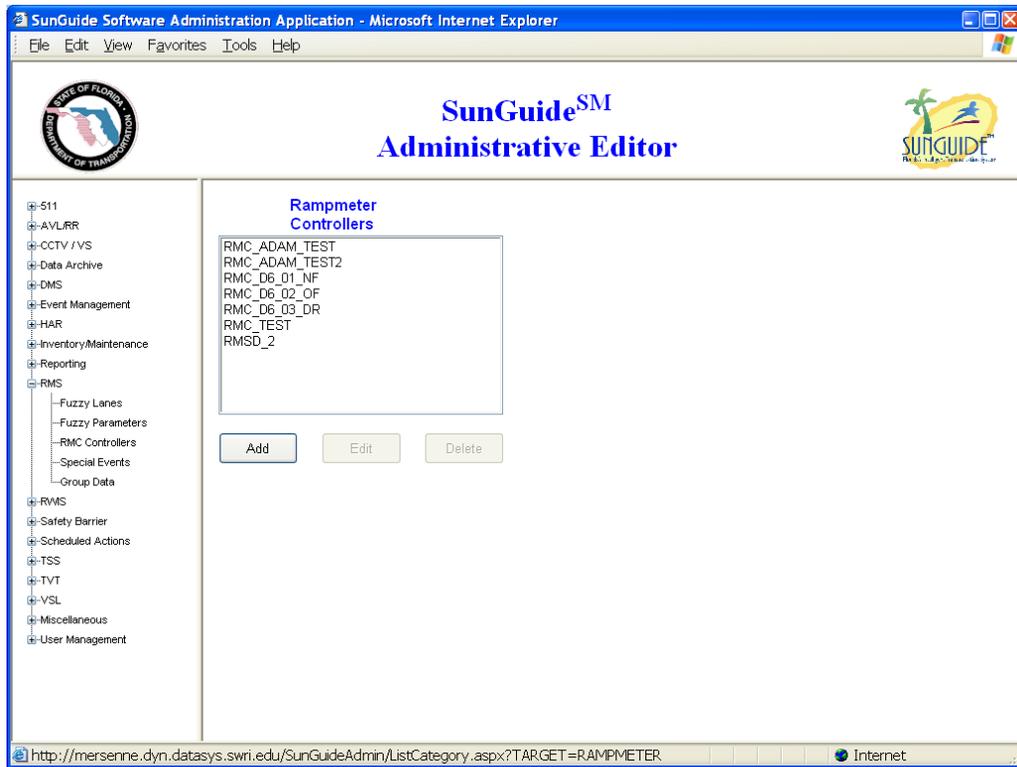
Figure 4–128 – RMC Controllers List

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified. The **Add** and **Edit** options both route to the same page, with only a few differences in the display.

Figure 4–129 shows an example of modifying a Ramp Meter controller. The administrator should enter all information to be stored in the database for this controller, and then click the **Save and Exit** button.
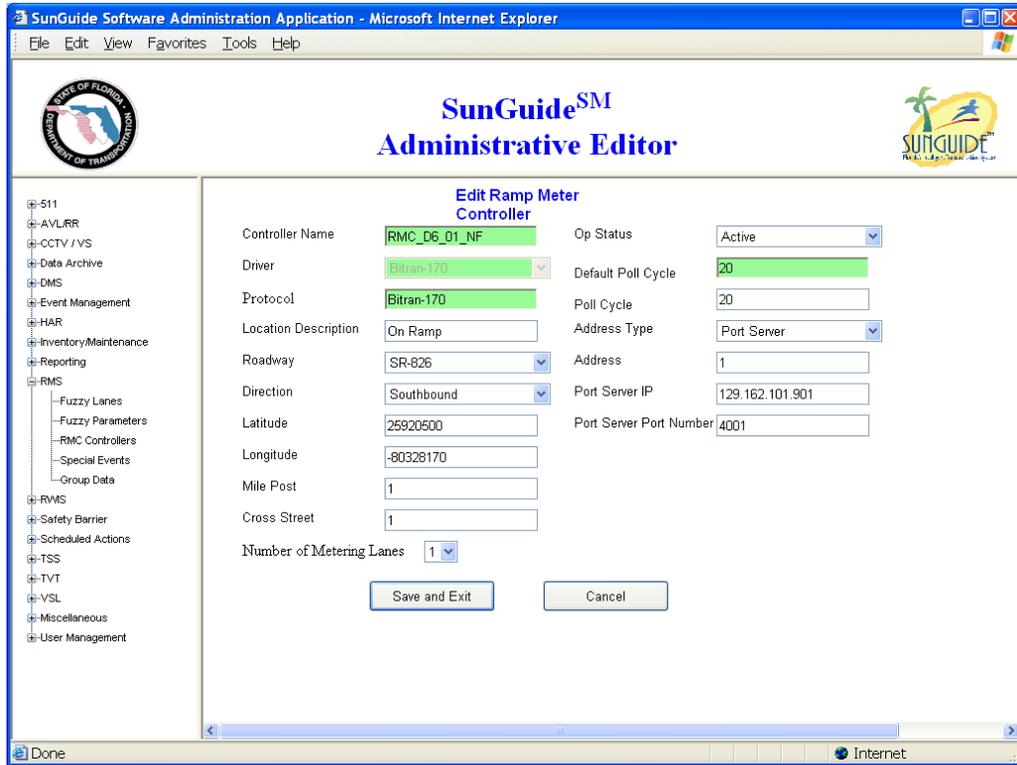
Figure 4–129 – Edit RMS Controllers

4.4.11.4 Special Events

The RMS Special Events Editor enables the administrator to manage special events for the Ramp Meter subsystem. This editor is opened by expanding the RMS element of the Editor List Frame, then clicking on **Special Events** (see Figure 4–130). The Administrative Editor will query the database and retrieve a list of the Special Events currently in the database.
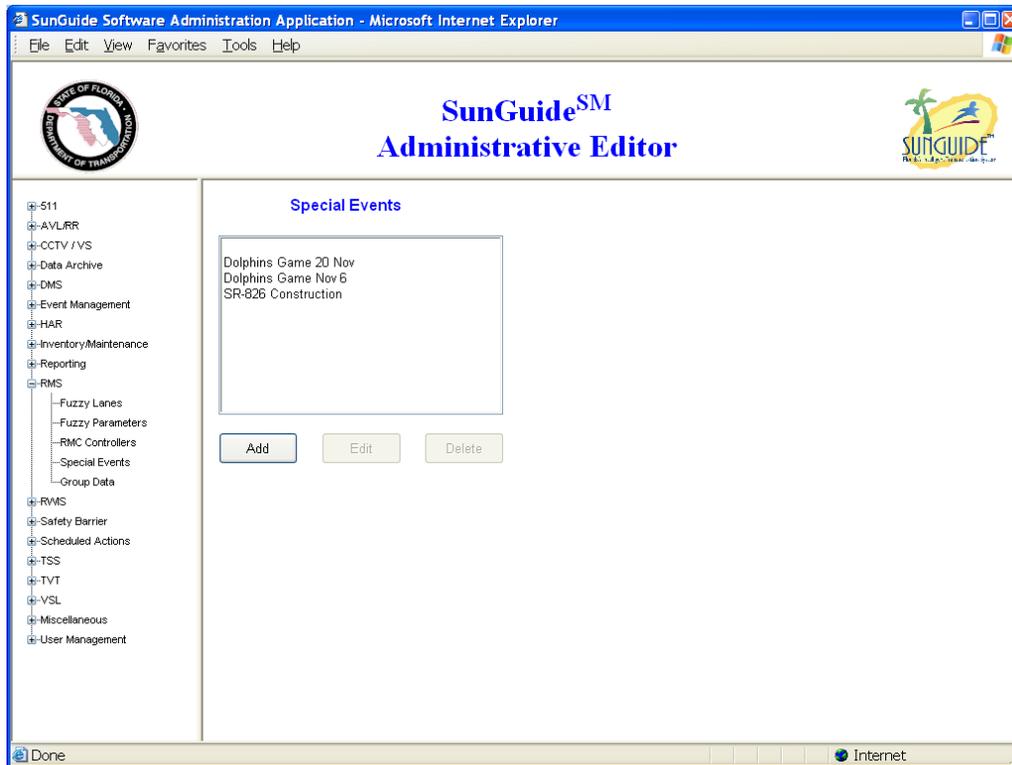
Figure 4–130 – RMS Special Events List

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified. The **Add** and **Edit** options both route to the same page, with only a few differences in the display.

Figure 4–131 shows an example of modifying a special event. The administrator should enter all information to be stored in the database for this special event, then click the **Save** or **Cancel** button.
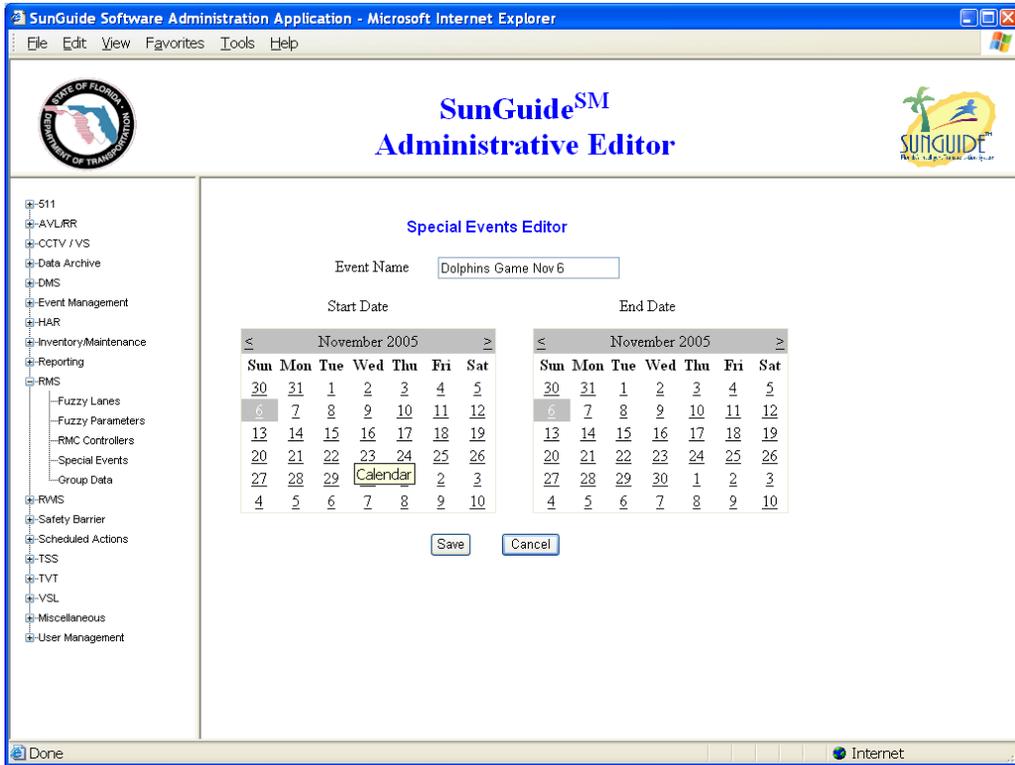
Figure 4–131 – Edit RMS Special Events

4.4.11.5 Group Data

The RMS Group Editor enables the administrator to manage the groups of Ramp Meter controllers that have been defined. This editor is opened by expanding the RMS element of the Editor List Frame, then clicking on **Group Data** (see Figure 4–132). The Administrative Editor will query the database and retrieve a list of the Ramp Meter groups currently in the database.
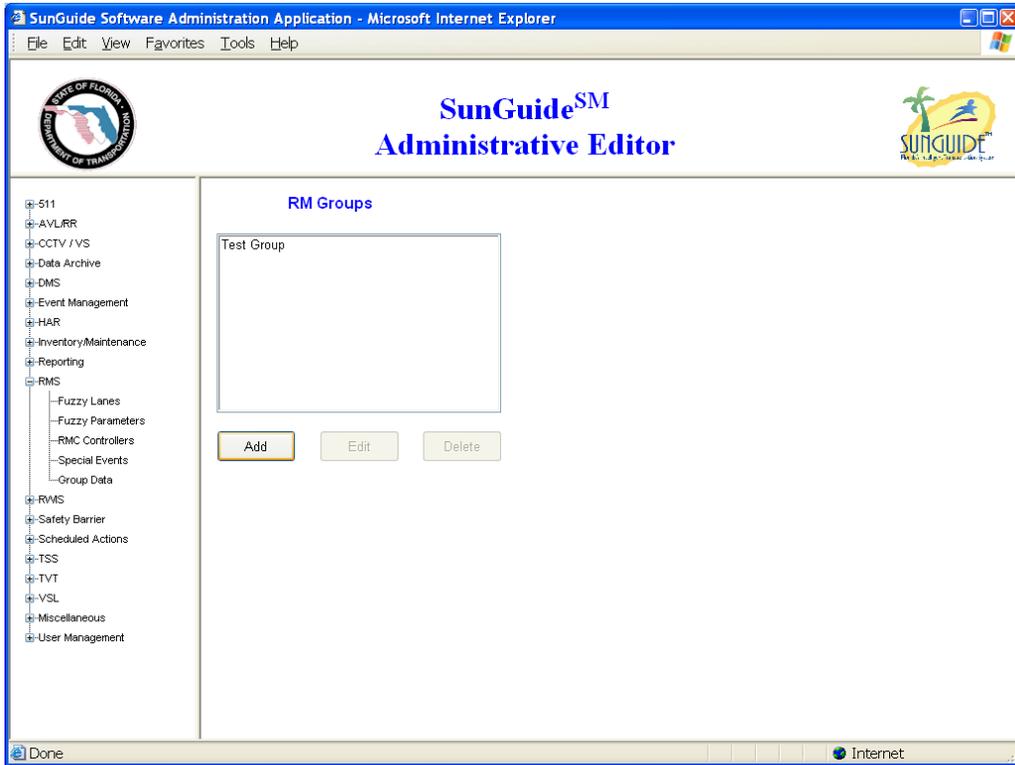
Figure 4–132 – RMS Group List

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified. The **Add** and **Edit** options both route to the same page, with only a few differences in the display.

Figure 4–133 shows an example of modifying a group. The administrator can **Add to Group** or **Remove from Group** controllers from the group and then click the **Save** or **Cancel** button.
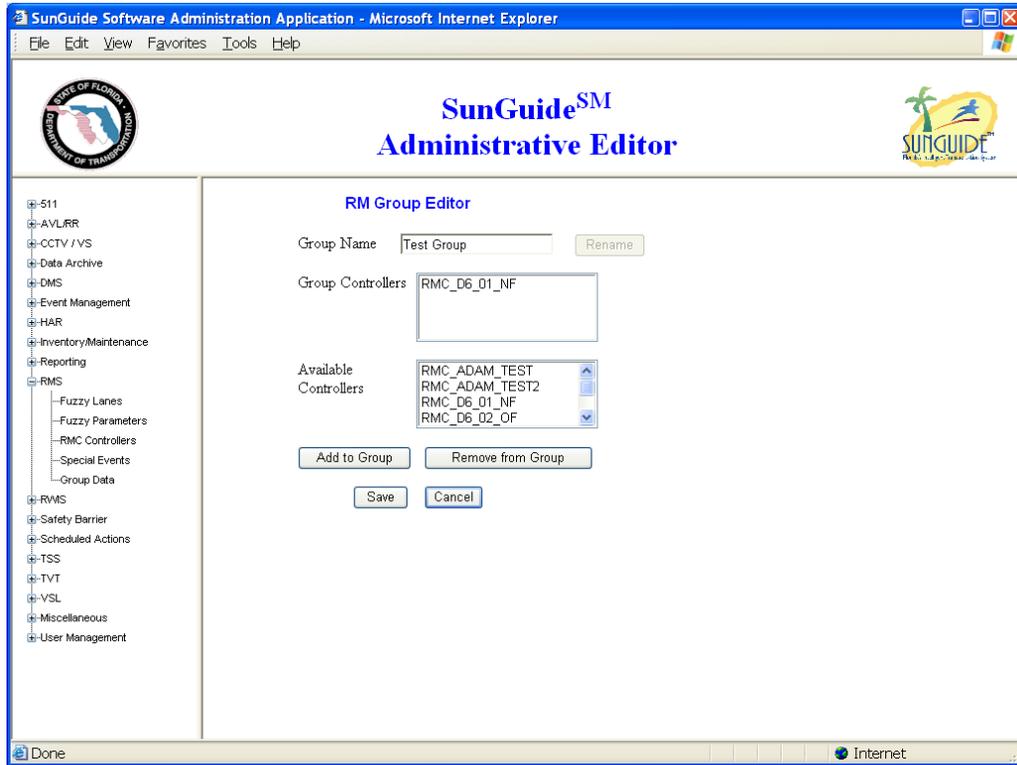
Figure 4–133 – Edit RMS Groups

4.4.12 RWIS Editor

The RWIS Editor enables the system administrator to manipulate RWIS detector data in the database. The RWIS Poll Cycle Driver list (see Figure 4–134) is opened by expanding RWIS, then clicking on Poll Cycle. The user may enter a new RWIS poll cycle driver by clicking Add or may edit an existing driver by selecting an existing driver and clicking Edit; in either case the a screen similar or the same as Figure 4–135 is displayed.
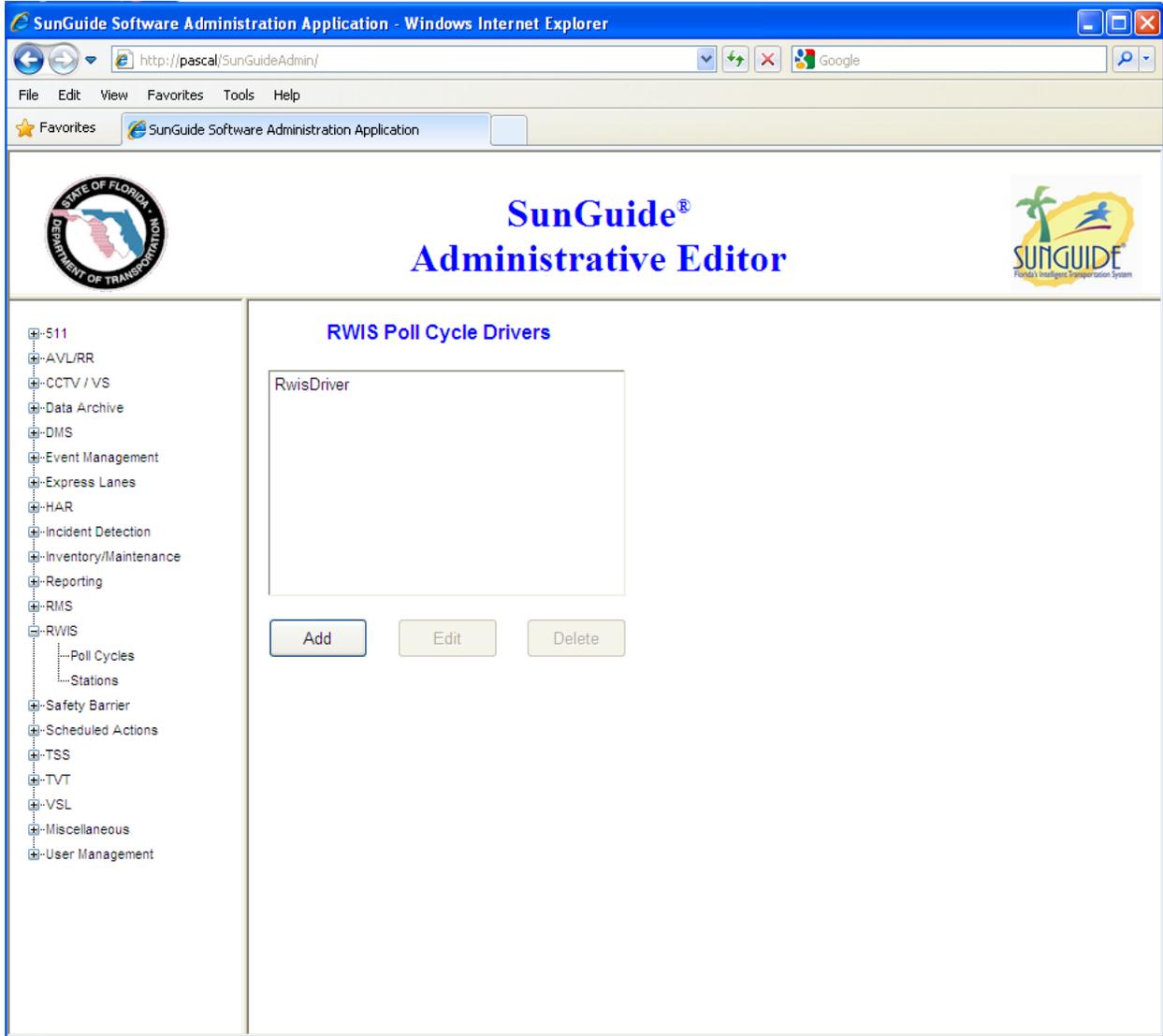
Figure 4–134 – RWIS Poll Cycle Drivers
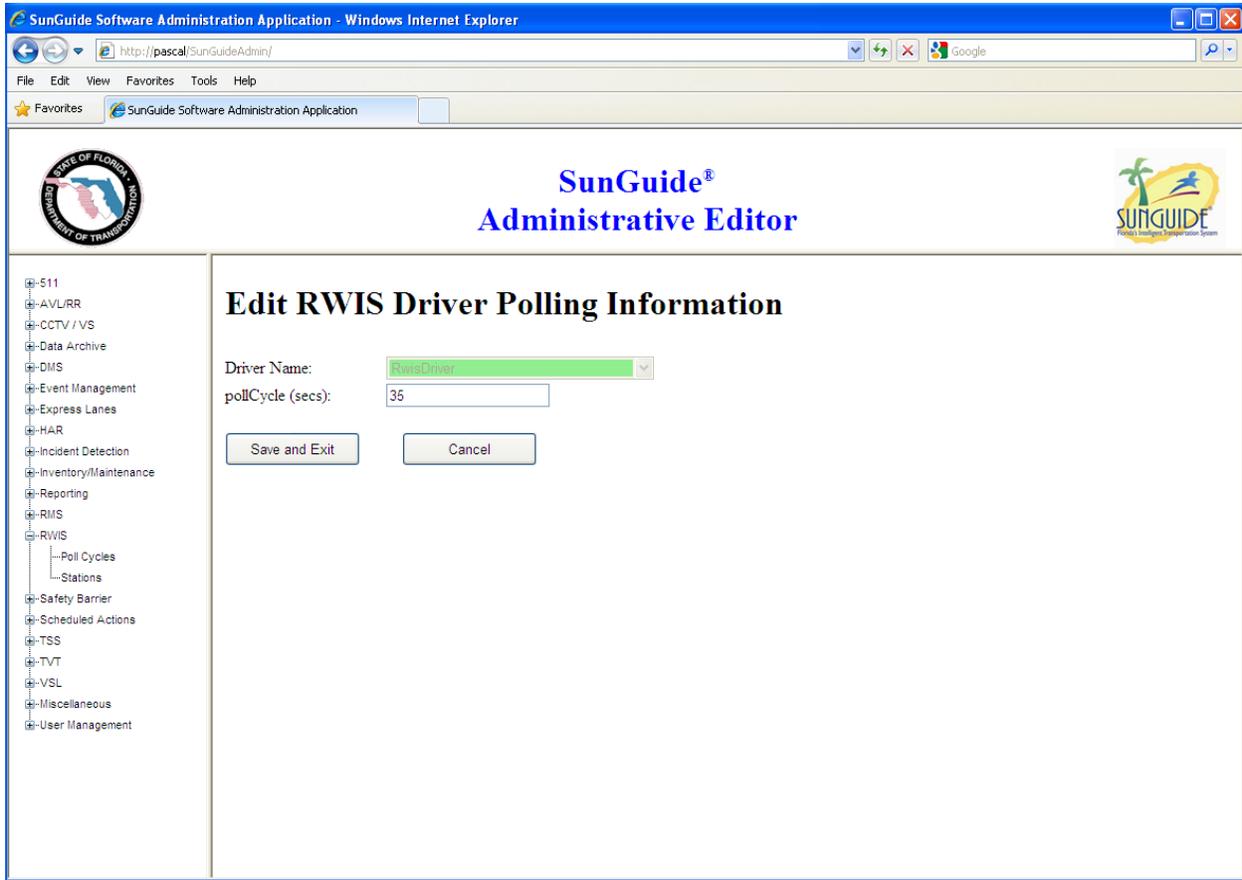
Figure 4–135 – Edit RWIS Driver Polling Information

The RWIS editor is opened by expanding the RIWS element of the Editor List Frame, then clicking on **Stations** (see Figure 4–136). The Administrative Editor will query the database and retrieve a list of the RWIS stations currently in the database.
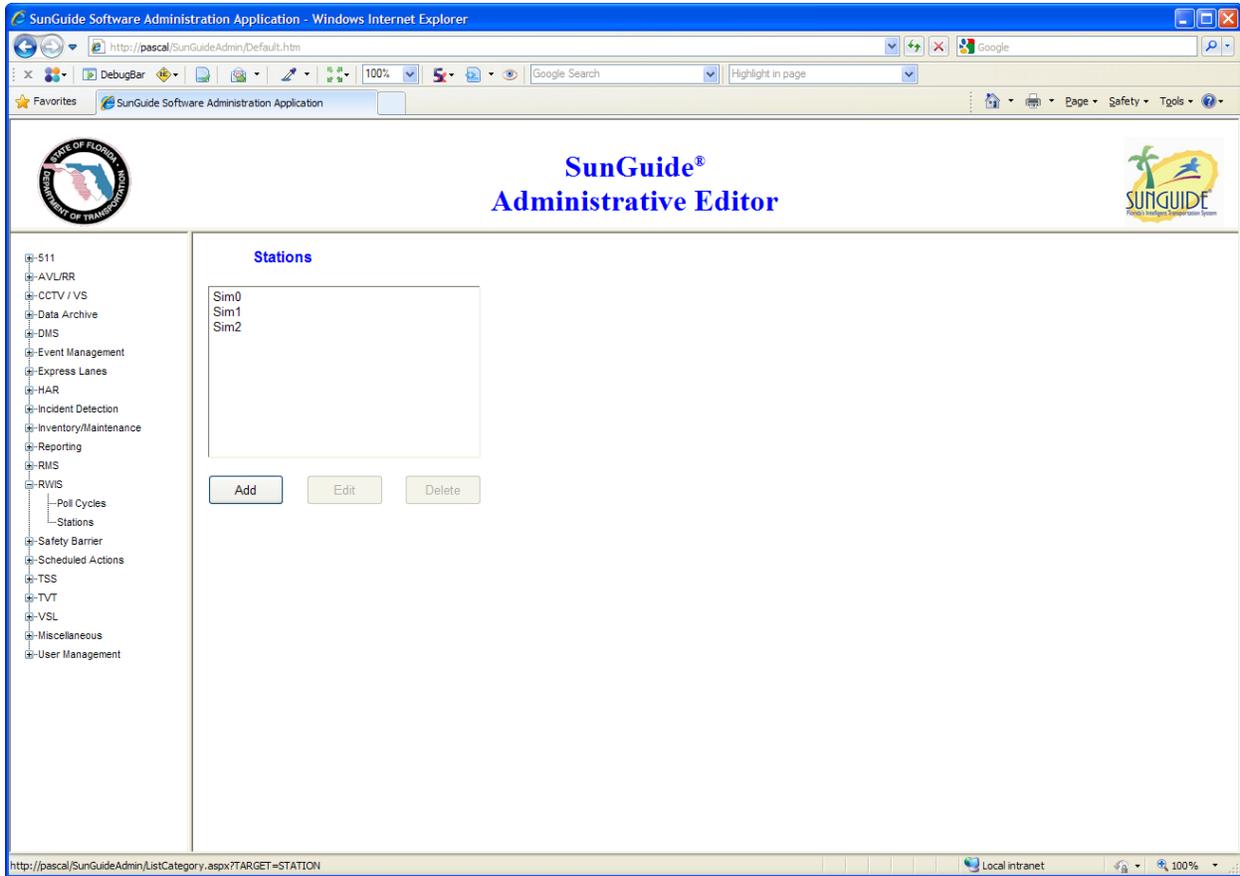
Figure 4–136 – RWIS List

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified. The **Add** and **Edit** options both route to the same page, with only a few differences in the display.

Figure 4–137 shows an example of modifying a RWIS station. The user should enter all information to be stored in the database for this RWIS station, and then click the **Save and Exit** button.
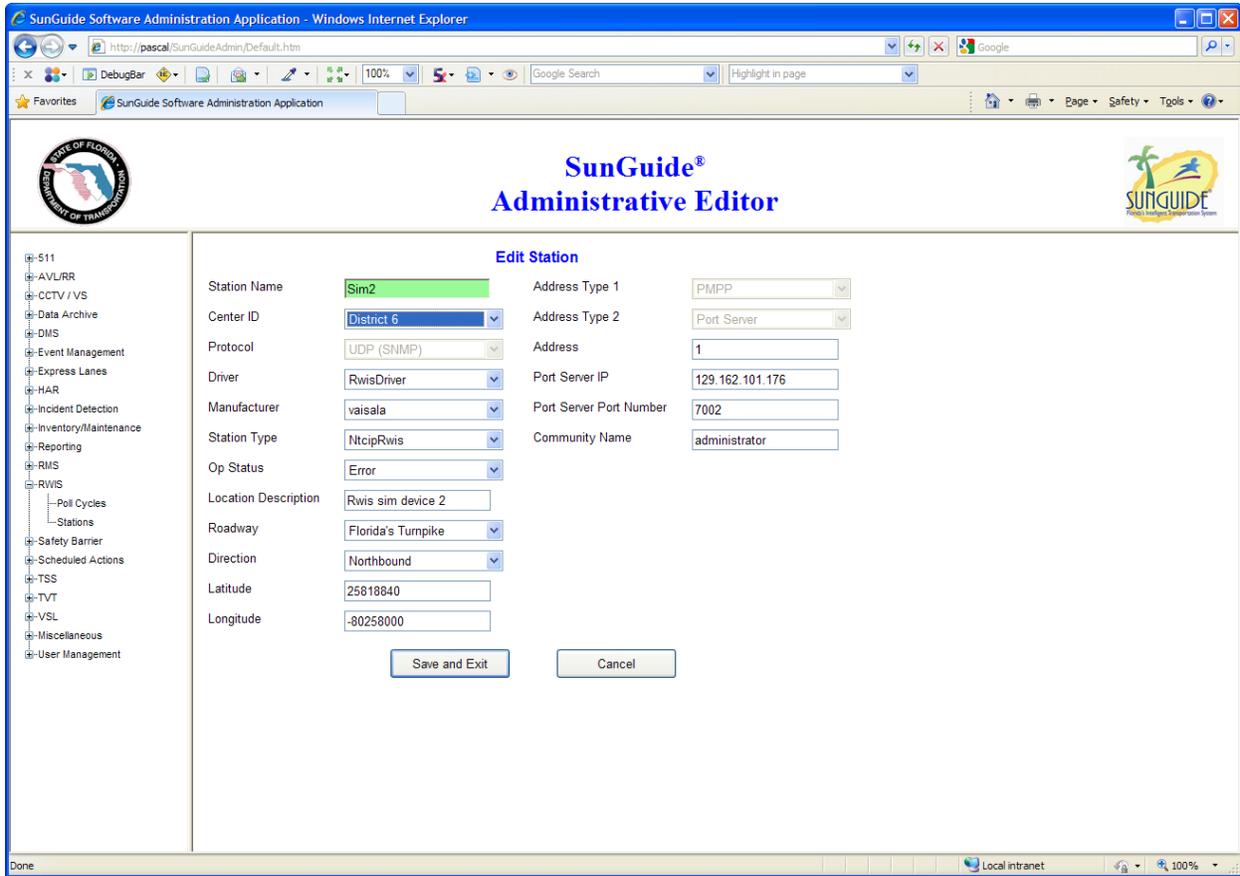
Figure 4–137 – Edit RWIS Device

4.4.13 Safety Barrier Editor

The Safety Barrier Editor (see Figure 4–138) enables the system user to manipulate Safety Barrier device data in the database. This editor is opened by expanding the Safety Barrier element of the Editor List Frame, then clicking on **Stations**. The Administrative Editor will query the database and retrieve a list of Safety Barrier Devices currently in the database.
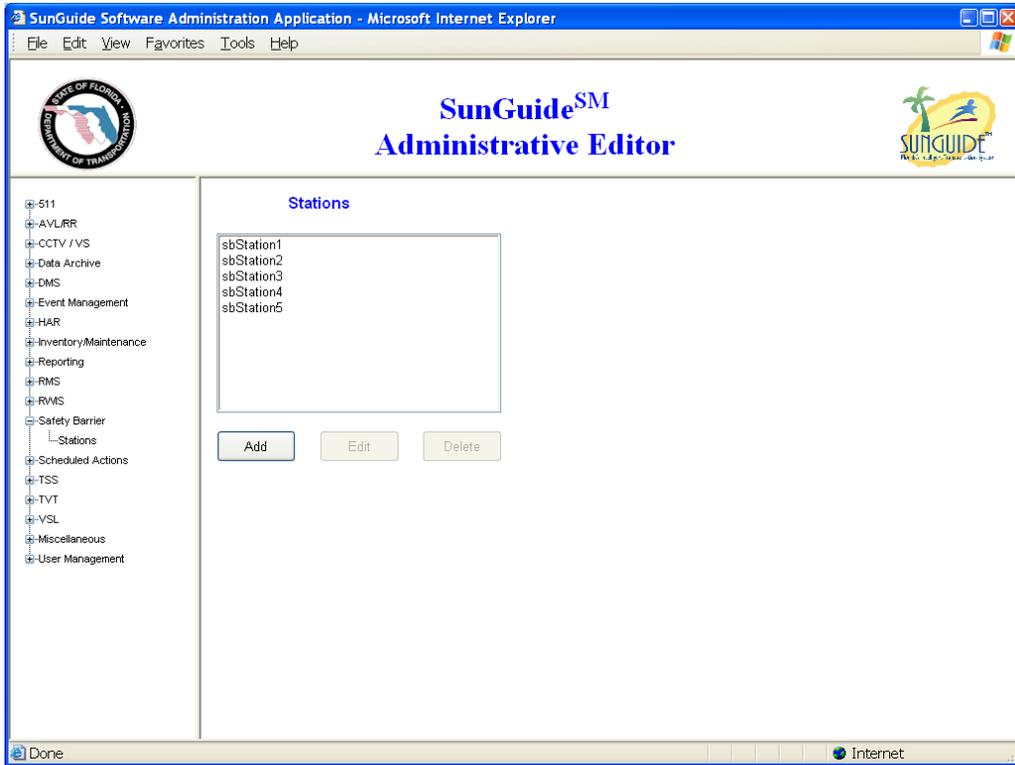
Figure 4–138 – Safety Barrier List

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified. The **Add** and **Edit** options both route to the same page, with only a few differences in the display. Figure 4–139 shows an example of modifying an existing Safety Barrier device. The user should modify the information and then click the **Save and Exit** button to save to the database.
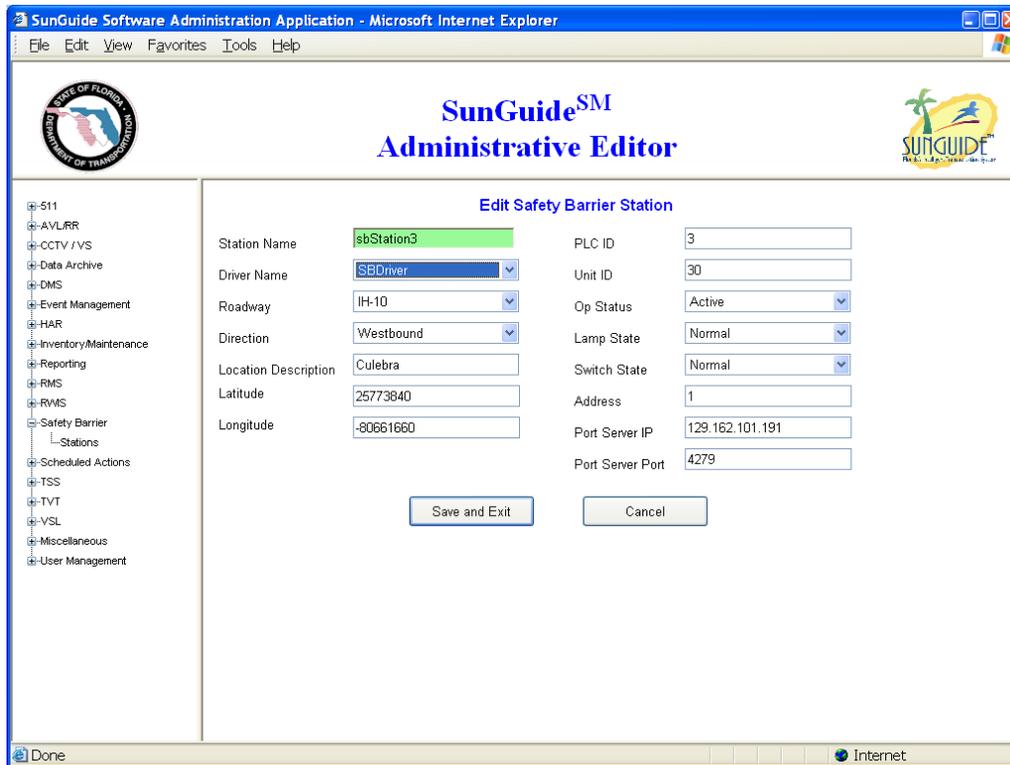
Figure 4–139 – Edit Safety Barrier Device

The PLC ID and Unit ID need to be consistent with the values that are configured in the Safety Barrier device when the device is activated in the field. These fields are used by the Safety Barrier device driver to communicate the PLC controller.

4.4.14 Scheduled Actions Editor

The following sections describe the editors related to the Scheduled Actions Subsystem.

4.4.14.1 Schedules

A schedule is a set of dates and times during which a number of sequences are to be performed. Thus, a user should define a sequence of actions before trying to establish a schedule for those to occur. An example of how this would be done is to setup a sequence of camera movements as a sequence and then a schedule during which those movements should occur.

The Schedules Editor (see Figure 4–140) enables the system user to manipulate schedule data in the database. This editor is opened by expanding the Scheduled Actions element of the Editor List Frame, then clicking **Schedules**. The Administrative Editor will query the Scheduled Actions Subsystem and retrieve a list of Scheduled Actions Schedules currently in the database.
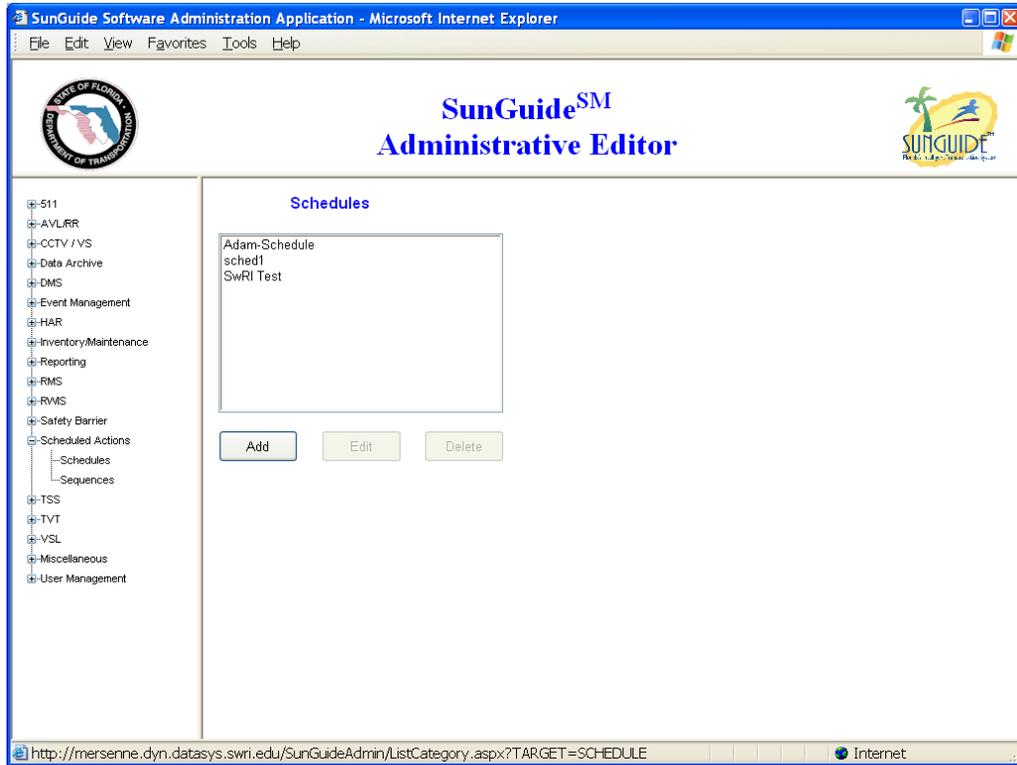
Figure 4–140 – Scheduled Actions Schedules List

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified. The **Add** and **Edit** options both route to the same page, with only a few differences in the display.

Figure 4–141 shows an example of modifying a schedule. The administrator should enter all information to be stored in the database for this schedule, then click the **Save** or **Cancel** button.
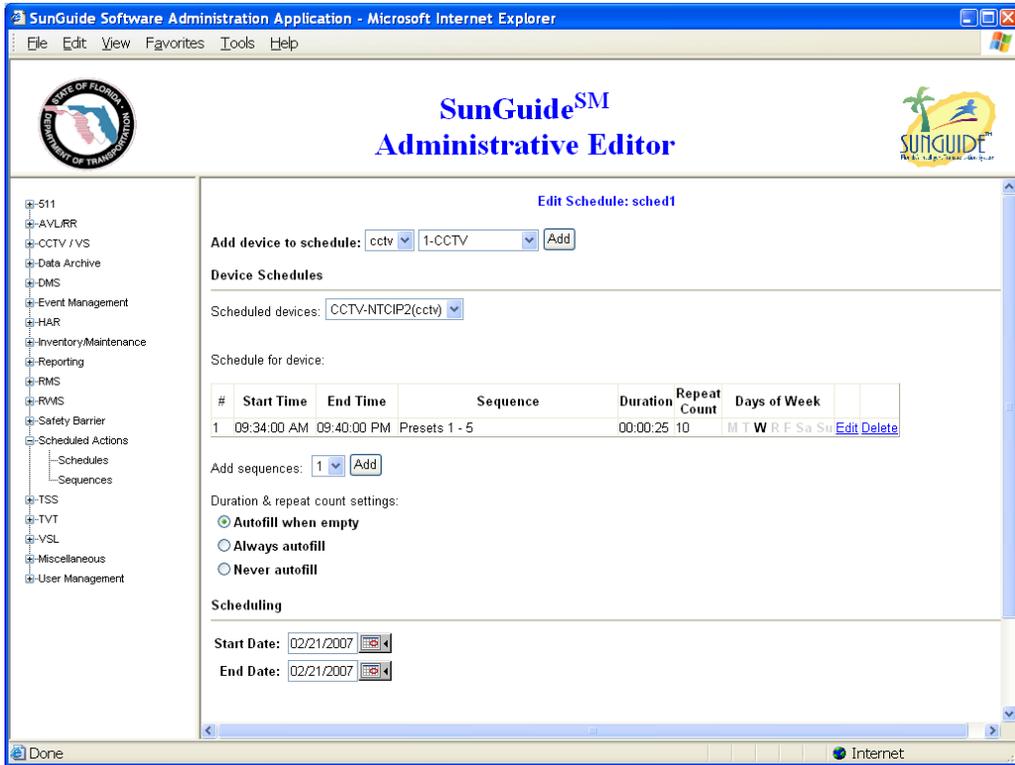
**Figure 4–141 – Edit Scheduled Actions Schedule**

4.4.14.2 Sequences

The Sequence Editor (see Figure 4–142) enables the system user to manipulate sequence data in the database. This editor is opened by expanding the Scheduled Actions element of the Editor List Frame, then clicking Sequences. The Administrative Editor will query the Scheduled Actions Subsystem and retrieve a list of Scheduled Actions Sequences currently in the database.
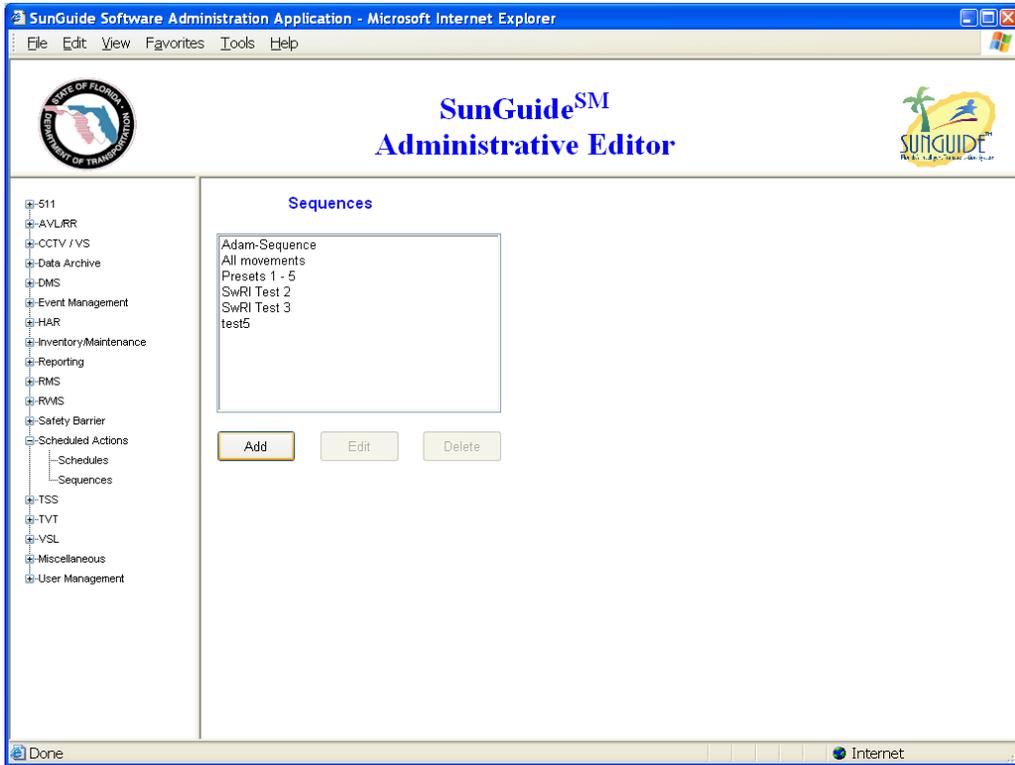
Figure 4–142 – Scheduled Actions Sequence List

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified. The **Add** and **Edit** options both route to the same page, with only a few differences in the display.

Figure 4–143 shows an example of modifying a sequence. The administrator should enter all information to be stored in the database for this schedule, then click the **Save** or **Cancel** button.
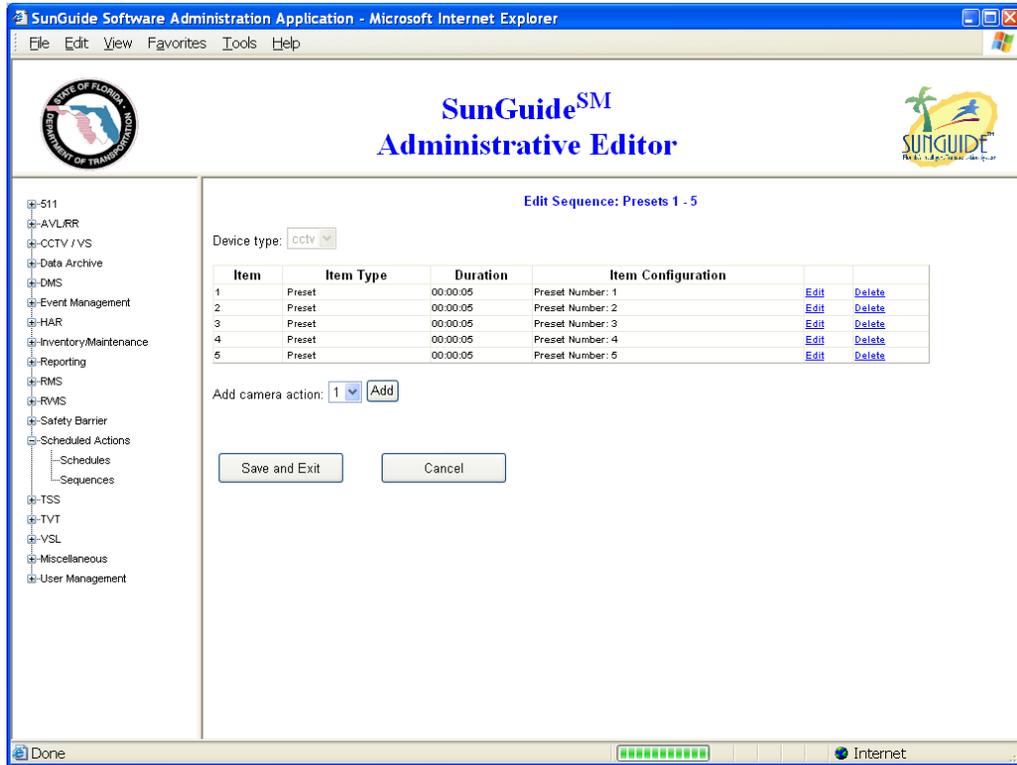
**Figure 4–143 – Edit Scheduled Actions Sequence**

4.4.15 TSS Editor

The following sections describe the editors that are TSS related.

4.4.15.1 Alarm Thresholds

The Alarm Threshold Editor enables the system administrator to define multiple alarm thresholds for a single detector – this allows the system to provide different thresholds based on time of day and recurring congestion levels. This editor is opened by expanding the TSS element of the Editor List Frame, then clicking on **Alarm Thresholds**. The Administrative Editor will query the database and retrieve a list of the links (each link may have multiple thresholds) currently in the database (see Figure 4–144).
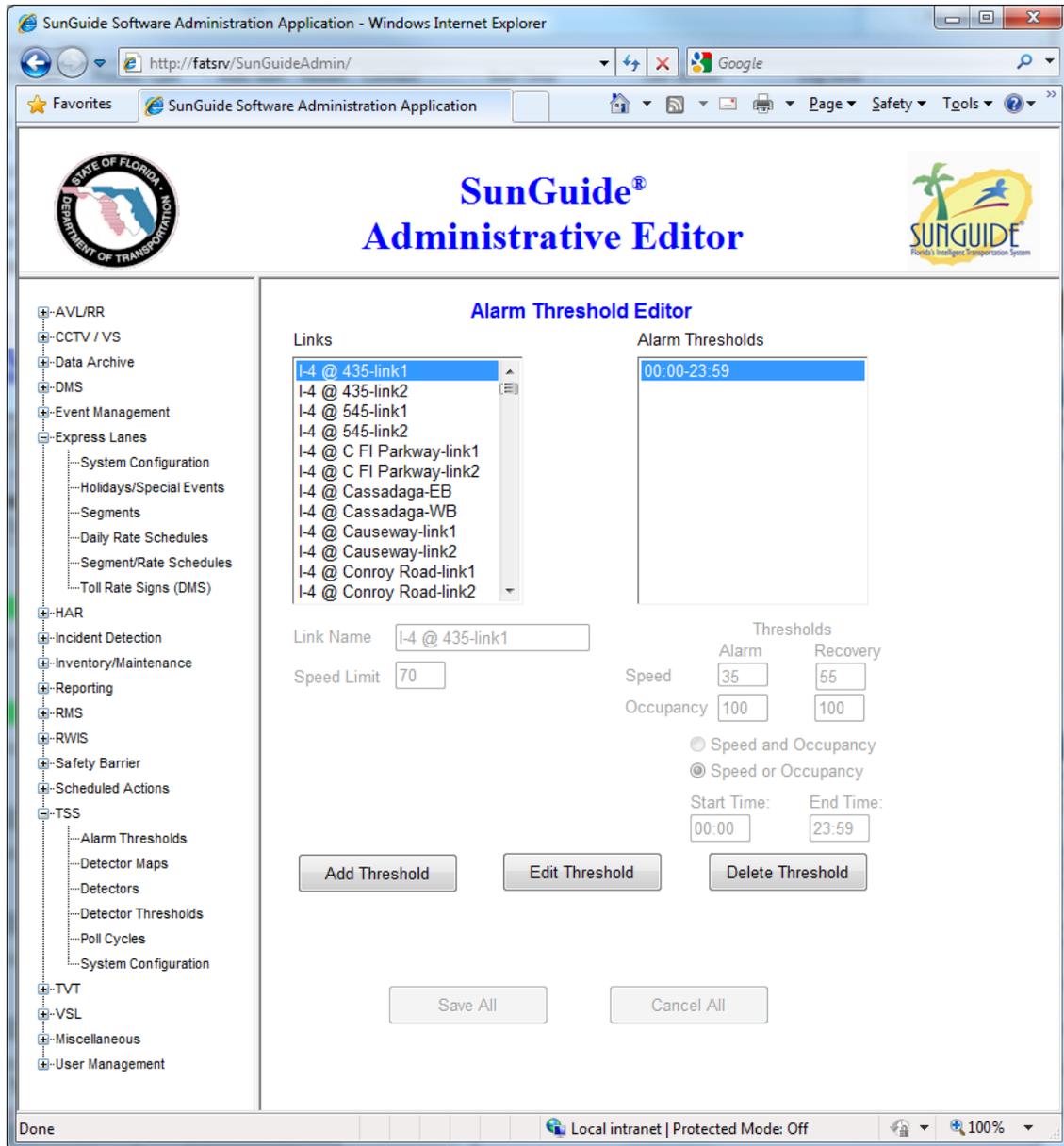
Figure 4–144 – Alarm Threshold Editor

To manage thresholds for a link, a link is selected and the **Add Threshold** button is enabled. The fields **Speed Alarm, Speed Recovery, Occupancy Alarm, Occupancy Recovery, Start Time** and **End Time** will be enabled (see Figure 4–145) along with the **OK** and **Cancel Add** buttons. Once the data is entered and saved, the user can select a threshold and utilize the **Edit Threshold and Delete Threshold** buttons to manage the data.

Threshold values determine when a link will report an alarm condition. If the smoothed speed of the link drops below the Speed Alarm setting, the alarm condition will be triggered. The condition will be cleared when the smoothed speed of the link rises above the Speed Recovery value. Likewise, an alarm will be triggered if the link's smoothed occupancy rises above the Occupancy Alarm value, and cleared when it falls below the Occupancy Recovery value. If the

Speed and Occupancy checkbox is checked, an alarm condition is only reported if **both** speed and occupancy are in an alarm condition.
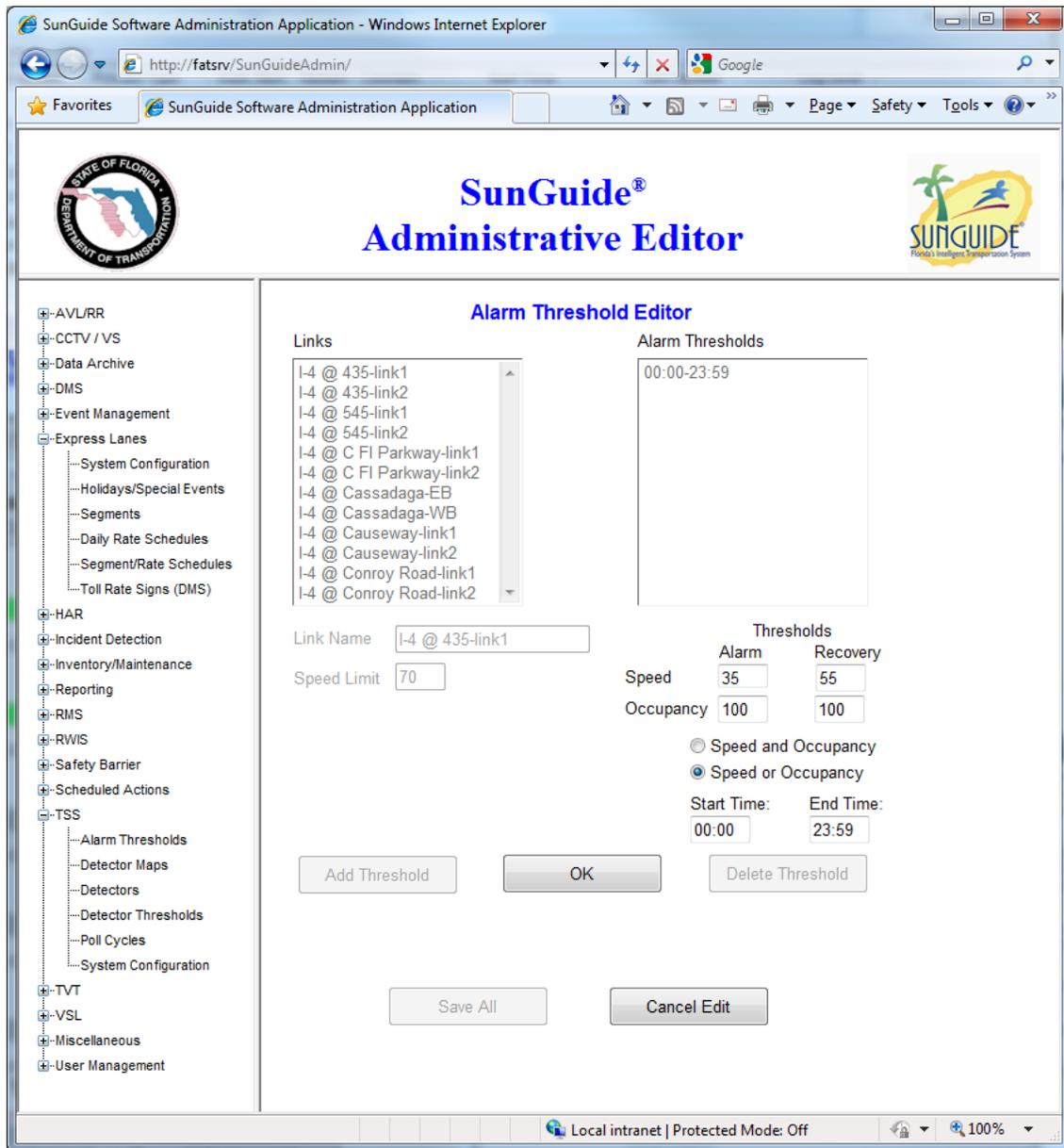
Figure 4–145 – Edit Alarm Threshold

4.4.15.2 Detector Maps

The Detector Map Editor enables the system administrator to manipulate detector mapping data in the database. This editor is opened by expanding the TSS element of the Editor List Frame, then clicking on **Detector Maps** (see Figure 4–146). The Administrative Editor will query the database and retrieve a list of the detectors currently in the database.

The checkbox labeled "Publish Link to FL511 Website" can be used to indicate whether or not the data should be displayed on the FL511 Website by the FL511 web application.

Figure 4–146 – Detector Map List

Once a name is selected in the list, the **Map** button will become enabled. Detector maps may be modified, but not deleted.

Depending on the type of detector selected, the mapping editor will differ. Figure 4–147 shows the map detector page for a point-based detector. (Probe-based detectors will be discussed following the point-based detectors.) Links associated with this detector are shown in the Links list; all other fields are empty since there are no further selections yet. The Detector Name field is read-only.
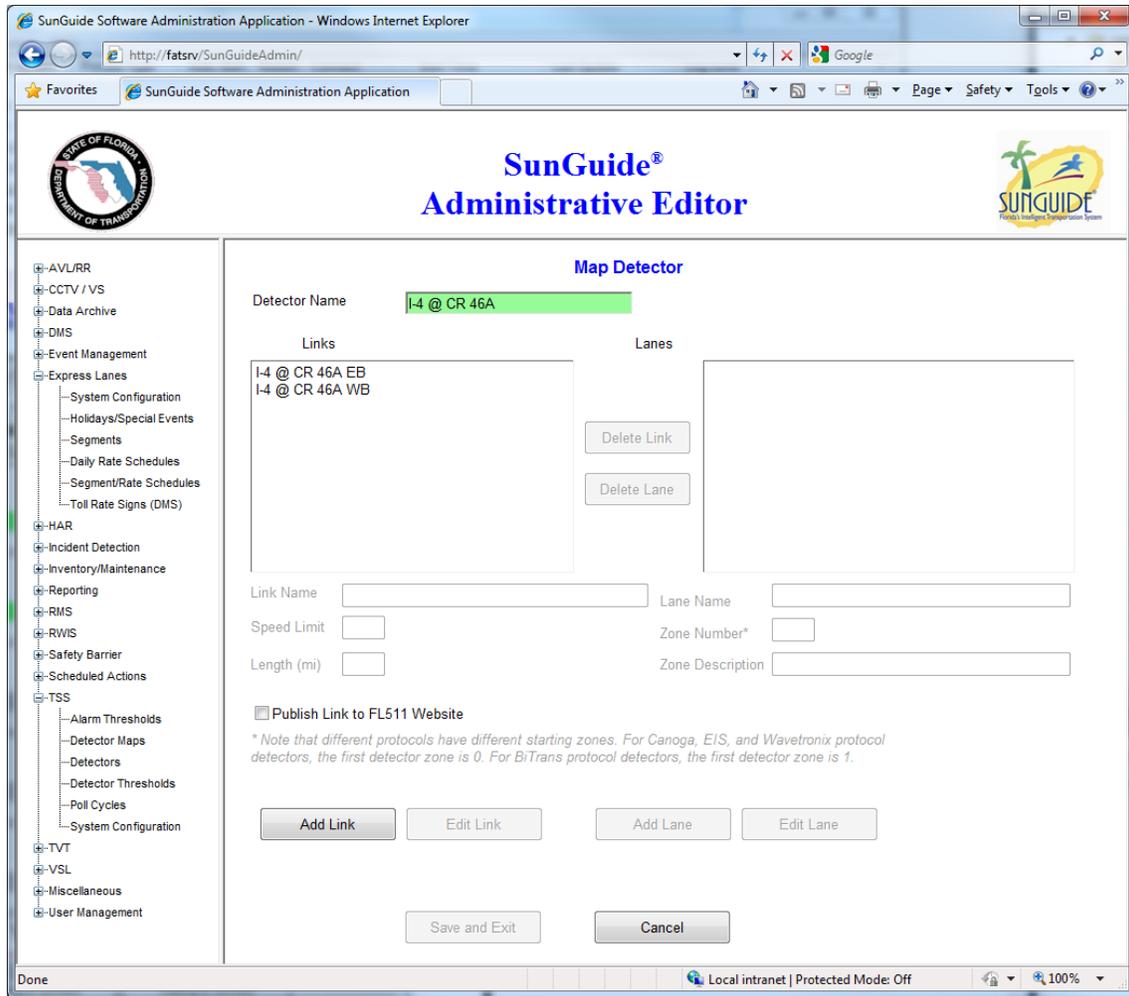
Figure 4–147 – Edit Point Detector Mapping

If a link is selected, lanes associated with this link will be displayed in the Lanes list, and a speed associated with this link, if any, will be displayed on the page as well (see Figure 4–148). Note that when SunGuide computes travel times the "measured speeds" (i.e. from the detectors) are evaluated and if a measured speed is above the specified speed limit, the speed value used in the travel time computation will be changed to that of the specified speed limit prior to calculating the travel time. This potential change in the measured speed is important to assure that a travel time generated and displayed reflects times no faster than traveling the posted speed limit.
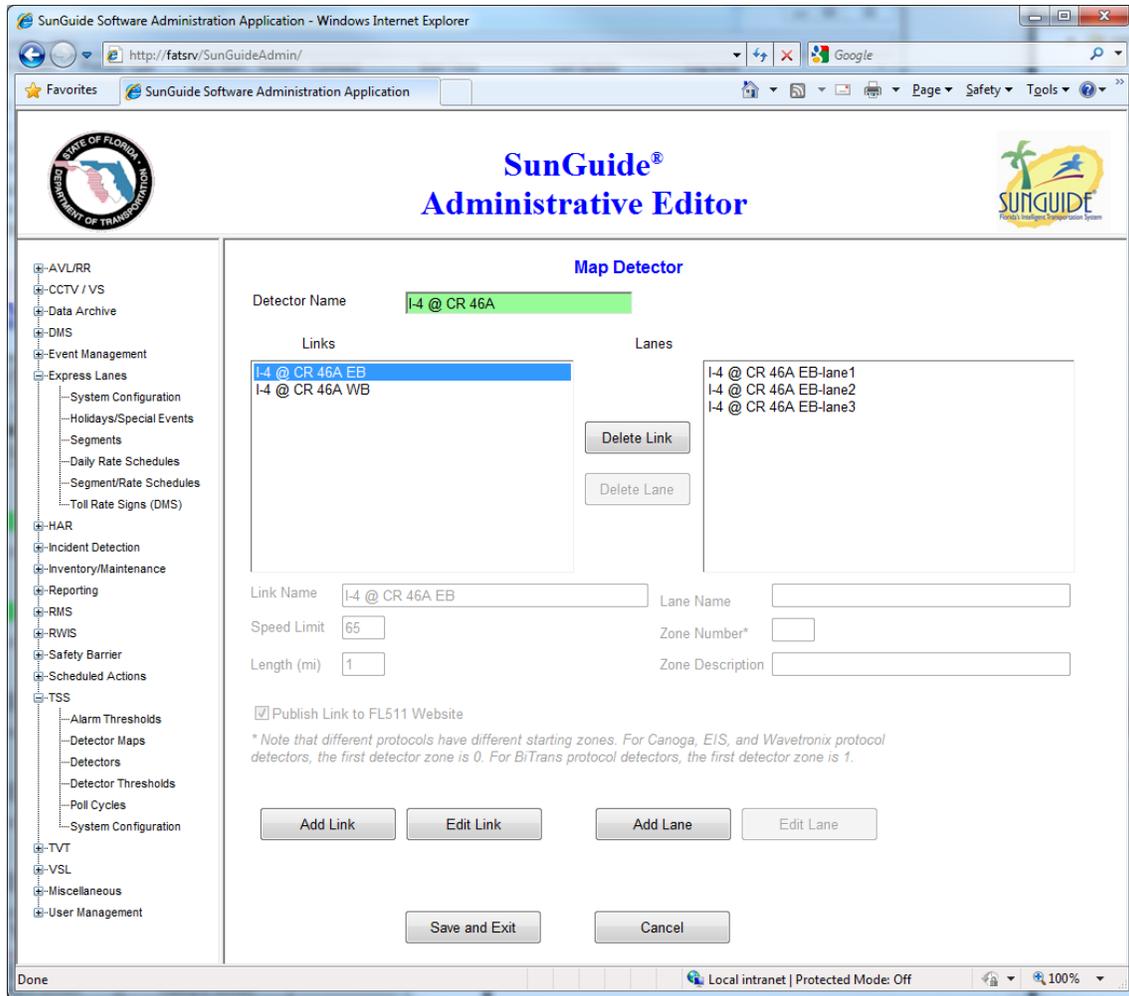
Figure 4–148 – Edit Point Detector Mapping – Select Link

Clicking on the **Add Link** button will cause the fields below the Link list to become enabled, and the **Add Link** button to change to an OK button (see Figure 4–149). A suggested link name is generated and displayed in the New Link Name field. The user should enter a Speed Limit for this link, modify the link name if desired, and then choose **OK** to save this new data. After a successful add operation, the new link's name will display in the Link list and the OK button will revert back to an **Add Link** button. If instead the user wants to cancel the add link operation, they may click the **Cancel** button.
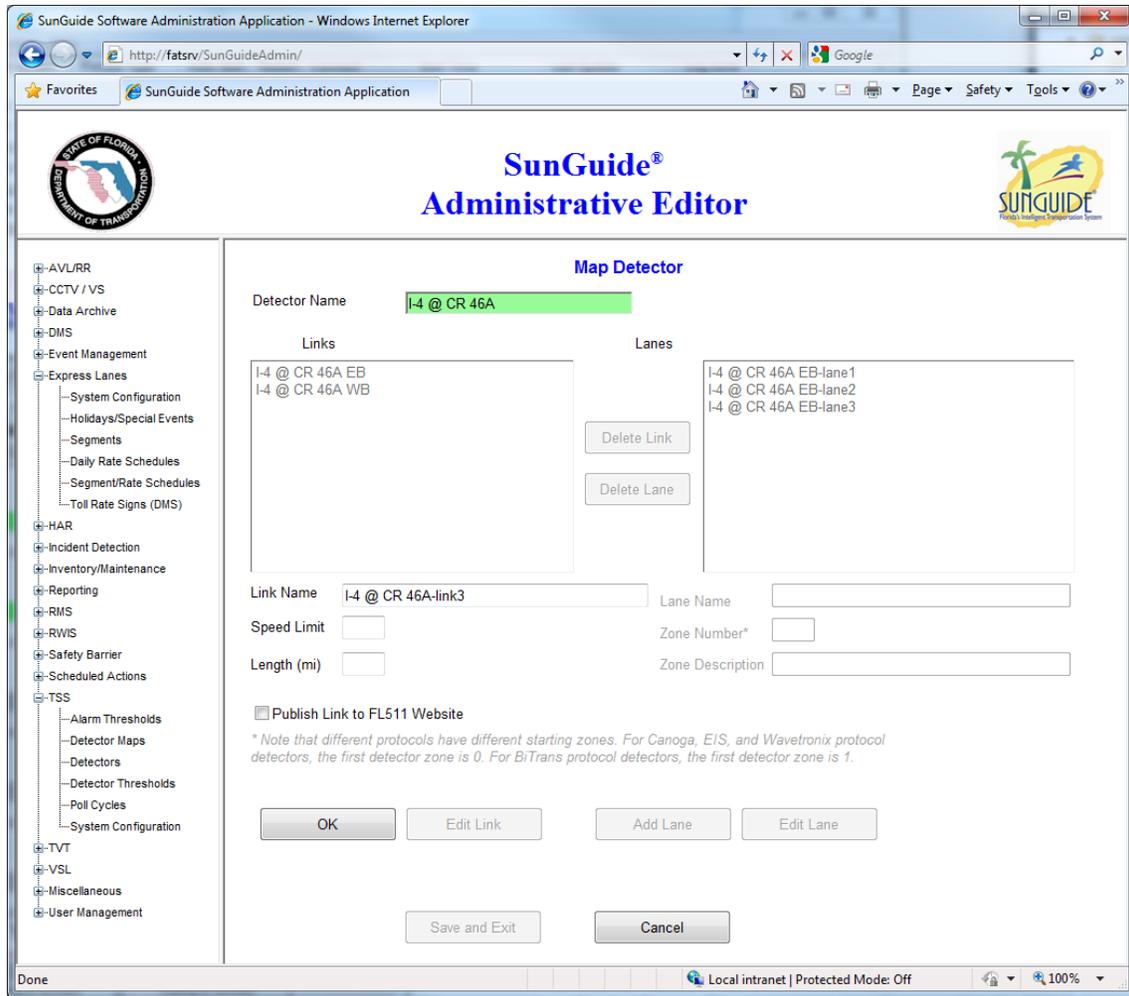
Figure 4–149 – Edit Point Detector Mapping – Add Link

Selecting a lane will cause the data associated with this lane to be displayed on the page in the fields below the Lane list (see Figure 4–150).
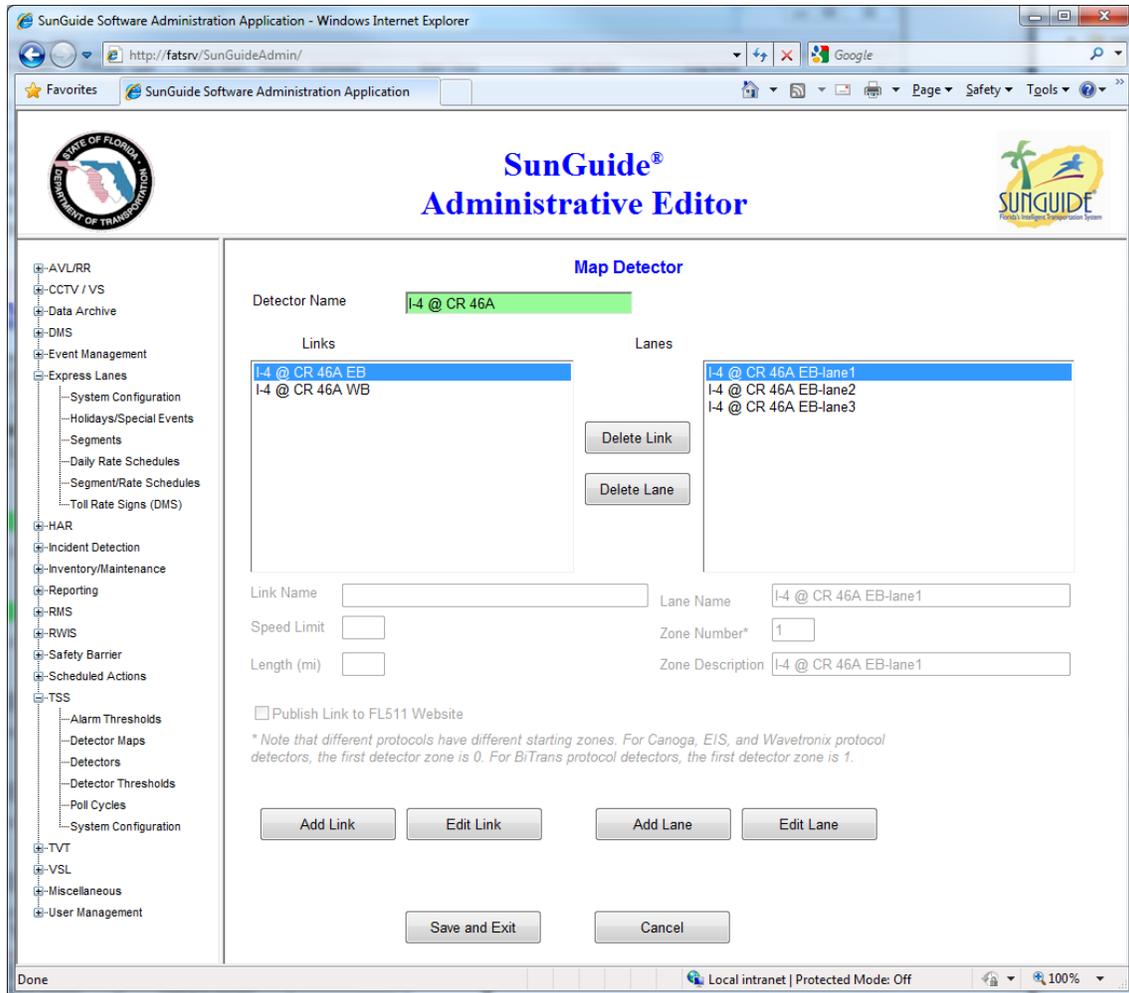
Figure 4–150 – Edit Point Detector Mapping – Select Lane

Clicking on the **Add Lane** button will cause the fields below the Lane list to become enabled and the **Add Lane** button to change to an **OK** button (see Figure 4–151). A suggested lane name is displayed in the **New Lane Name** field. Users should enter a zone number (see note below) and description, modify the lane name if desired, and then click on **OK** to save this data to the database. After a successful add operation, the new lane's name will display in the **Lane list** and the **OK** button will revert back to an **Add Lane** button. If instead the user wants to cancel the add lane operation, they may click the **Cancel** button.

NOTE: Different TSS protocols have different starting zones based on how the vendor implemented their protocol. For Canoga, EIS, and Wavetronix protocol detectors, the first detector zone is 0; for BiTrans protocol detectors, the first detector zone is 1.
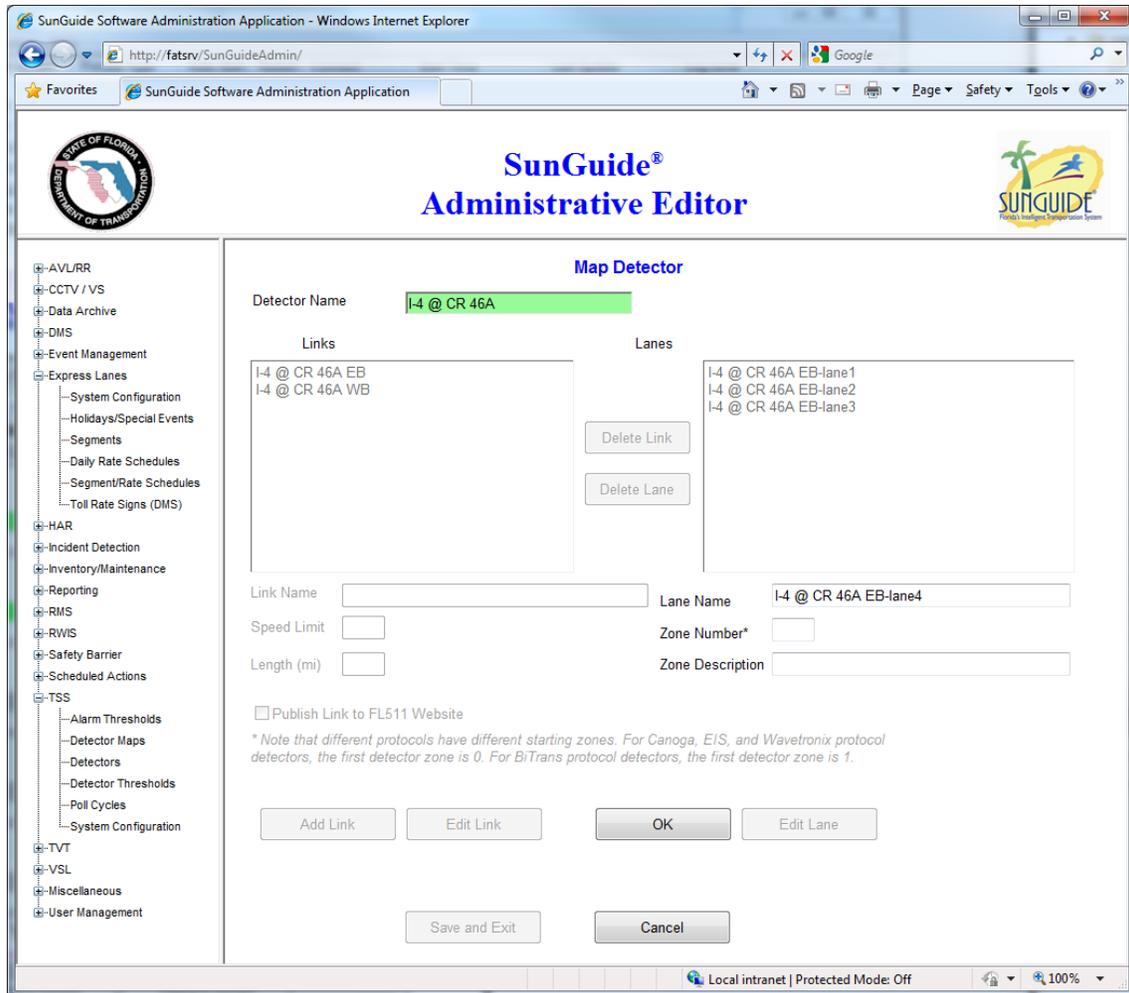
Figure 4–151 – Edit Point Detector Mapping – Add Lane

Administrators are not allowed to modify or delete detector mappings via this editor; such changes require direct manipulation of database tables.

If the detector selected was a probe-based detector, the mapping process is somewhat different. Figure 4–152 shows the map detector page for a probe-based detector. Links associated with this detector are shown in the Links list; all other fields are empty since there are no further selections yet. The Detector Name field is read-only.
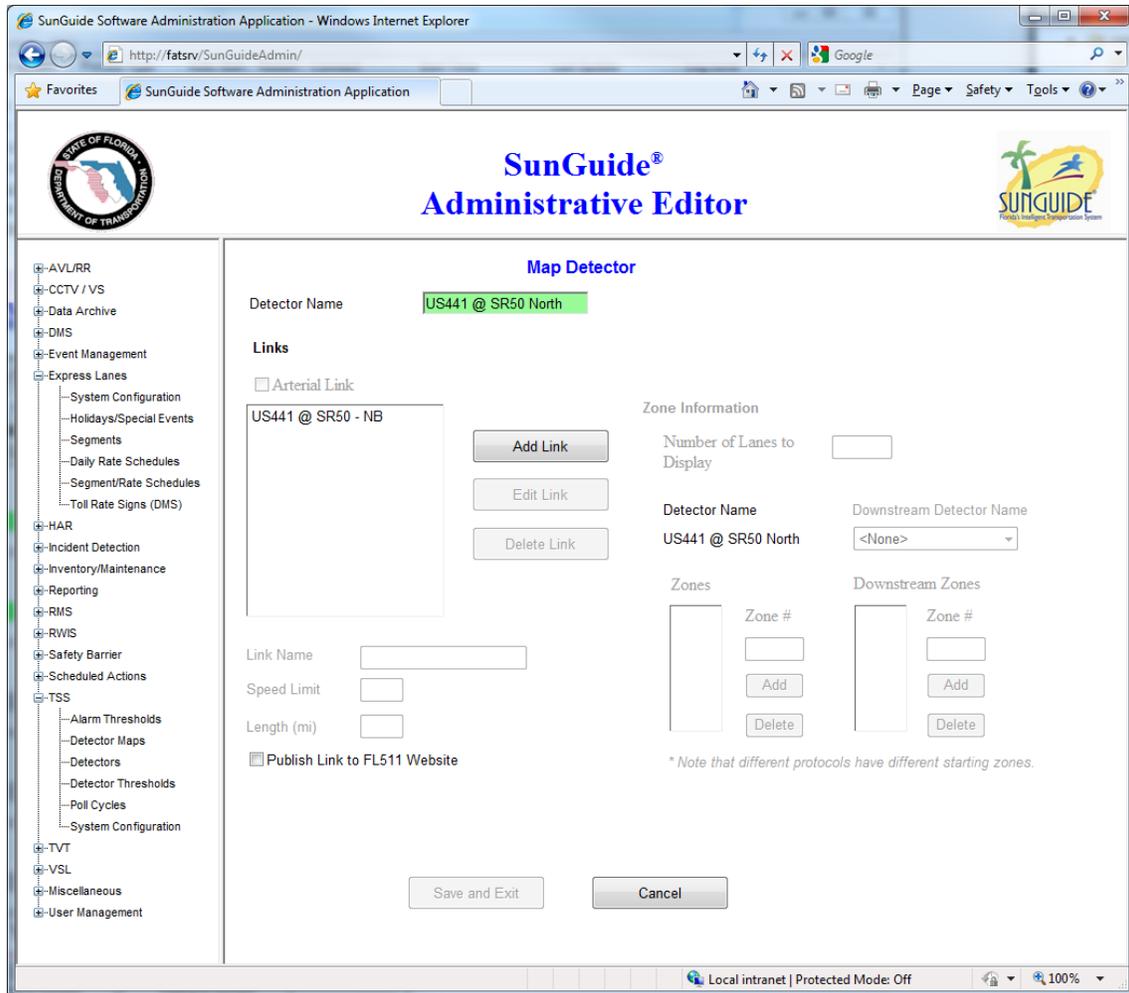
Figure 4–152 – Edit Probe Detector Mapping

If a link is selected, the number of lanes associated with this link, its paired detector, and zones for both detectors will be displayed in the Zone Information section, and a speed and length associated with this link, if any, will be displayed on the page as well (see Figure 4–148). Note that when SunGuide computes travel times the "measured speeds" (i.e. from the detectors) are evaluated and if a measured speed is above the specified speed limit, the speed value used in the travel time computation will be changed to that of the specified speed limit prior to calculating the travel time. This potential change in the measured speed is important to assure that a travel time generated and displayed reflects times no faster than traveling the posted speed limit.
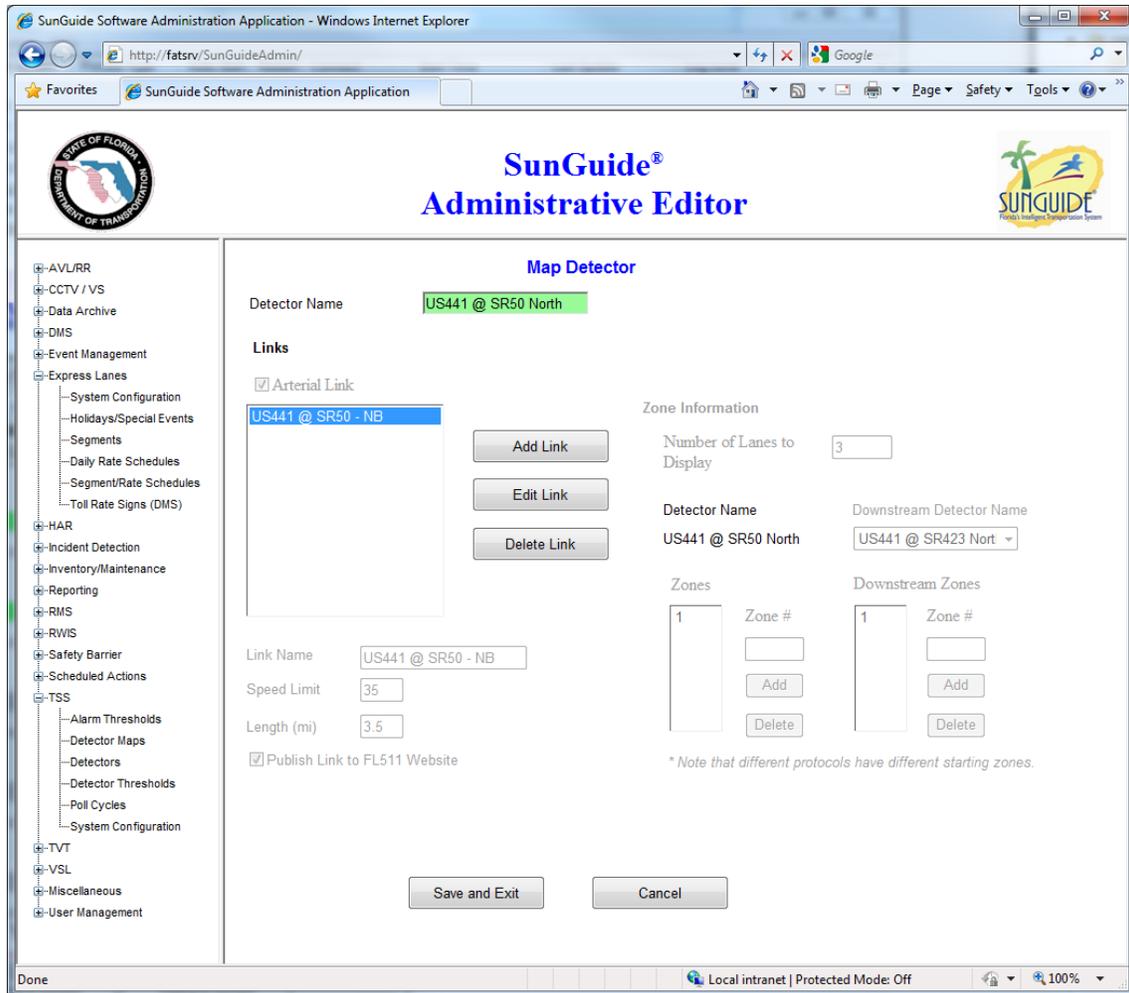
Figure 4–153 – Edit Detector Mapping – Select Link

Clicking on the **Add Link** button will cause the fields below the Link list and in the Zone Information section to become enabled, and the **Add Link** button to change to an OK button (see Figure 4–149). A suggested link name is generated and displayed in the Link Name field. The user should enter a Speed Limit and length for this link, modify the link name if desired, and then complete the Zone Information section. In the Zone Information section, the number of lanes for the link may be entered (this is used for display purposes only, and does not affect any calculations).

For probe-based detectors, a link is defined as being between two detectors. The detector being mapped is considered the first (upstream) detector. The second (downstream) detector should be selected in the Paired Detector Name field. To specify which zones of each detector should be considered when performing tag matches between the detectors, the first detector's zones should be entered in the Zones list, and the second detector's zones should be entered in the Paired Zones list. For each list, a zone may be added by entering the zone number in the Zone # field and pressing **Add**; an existing zone can be removed by selecting it and pressing **Delete**.

NOTE: Different TSS protocols have different starting zones based on how the vendor implemented their protocol.

Once all zones for both detectors are configured, choose **OK** to save this new data. After a successful add operation, the new link's name will display in the Link list and the OK button will revert back to an **Add Link** button. If instead the user wants to cancel the add link operation, they may click the **Cancel** button.
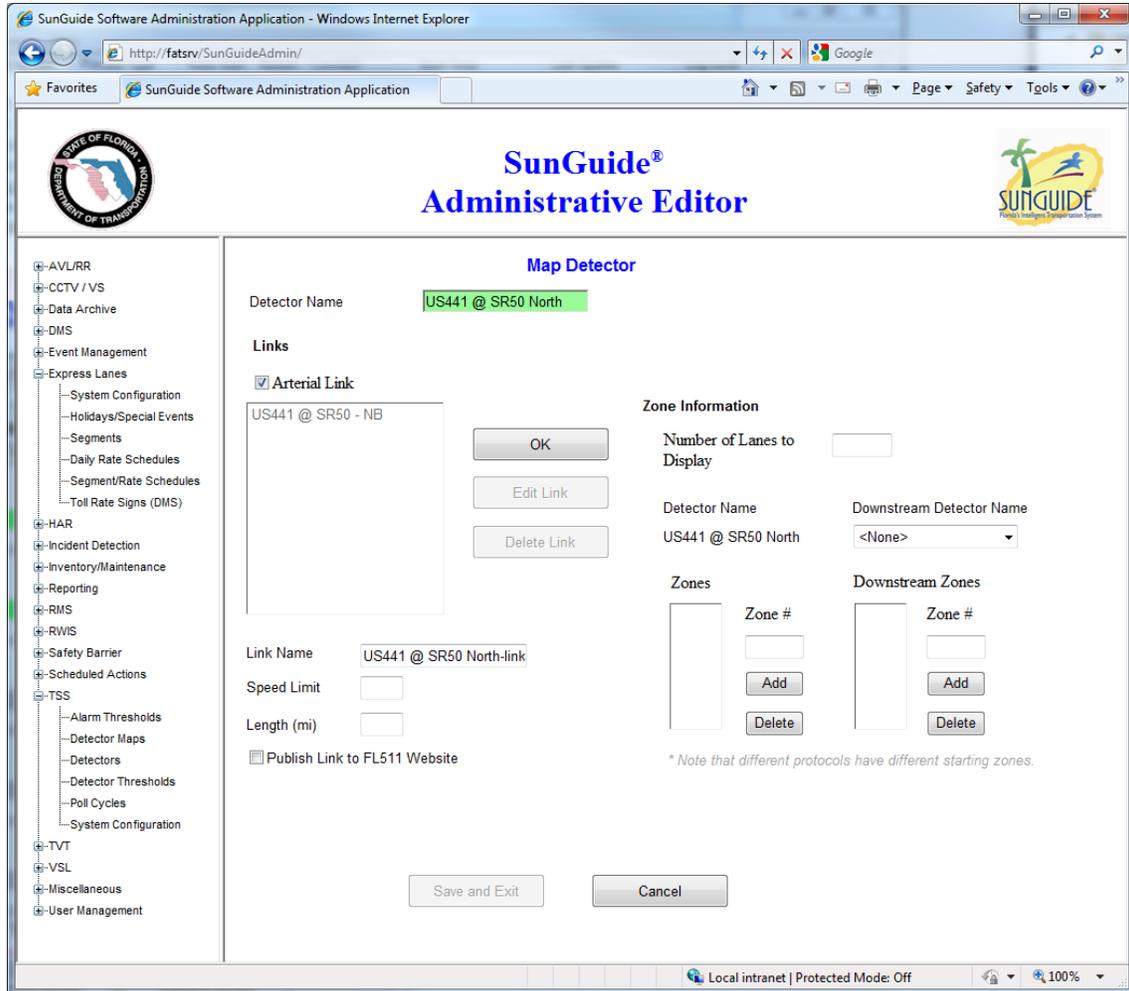
Figure 4–154 – Edit Detector Mapping – Add Link

Operations may be cancelled without altering the database by clicking on the **Cancel** button. Alternatively, the selections on the screen can be submitted to the database via selection of the **Save and Exit** button. When saving, required fields will be validated, and error messages will be displayed on the page when necessary. Users will be notified of errors encountered in accessing the database via informational messages sent to the Status Logger; messages will also appear on the page when needed. Critical errors will cause this page to remain in focus, forcing the user to manually cancel the operation. Non-critical errors as well as successful database access will result in browser redirection to the previous list page.

4.4.15.3 Detector

The Detector Editor enables the system user to manipulate traffic detector data in the database. This editor is opened by expanding the TSS element of the Editor List Frame, then clicking on

Detectors (see Figure 4–155). The Administrative Editor will query the database and retrieve a list of the detectors currently in the database.
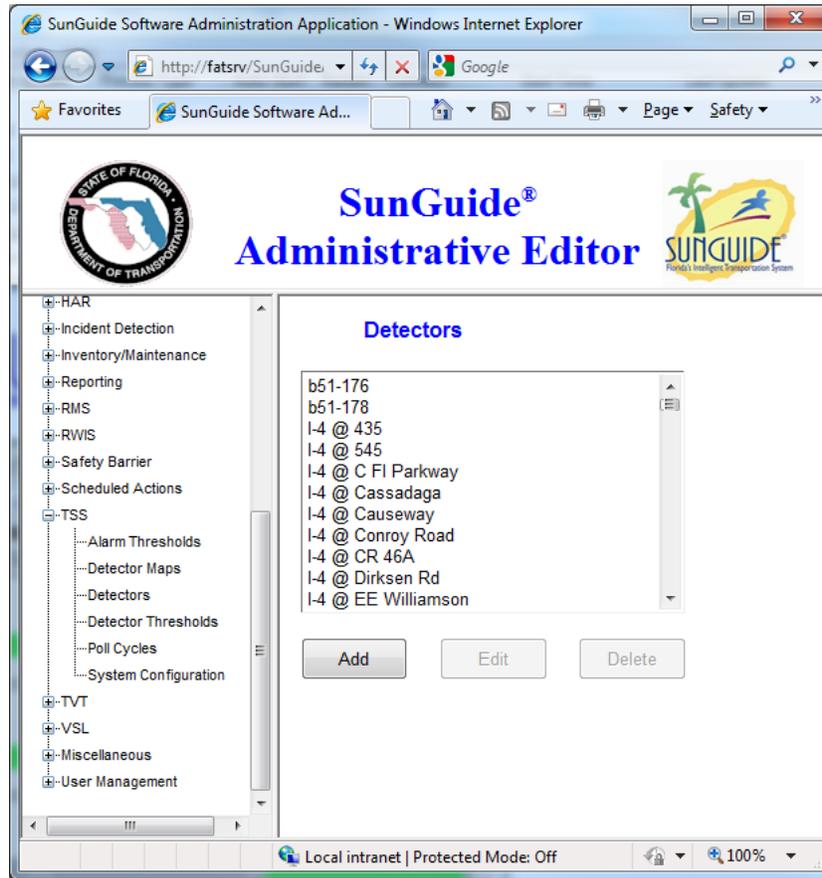

Figure 4–155 – Detector List

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified (see Figure 4–156). The **Add** and **Edit** options both route to the same page, with only a few differences in the display.
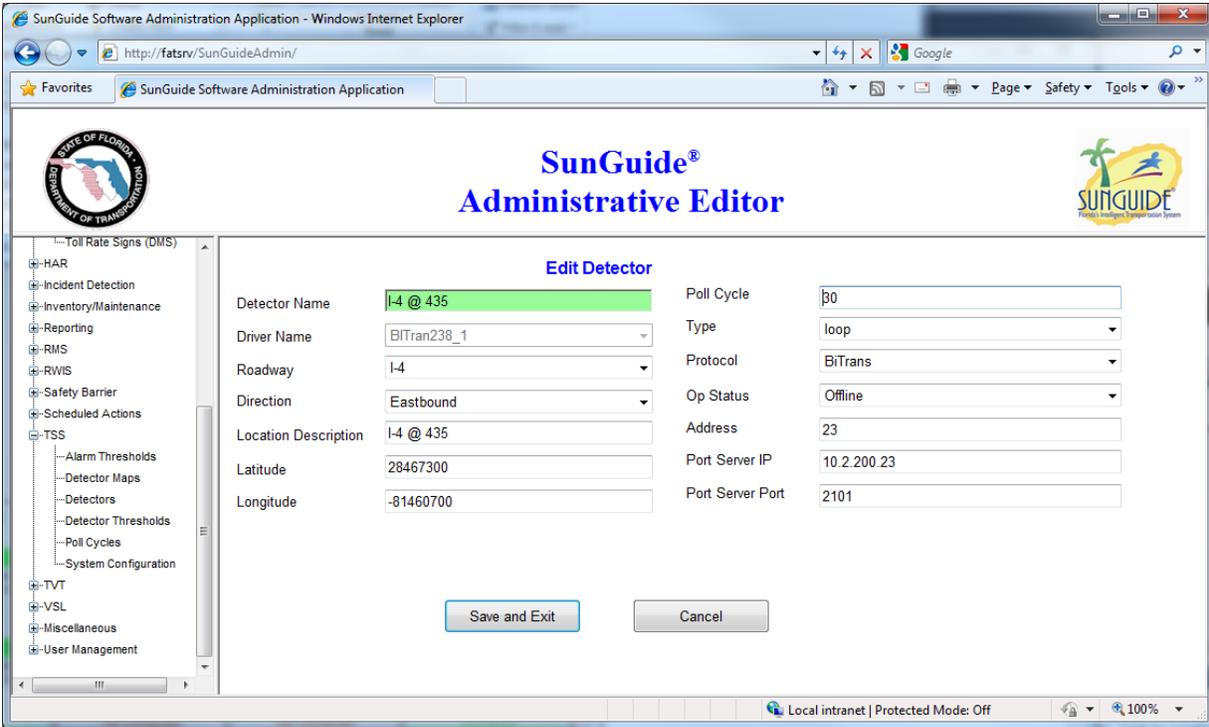
Figure 4–156 – Edit Detector

Many of the dropdowns are populated with values from the database. Changes to the Address Type selection cause dynamic changes to the page below this field; labels and associated fields will be displayed based on Address Type selection. The Detector Name field is editable only when adding a new detector.

If a detector is a probe-based detector and is mapped to another probe-based detector for reporting link data, a note will appear at the bottom of the form indicating the detectors it is paired with.

Operations may be cancelled without altering the database by clicking on the **Cancel** button. Alternatively, the selections on the screen can be submitted to the database via selection of the **Save and Exit** button. When saving, required fields will be validated, and error messages will be displayed on the page when necessary. Users will be notified of errors encountered in accessing the database via informational messages sent to the Status Logger; messages will also appear on the page when needed. Critical errors will cause this page to remain in focus, forcing the user to manually cancel the operation. Non-critical errors as well as successful database access will result in browser redirection to the previous list page. If a new detector was created, the user will see the name of this new detector in the list on the list page.

For both point-based and probe-based detectors, poll cycle information is configured. For point-based detectors (radar, loops, etc.), the poll cycle indicates the interval for which the associated driver will poll this device. For probe-based detectors (AVI and LPR), the poll cycle indicates the interval for which the probe fusion driver will process matched tag reads.

4.4.15.4 Detector Thresholds

The Detector Threshold Editor enables the system user to configure thresholds which should trigger email alerts to certain users when invalid data is reported from detectors for a period of time. This editor is opened by expanding the TSS element of the Editor List Frame, then clicking on Detector Thresholds (see Figure 4–157). The Administrative Editor will query TSS and retrieve a list of current detectors and thresholds.
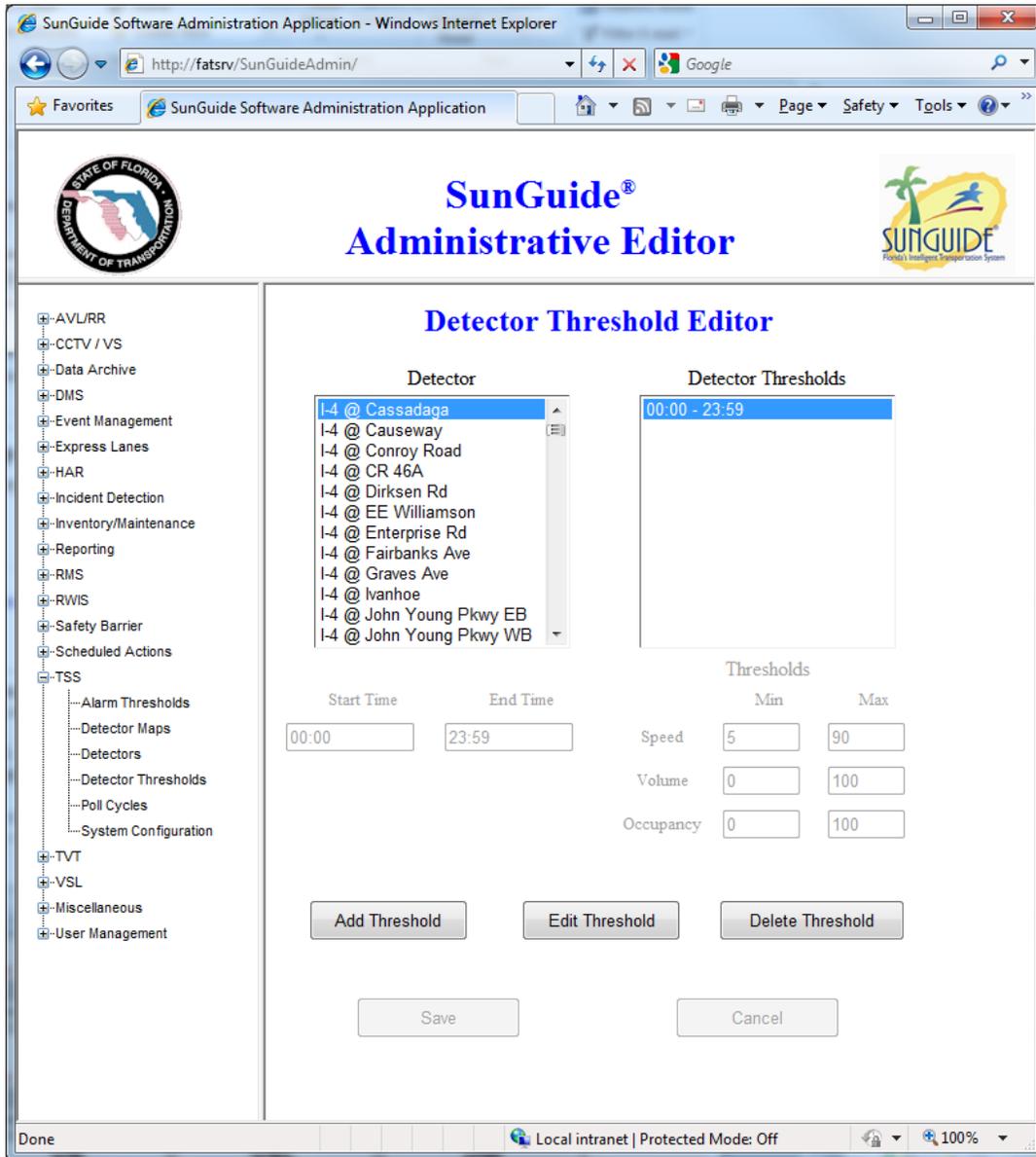
Figure 4–157 – Detector Threshold Editor

To manage thresholds for a detector, a detector is selected and the **Add Threshold** button is enabled. The fields **Speed Min, Speed Max, Volume Min, Volume Max, Occupancy Min, Occupancy Max, Start Time** and **End Time** will be enabled (see Figure 4–158) along with the **Save** and **Cancel** buttons. Once the data is entered and saved, the user can select a threshold and utilize the **Edit Threshold and Delete Threshold** buttons to manage the data.

Threshold values determine when a detector will generate an email alert. The conditions for email generate are managed by both these values and system wide settings in the configuration file.
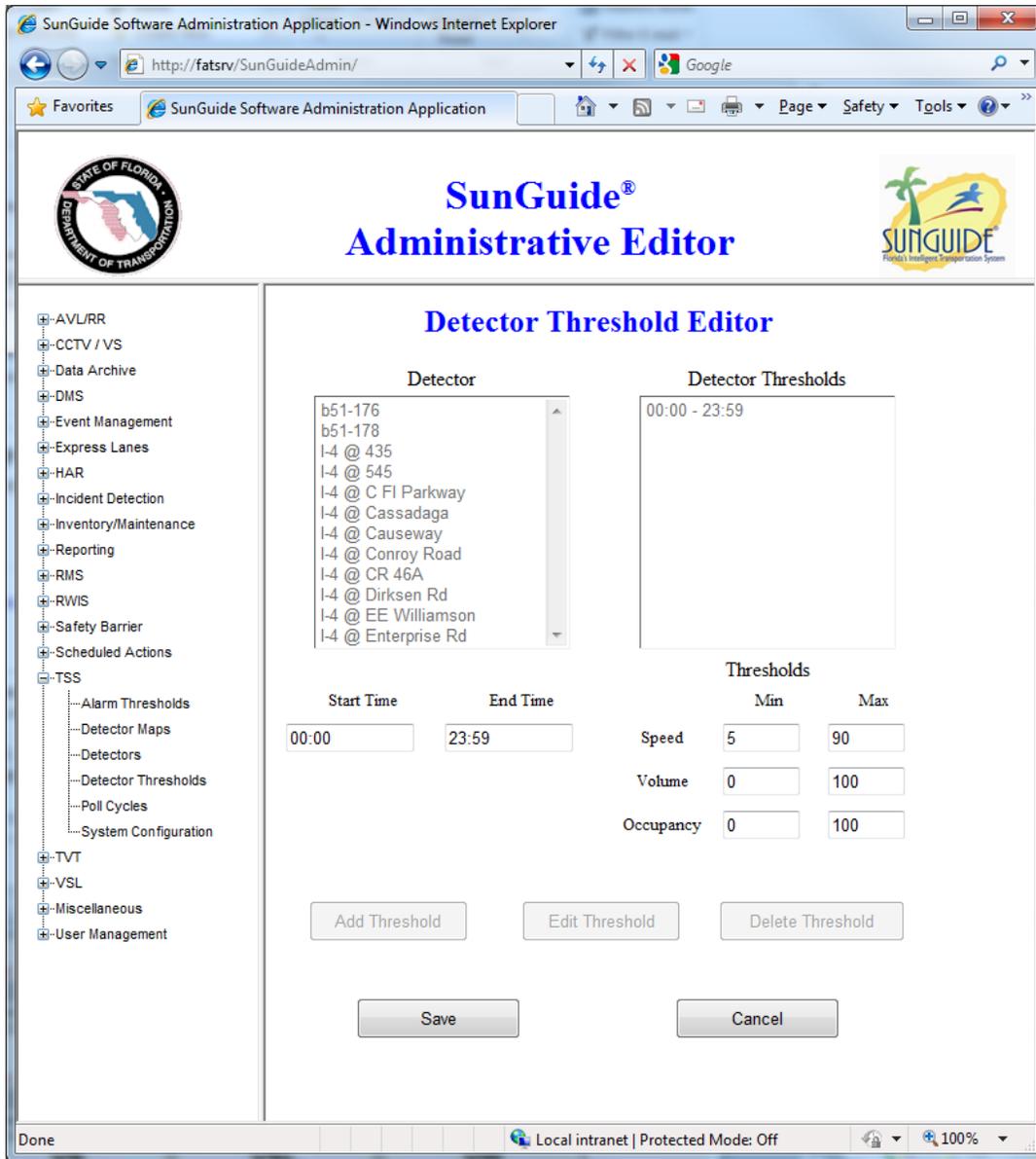
Figure 4–158 – Edit Detector Threshold

4.4.15.5 Poll Cycles

The Poll Cycle Editor enables the system user to manipulate traffic detector poll cycle data in the database. This editor is opened by expanding the TSS element of the Editor List Frame, then clicking on **Poll Cycles** (see Figure 4–159). The Administrative Editor will query the database and retrieve a list of the poll cycles currently in the database.
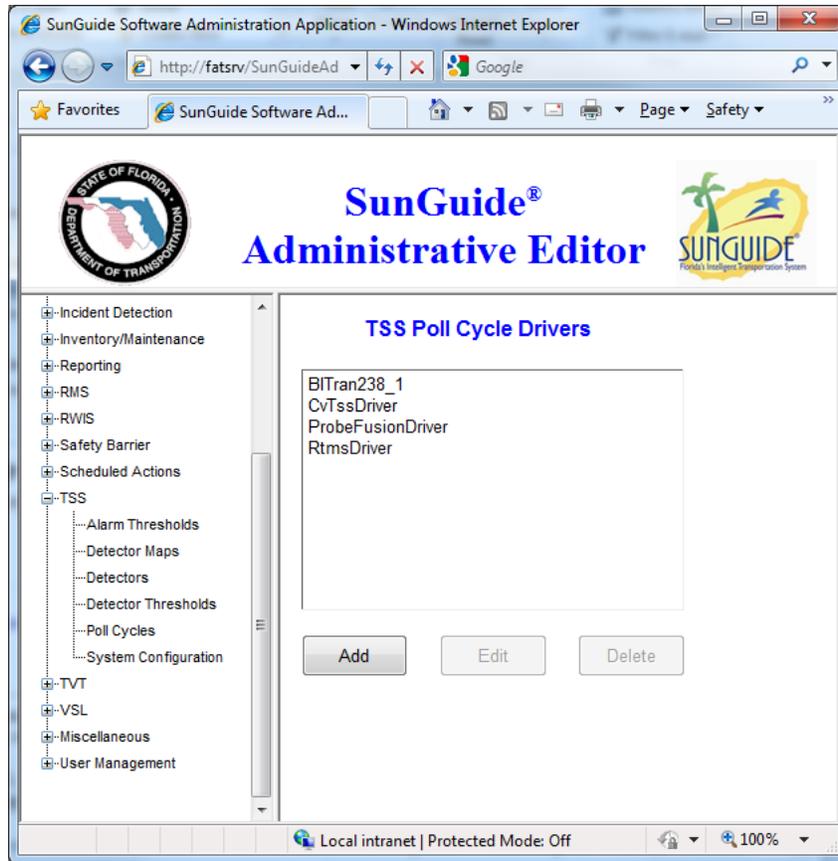
Figure 4–159 – Poll Cycle List

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified (seeFigure 4–160). The **Add** and **Edit** options both route to the same page, with only a few differences in the display.
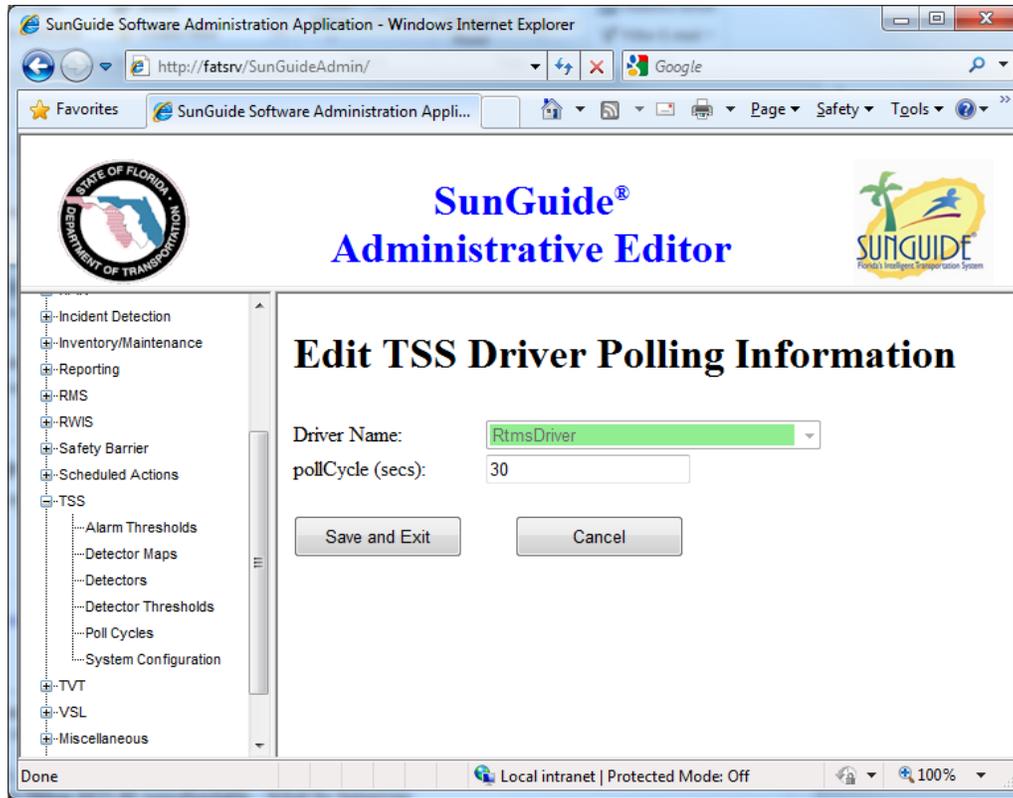
Figure 4–160 – Edit Poll Cycle

The Driver Name field is editable only when adding a new detector. The currently defined poll cycle for the selected driver will be displayed if it is defined.

Operations may be cancelled without altering the database by clicking on the **Cancel** button. Alternatively, the selections on the screen can be submitted to the database via selection of the **Save and Exit** button. When saving, required fields will be validated, and error messages will be displayed on the page when necessary. Users will be notified of errors encountered in accessing the database via informational messages sent to the Status Logger; messages will also appear on the page when needed. Critical errors will cause this page to remain in focus, forcing the user to manually cancel the operation. Non-critical errors as well as successful database access will result in browser redirection to the previous list page. If a new detector was created, the user will see the name of this new detector in the list on the list page.

4.4.15.6 TSS System Configuration

The TSS System Configuration Editor enables configuration for the following items (see Figure 4–161). From this editor, the administrator may configure the max speed value for which reported speeds should not exceed. The tag expiration timeout indicates the amount of time (in seconds) for which tag reads expire. The minimum LPR confidence index is configured to determine the minimum confidence level accepted by the system to apply received LPR tag data. The minimum and maximum number of characters that LPR tag reads must contain to be accepted. The arterial sampling percentage value is used by system to apply only this percentage

of the fastest speeds received along roadways marked as being arterials. Administrators may also configure the number of detectors in a failure state for which dynamic linking will be triggered.
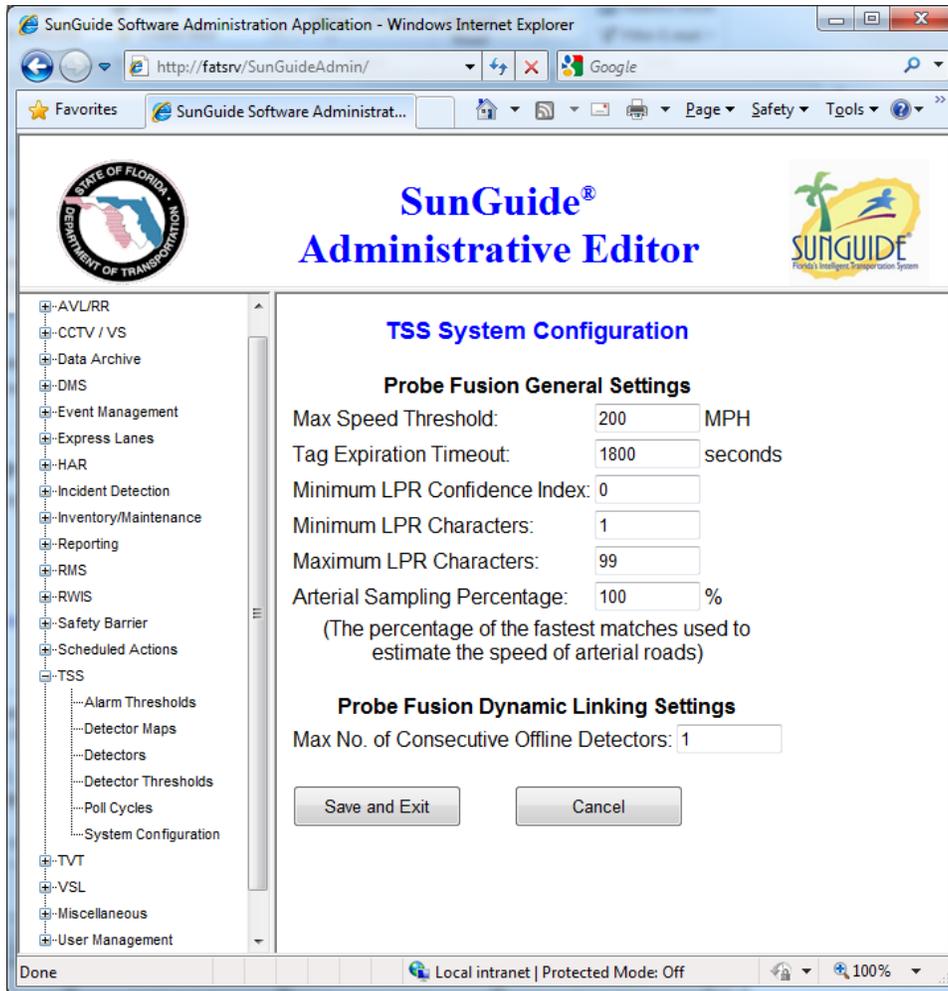
Figure 4–161 – System Configuration

4.4.16 Travel Time Editor

The following sections describe the editors that are Travel Time related. A white paper entitled "Using SunGuide Travel Times" is available that describes the process of how travel times are generated and how the SunGuide software can be used to display those travel times.

4.4.16.1 Alternate Routes

The Travel Time (TvT) Alternate Routes Editor enables the administrator to manage TvT alternate route sets (travel time links which are configured to allow travel from the same origin to the same destination via different travel routes). This editor is opened by expanding the Travel Time element of the Editor List Frame, then clicking on **Alternate Routes** (see Figure 4–162). The Administrative Editor will query the database and retrieve a list of the alternate route sets currently in the database.

Figure 4–162 – Alternate Routes List

The **Add** button is always enabled; once an alternate route set is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified. The **Add** and **Edit** options both route to the same page, with only a few differences in the display.

Figure 4–163 shows an example of editing an existing alternate route. The name of the alternate route set can only be modified when adding a new alternate route. The list of TvT links that are part of the alternate route set are displayed in the Associated TVT Links list. To add an item to this list, select the TVT link from the Available TVT Links list and click the left pointing arrow. To remove an item from the list select it and click the right pointing arrow. The user should enter all information to be stored in the database for this alternate route, and then click the **Save and Exit** button.
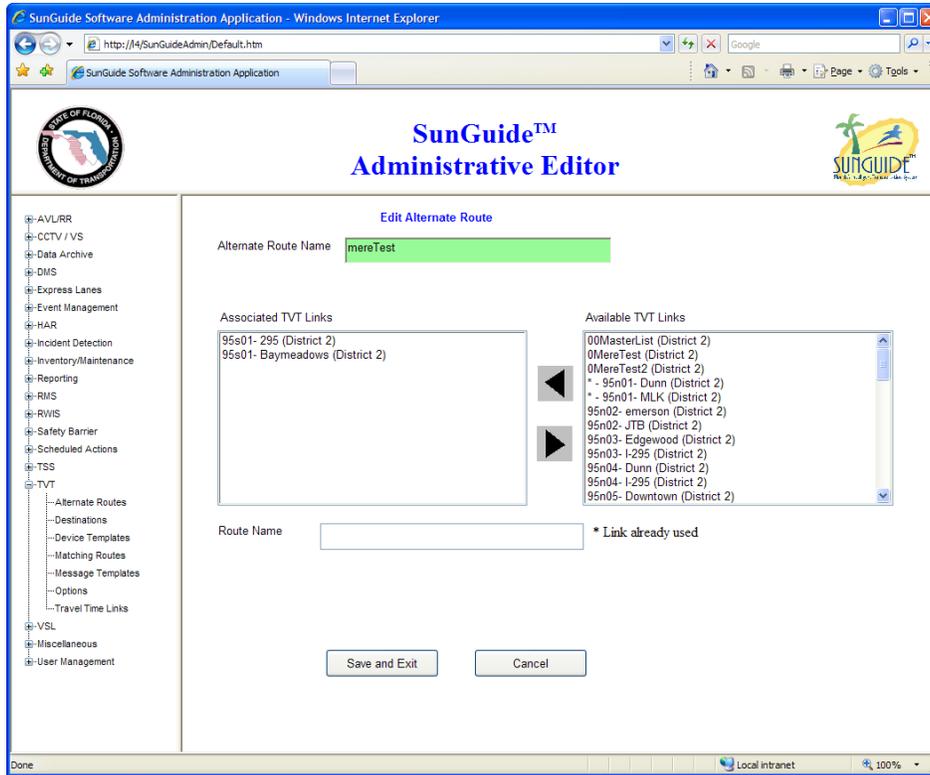
Figure 4–163 – Edit Travel Time Alternate Route Set

4.4.16.2 Destinations

The Travel Time (TvT) Destinations Editor enables the administrator to manage TvT destinations (tags in the generation of travel time messages). This editor is opened by expanding the Travel Time element of the Editor List Frame, then clicking on **Destinations** (see Figure 4–164). The Administrative Editor will query the database and retrieve a list of the destinations currently in the database.
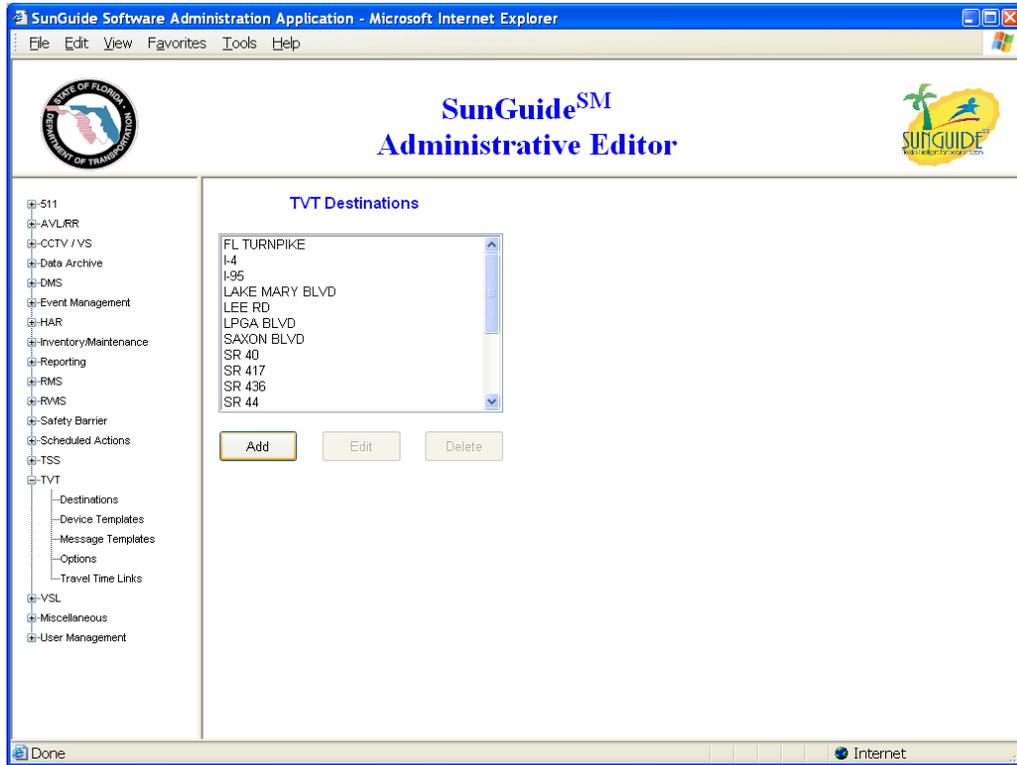
Figure 4–164 – TVT Destinations

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified. The **Add** and **Edit** options both route to the same page, with only a few differences in the display.

Figure 4–165 shows an example of editing an existing destination. The page displays with all fields enabled and blank. The user should enter all information to be stored in the database for this destination, and then click the **Save and Exit** button.

Figure 4–165 – Edit Travel Time Destination

4.4.16.3 Device Templates

The TvT Device Templates Editor enables the administrator to manage TvT device templates (each sign has unique attributes associated with a template for each sign). This editor is opened by expanding the Travel Time element of the Editor List Frame, then clicking on **Device Templates** (see Figure 4–166). The Administrative Editor will query the database and retrieve a list of the templates currently in the database.
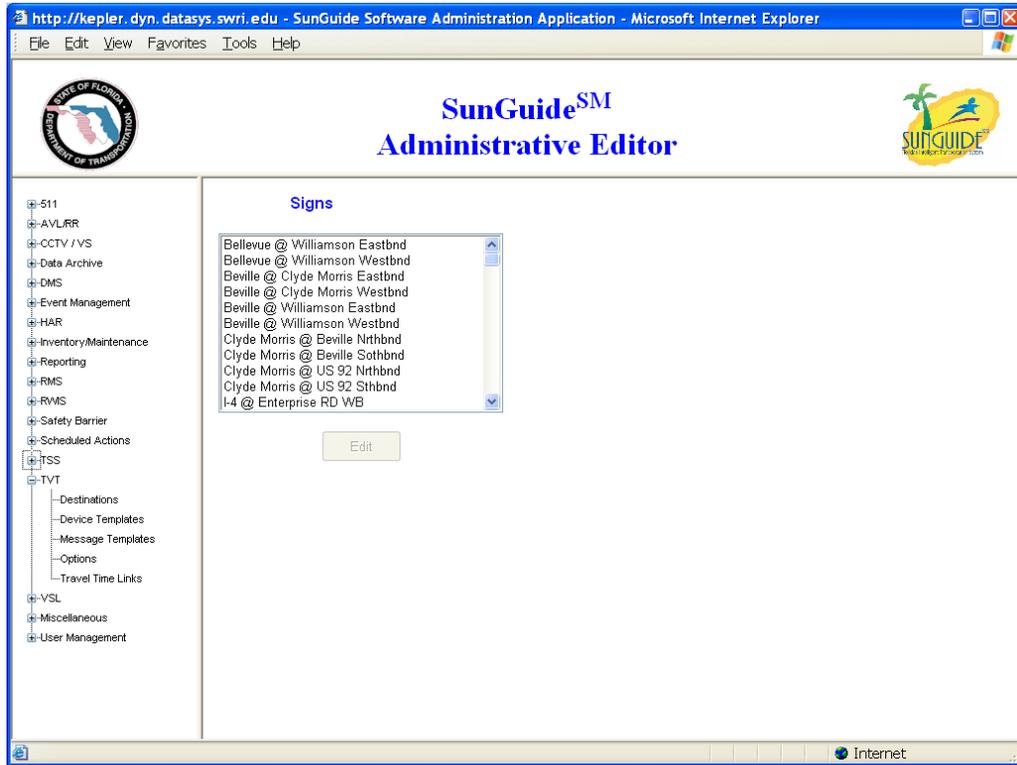
Figure 4–166 – Travel Time Device List

The **Edit** is enabled once a sign is selected. Once this option is selected the screen shown in Figure 4–167 is displayed. The administrator can select the fields and links to be associated with the message template for the selected sign. The administrator will select the link travel times that should be displayed on the selected sign. The administrator may also specify whether travel time messages are currently enabled on the sign, as well as whether the sign should replace travel time messages with alternate route messages when travel times along the main route are sufficiently slower than along alternate routes. The options to **Save**, **Clear**, or **Cancel** can be selected to complete the editing of the template.
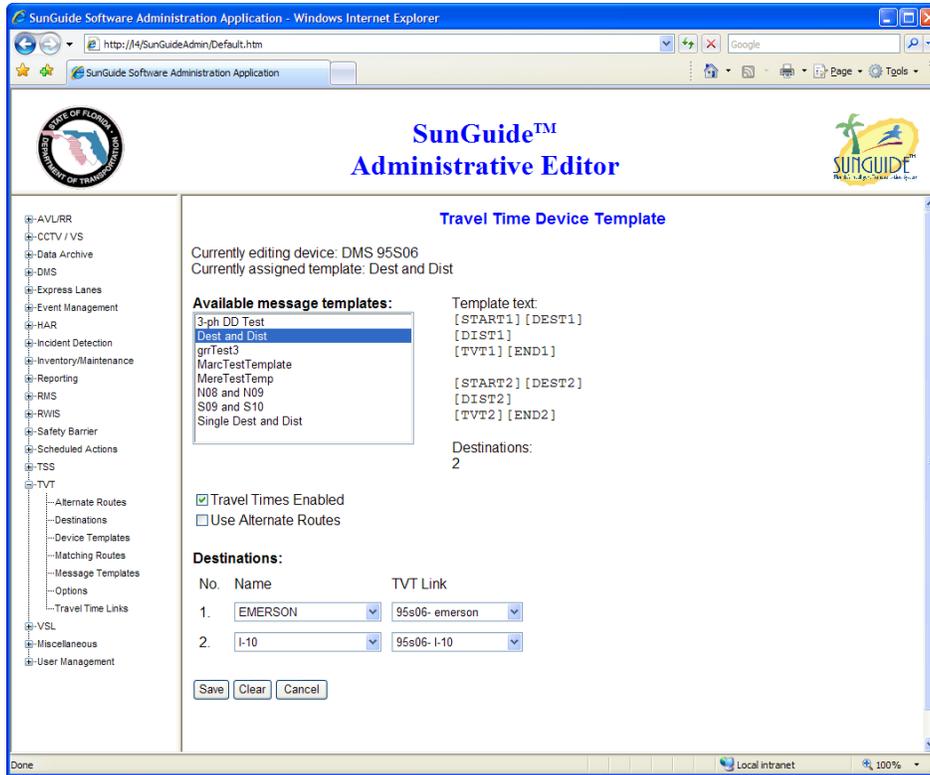
Figure 4–167 – Edit Travel Time Device Template

4.4.16.4 Matching Routes

The Travel Time (TvT) Matching Routes Editor enables the administrator to manage TvT matching route sets (travel time links which are configured to follow the same segment of roadway, but typically use data from different detection methods). This editor is opened by expanding the Travel Time element of the Editor List Frame, then clicking on **Matching Routes** (see Figure 4–168). The Administrative Editor will query the database and retrieve a list of the matching route sets currently in the database.

Figure 4–168 – Matching Routes List

The **Add** button is always enabled; once a matching route set is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified. The **Add** and **Edit** options both route to the same page, with only a few differences in the display.

Figure 4–169 shows an example of editing an existing matching route. The name of the matching route set can only be modified when adding a new matching route. The list of TvT links that are part of the matching route set are displayed in the Associated TVT Links list. To add an item to this list, select the TVT link from the Available TVT Links list and click the left pointing arrow. To remove an item from the list select it and click the right pointing arrow. The description of a particular TVT link in this matching route set can be set by selecting the TVT link in the Associated TVT Links list, then entering a description in the field below the list. Once focus is moved away from that field, the description will be saved. If a description is already available, it will be displayed when the link is selected. These descriptions should be used to specify the type of detection used to determine the travel time, such as Radar, LPR, etc. The user should enter all information to be stored in the database for this matching route, and then click the **Save and Exit** button.
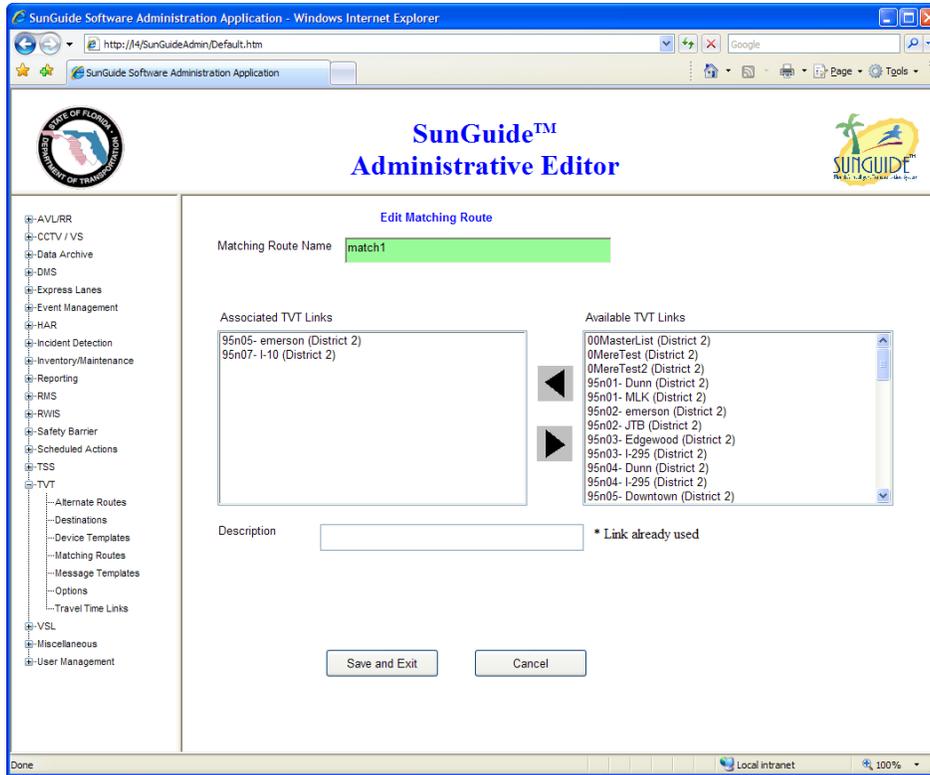
Figure 4–169 – Edit Travel Time Matching Route Set

4.4.16.5 Message Templates

The TvT Message Templates Editor enables the administrator to manage TvT message templates (the system may have multiple message templates defined). This editor is opened by expanding the Travel Time element of the Editor List Frame, then clicking on **Message Templates** (see Figure 4–170). The Administrative Editor will query the database and retrieve a list of the templates currently in the database.
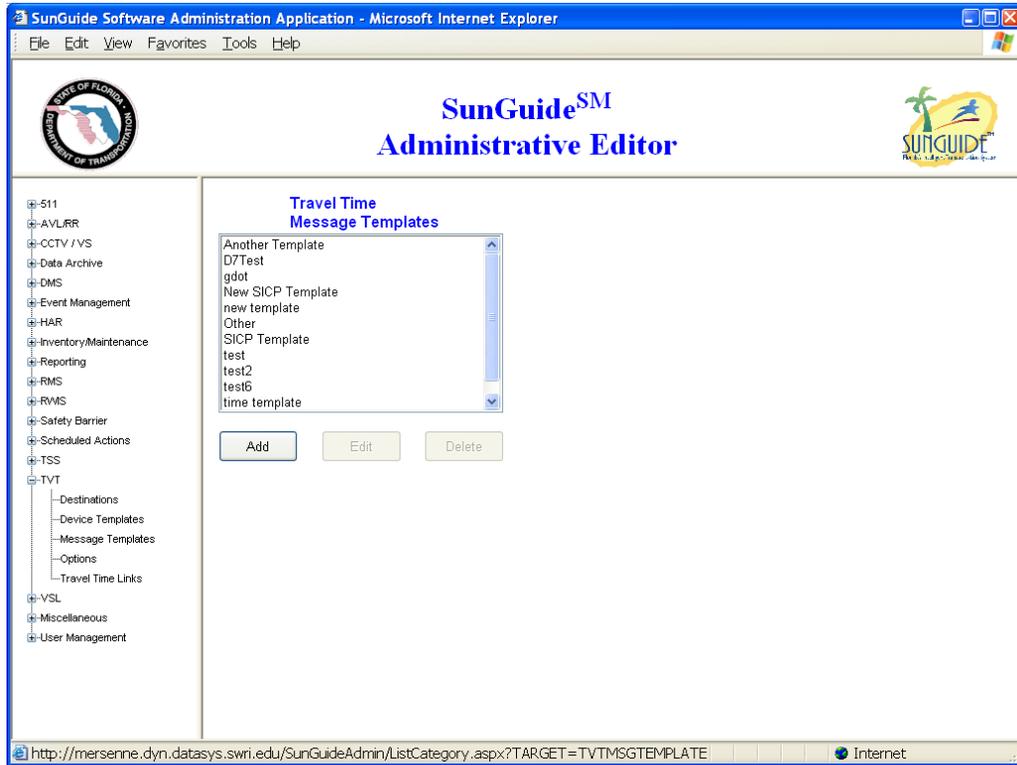
Figure 4–170 – Travel Time Message Template List

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified. The **Add** and **Edit** options both route to the same page, with only a few differences in the display.

Figure 4–171 shows an example of editing an existing template. The user should modify the tags that are to be included on the message template (the arrow keys can be utilized to move tags around). Information will be stored in the database when the **Save and Exit** button is selected.
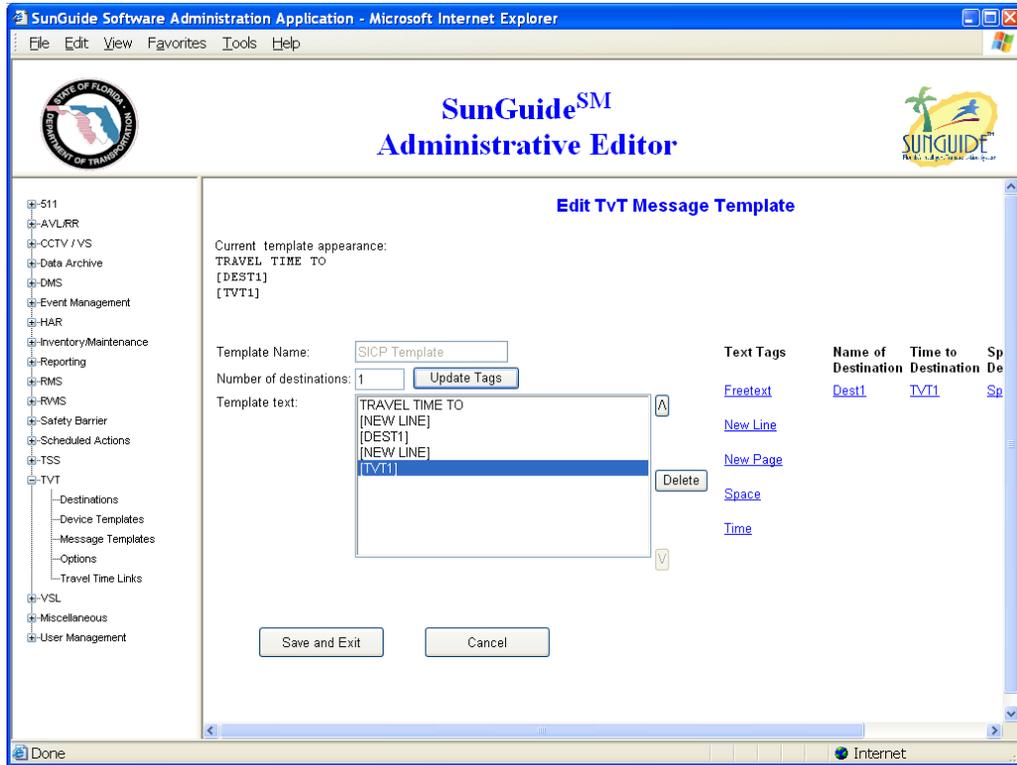
Figure 4–171 – Travel Time Message Template Editing

4.4.16.6 Options

The TvT Options Editor enables the administrator to manage TvT options. This editor is opened by expanding the Travel Time element of the Editor List Frame, then clicking on **Options** (see Figure 4–172). The Administrative Editor will query the database and retrieve a list of the options currently in the database.
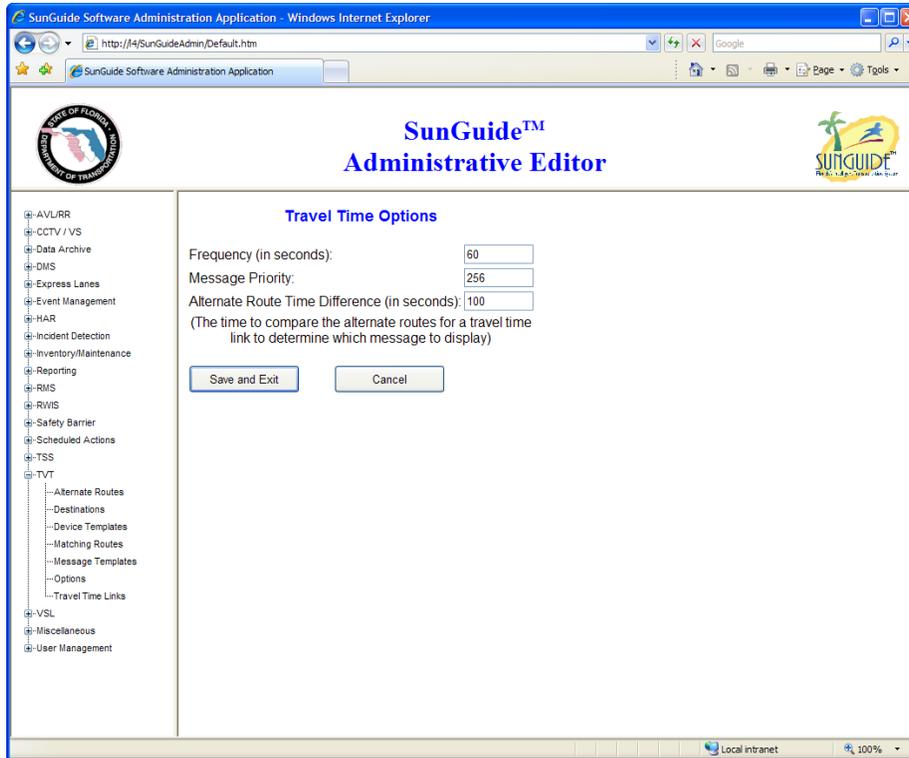
Figure 4–172 – Travel Time Options

Frequency specifies how often travel times and travel time DMS messages should be updated. Message priority specifies the priority travel time messages will be assigned when sent to MAS. Alternate Route Travel Time Difference specifies how much time must be saved by using an alternate route (as compared to the primary route) to trigger an alternate route message to be displayed in lieu of a normal travel time message on devices which have alternate route messages enabled. The administrator will edit the options and then select the **Save and Exit** button to store to the database.

4.4.16.7 Travel Time Links

The Travel Time Link Editor enables the system administrator to manipulate travel time link data in the database (see Figure 4–173). This editor is opened by expanding the Travel Time element of the Editor List Frame, then clicking on **Travel Time Links**. The Administrative Editor will query the database and retrieve a list of the links currently in the database.

Figure 4–173 – Travel Time Link List

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified. The **Add** and **Edit** options both route to the same page, with only a few differences in the display (see Figure 4–174).
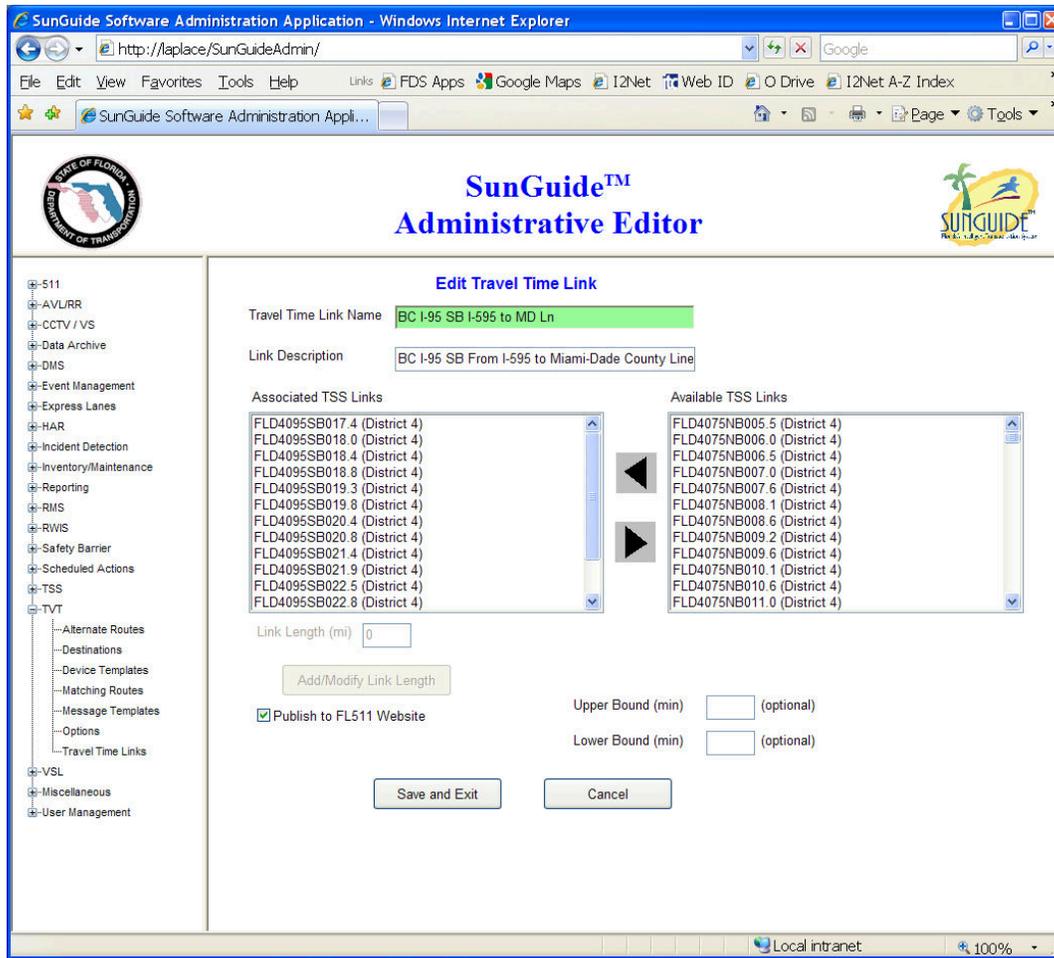
Figure 4–174 – Edit Travel Time Link

The Travel Time Link Name field is editable only when adding a new travel time link. Selecting a link in the associated list causes the Link Length input field and the **Add/Modify Link Length** button to become enabled. Clicking on the **Add/Modify Link Length** button will cause the link length to be modified internally only – changes are not saved to the database until the **Save** button is clicked.

Links may be moved from the available list to the associated list, and vice-versa, by selecting the desired link in the list (see Figure 4–175), then clicking on either the **left-arrow** button (to add the item) or the **right-arrow** button (to remove the item). An upper and lower limit on the travel time may also be specified by entering values in the lower fields of the form. If these values are provided, the travel time reported for this link will never be reported as higher than the upper bound or as lower than the upper bound. If these values are not provided, travel times will always be based on actual travel speeds (bound by the speed limit of links if defined) regardless of how fast or slow they may be.

The checkbox labeled "Publish Link to FL511 Website" can be used to indicate whether or not the data should be displayed on the FL511 Website by the FL511 web application.
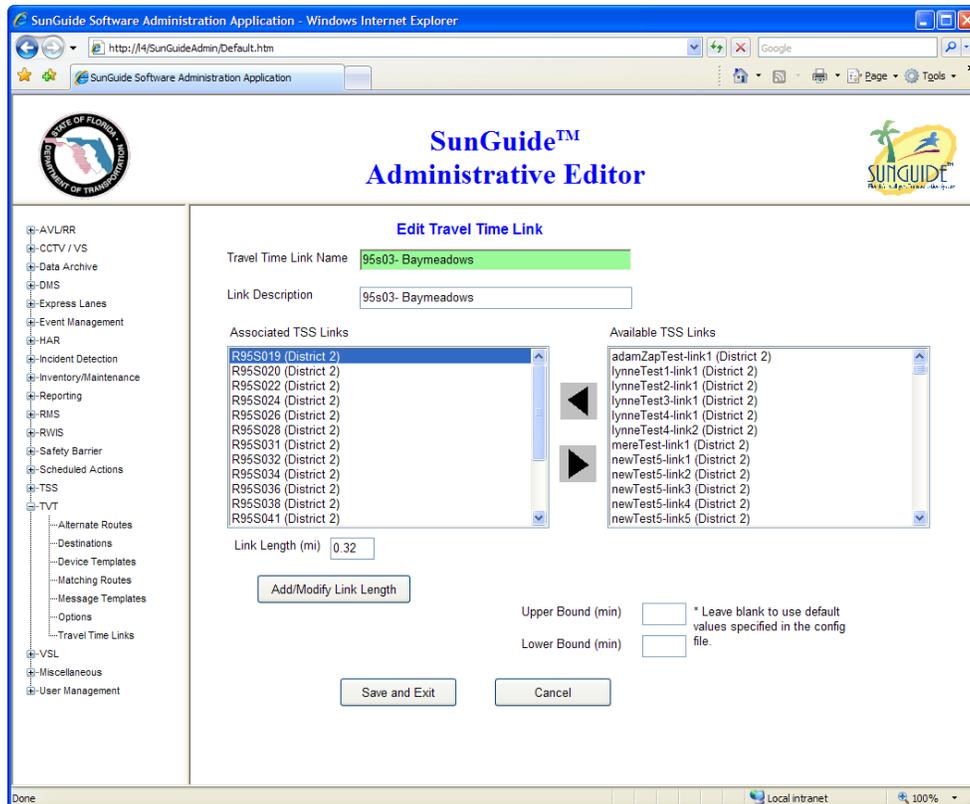
Figure 4–175 – Edit Travel Time Link – Select Link

Operations may be cancelled without altering the database by clicking on the **Cancel** button. Alternatively, the selections on the screen can be submitted to the database via selection of the **Save and Exit** button. When saving, required fields will be validated, and error messages will be displayed on the page when necessary. Users will be notified of errors encountered in accessing the database via informational messages sent to the Status Logger; messages will also appear on the page when needed. Critical errors will cause this page to remain in focus, forcing the user to manually cancel the operation. Non-critical errors as well as successful database access will result in browser redirection to the previous list page. If a new travel time link was created, the user will see the name of this new link in the list on the list page.

4.4.17 Variable Speed Limit Editor

The following sections describe the VSL editors.

4.4.17.1 Groups

The VSL Group Editor (see Figure 4–176) enables the system administrator to manage groups of VSL devices. This editor is opened by expanding the VSL node of the Editor List Frame, then clicking on **Groups**. The Administrative Editor will query the database and retrieve a list of all VSL groups currently in the database.
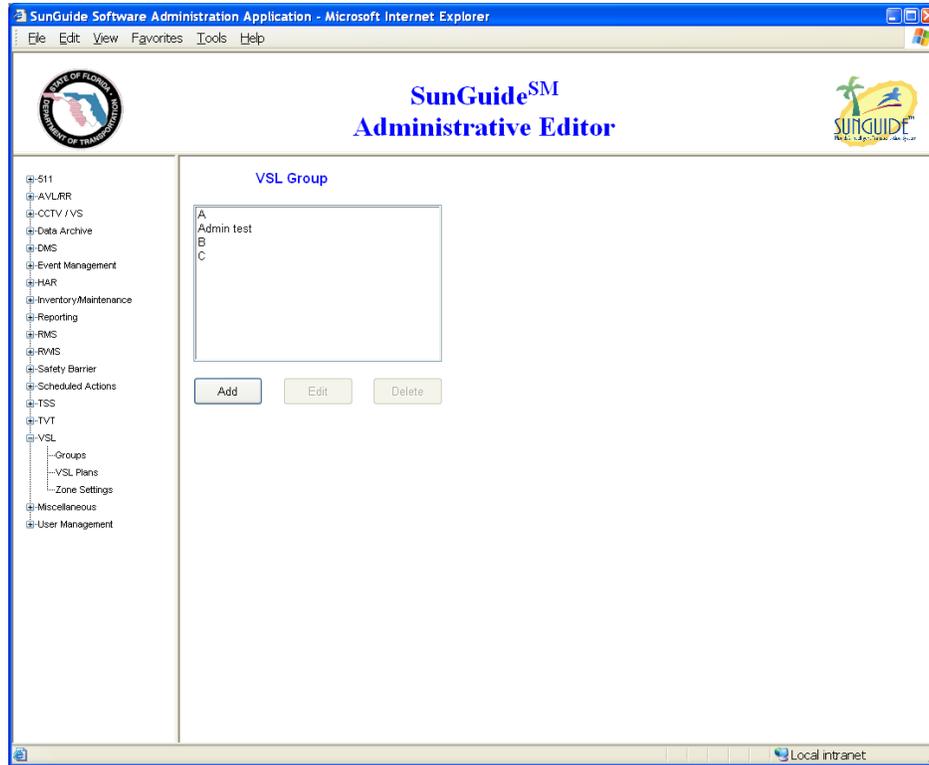
Figure 4–176 – VSL Group List

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified; the **Add** and **Edit** options both route to the same page, with only a few differences in the display.

When editing an existing group (see Figure 4–177), the page is initially loaded with the group's name, DMS identifiers and which TSS links are associated with each DMS. A DMS configured as a VSL must be selected for each VSL position. The VSL is selected by locating the desired VSL in the drop down list for the particular VSL position. TSS links can be associated with a particular VSL by selecting a TSS link from the list of available links and clicking the arrow pointing to the left. To remove one, select it from the list of associated links and click the arrow pointing to the right. Each group must also have a single VSL position with two signs, showing duplicate messages. The duplicate is configured in the Duplicate VSL Configuration section by selecting the VSL position in the list below that has the duplicate sign, then selecting the VSL sign which should show a duplicate value of the selected position.
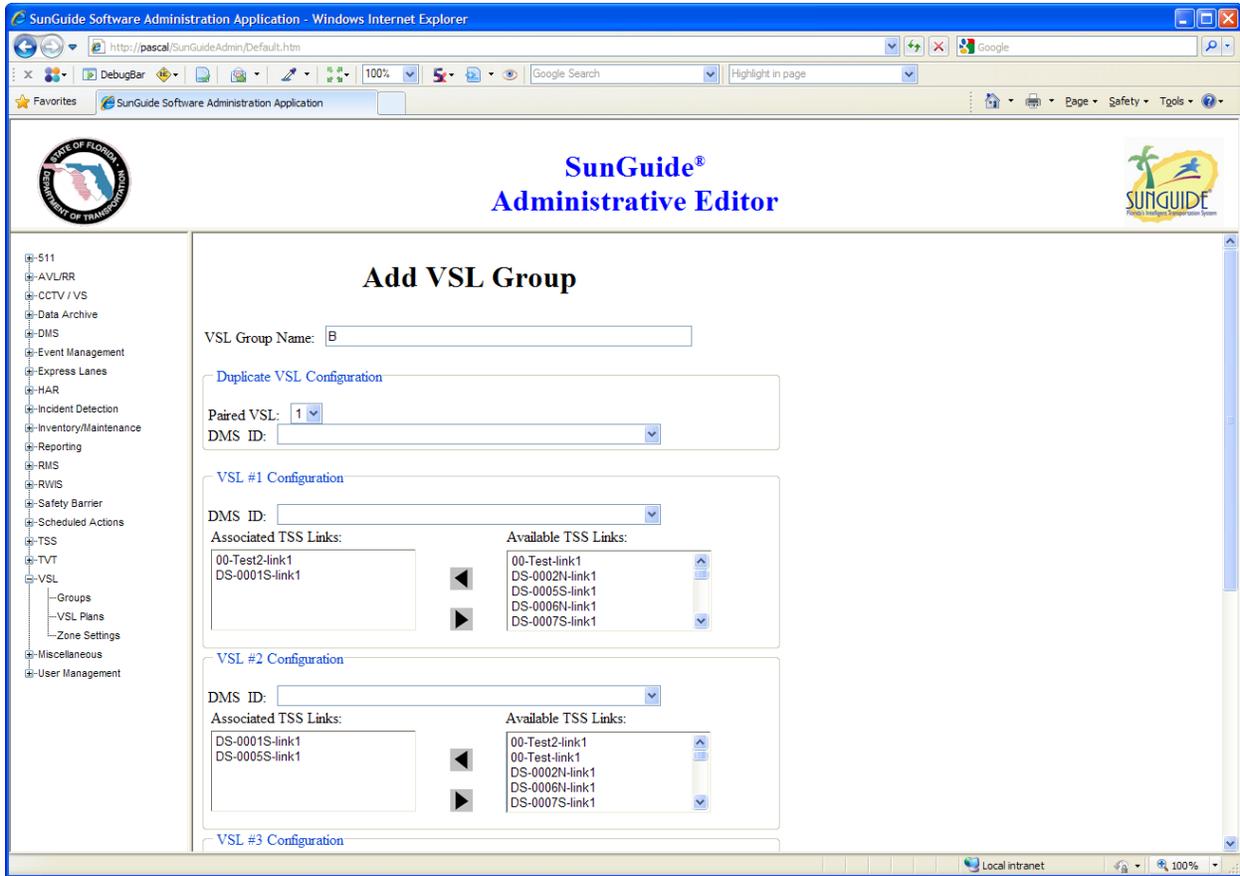
Figure 4–177 – Edit Group

4.4.17.2 Plans

The VSL Plans Editor (see Figure 4–178) enables the system administrator to manipulate VSL plan data in the database. This editor is opened by expanding the VSL element of the Editor List Frame, then clicking on **Plans**. The Administrative Editor will query the database and retrieve a list of all plans currently in the database.

Figure 4–178 – VSL Plan List
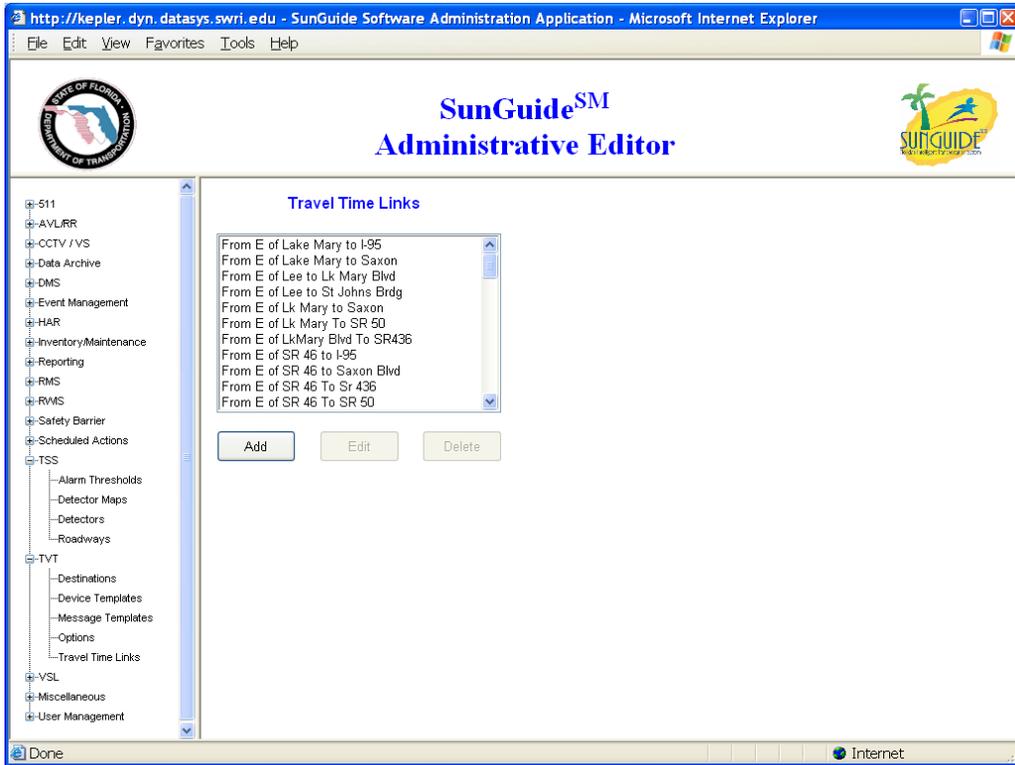
The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified; the **Add** and **Edit** options both route to the same page, with only a few differences in the display.

When editing an existing group (see Figure 4–179), the page is initially loaded with the plan's name, a list of positions and their associated information, and the list of groups this plan has been associated with. To configure a plan, it must be given a name if it does not already have one, and then for each of its four zones, a traffic condition and recommended speed must be chosen. If beacon lights are to be turned on in this position, the Use Beacon checkbox should be checked for that position. The traffic condition is chosen by selecting the appropriate condition from the positions drop down list. The recommended speed is entered in the text box associated with the position. Groups can be associated with the plan by selecting the group from the list of groups and clicking the left arrow. To remove a group, select the group from the left list of groups and click the right arrow. A list of all the plans is displayed at the bottom of the page and includes associated groups, traffic conditions, and recommended speeds for each.
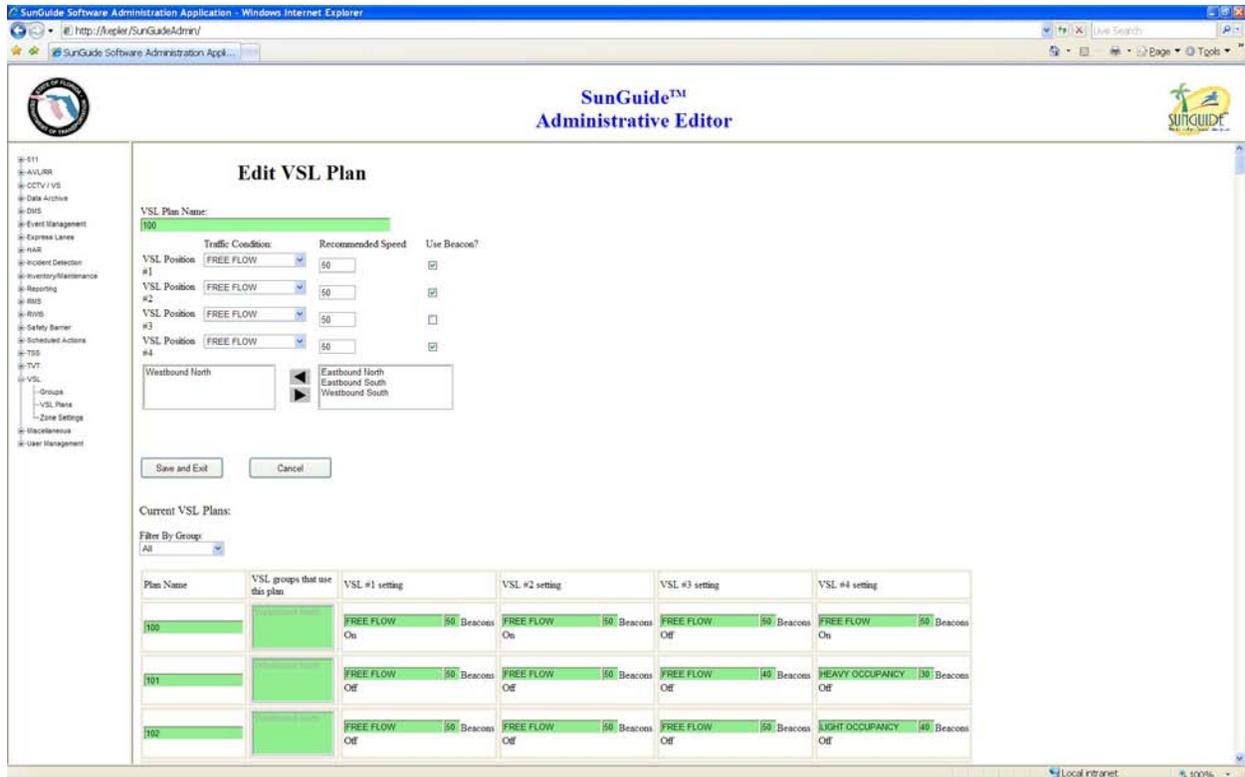
Figure 4–179 – VSL Plan Edit

4.4.17.3 Zone Settings

The Zone Settings Editor (see Figure 4–180) enables the system administrator to manage the zone settings for Variable Speed Limit devices. The settings allow up to three Traffic Conditions to be configured. A **Threshold** is established (how often the conditions should be evaluated) and for each Traffic Condition the following are configured: **Name**, **Adjustment Threshold**, and **Recovery Threshold**. These values are used to determine when the VSL subsystem should recommend to the operators that a different Traffic Condition has been encountered.
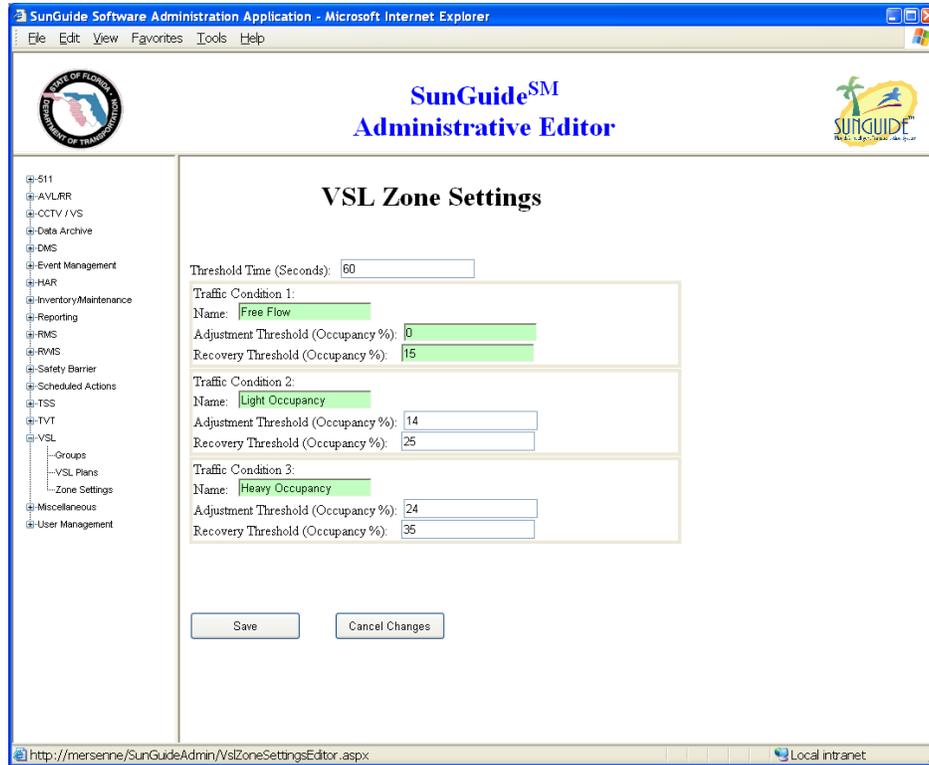
Figure 4–180 – VSL Zone Settings

4.4.18 Miscellaneous Editor

The following sections describe the editors that are not associated to a particular group.

4.4.18.1 Centers

The Center Editor enables the system administrator to manipulate centers (representing SunGuide deployments) in the database. This information is critical because all devices in SunGuide are "keyed" to a center. This editor is opened by expanding the miscellaneous element of the Editor List Frame, then clicking on **Centers** (seeFigure 4–181). The Administrative Editor will query the database and retrieve a list of the centers currently in the database.

Figure 4–181 – Center List

The **Add** button is always enabled; once a name is selected in the list, the **Delete** button is also enabled. Upon selecting **Add**, the page will redirect to another page allowing detailed data to be entered. Figure 4–182 shows an example of adding a new Center. After data entry, the administrator should select **Save and Exit** button to save the data to the database.
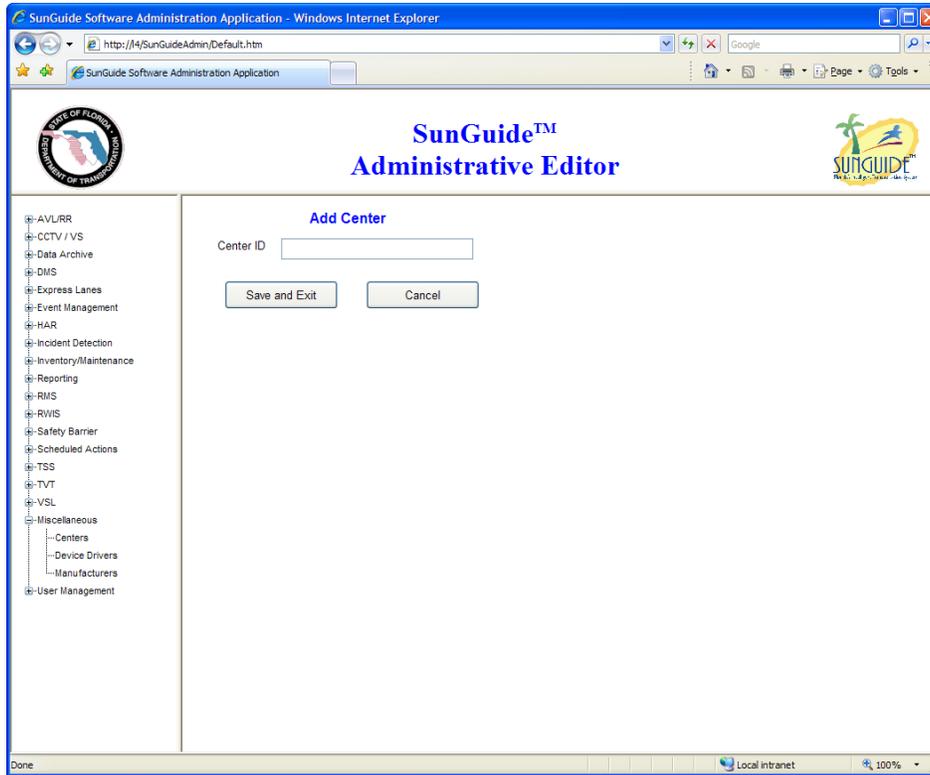
Figure 4–182 – Center List – Add

4.4.18.2 Device Drivers

The Device Driver Editor enables the system administrator to manipulate device driver names in the database. This editor is opened by expanding the miscellaneous element of the Editor List Frame, then clicking on **Device Drivers** (see Figure 4–183). The Administrative Editor will query the database and retrieve a list of the resource types and device drivers currently in the database.
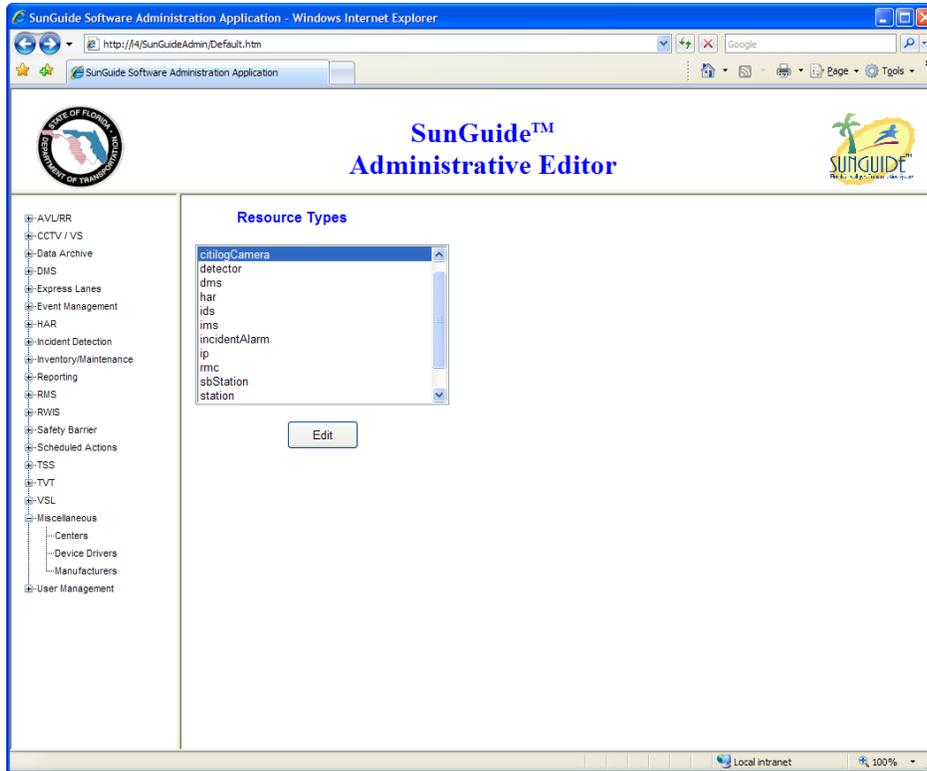
Figure 4–183 – Device Driver List

The list of resource types cannot be modified. To edit the device drivers for a particular resource type, the administrator should select **Edit**. Upon selecting **Add**, the page will redirect to another page allowing detailed data to be entered. Figure 4–184 shows an example of editing device drivers for a resource type. A driver can be added by entering its name in the lower field and selecting the **Add Driver** button. A driver can be removed by selecting it then selecting **Remove Driver**. After data entry, the administrator should select **Save and Exit** button to save the data to the database.

Figure 4–184 – Device Driver List – Edit

4.4.18.3 Manufacturers

The Manufacturer Editor enables the system administrator to manipulate manufacturer names in the database. This editor is opened by expanding the miscellaneous element of the Editor List Frame, then clicking on **Manufacturers** (see Figure 4–185). The Administrative Editor will query the database and retrieve a list of the manufacturers currently in the database.

Figure 4–185 – Manufacturers List

The **Add** button is always enabled; manufacturer names cannot be edited or deleted. Upon selecting **Add**, the page will redirect to another page allowing a new manufacturer name to be entered. Figure 4–186 shows an example of adding a new Manufacturer. After data entry, the administrator should select **Save and Exit** button to save the data to the database.

Figure 4–186 – Manufacturer List – Add

4.4.19 User Editor

The following sections describe the editors that are users/group related.

4.4.19.1 Groups

The Group Editor (see Figure 4–187) enables the system administrator to manipulate permission group data in the database. This editor is opened by expanding the User Management element of the Editor List Frame, then clicking on **Groups**. The Administrative Editor will query the database and retrieve a list of all groups currently in the database.
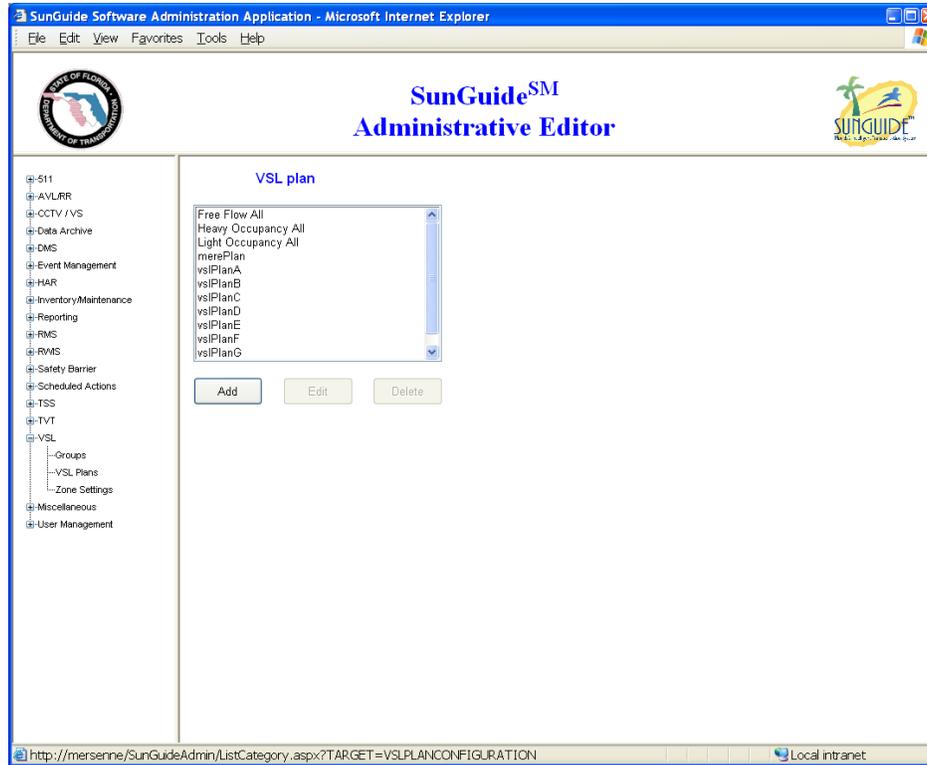

Figure 4–187 – Group List

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified; the **Add** and **Edit** options both route to the same page, with only a few differences in the display.

When adding a new group (see Figure 4–188), the page is initially loaded with the list of all permissions (by subsystem) that are in the database. All permission settings are initially deselected (or set to false). Individual permissions may be selected/deselected specifically for the current group. Selecting the **Reset Permissions** button will cause the permission settings shown on the screen to be cleared (deselected).

Figure 4–188 – Edit Group

When editing an existing group, the page is initially loaded with the group's name and description, and a current list of permissions (by subsystem) for this group, showing their individual settings. Individual permissions may be selected/deselected specifically for the current group. Clicking on the Reset Permissions button will cause the permission settings shown on the screen to be reset to the values stored in the database for the current group.

All operations may be cancelled without altering the database by clicking on the **Cancel** button. Alternatively, the selections on the screen can be submitted to the database via selection of the **Save and Exit** button. When saving, required fields will be validated, and error messages will be displayed on the page when necessary. Users will be notified of errors encountered in accessing the database via informational messages sent to the Status Logger; messages will also appear on the page when needed. It is important to note that while errors may occur in writing individual permission settings to the database, this is not considered a critical error so processing does not terminate. Other permissions may write to the database successfully, so no rollback occurs on error; successful writes will be committed to the database, while unsuccessful writes will be logged for the user. Critical errors will cause this page to remain in focus, forcing the user to manually cancel the operation. Non-critical errors as well as successful database access will result in browser redirection to the previous list page. If a new group was created, the user will see the name of this new group in the list on the list page.

4.4.19.2 Operator Workstations

The Operator Workstation Editor (see Figure 4–189) enables the system administrator to add and remove workstations to/from the database, and to associate monitors (video destinations) with these workstations. This editor is opened by expanding the User Management element of the Editor List Frame, then clicking on **Operator Workstations**. The Administrative Editor will query the database and retrieve a list of all workstations currently in the database.
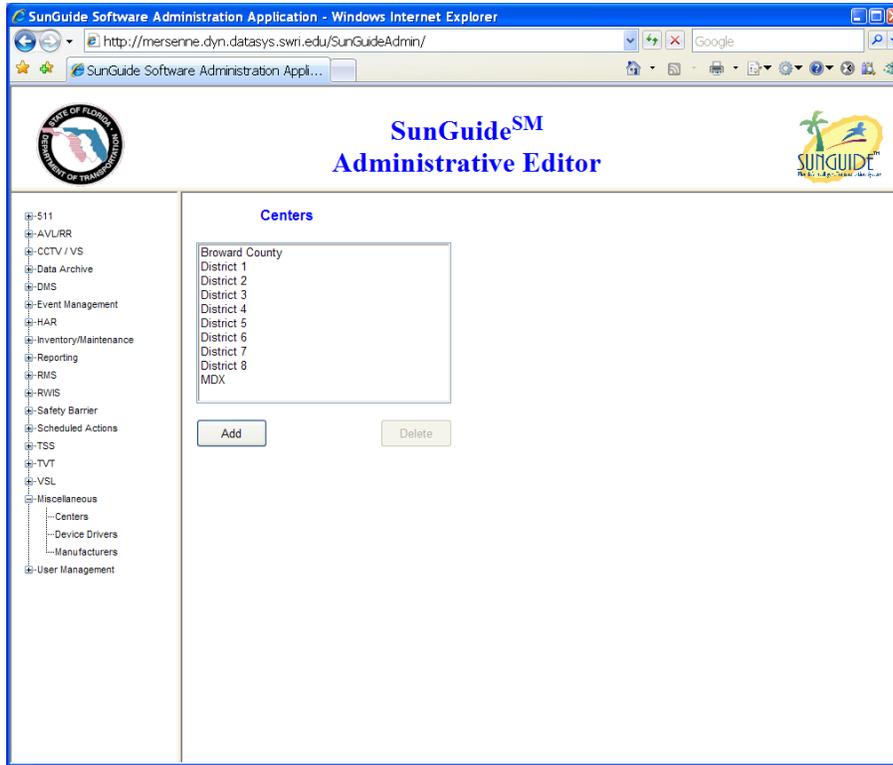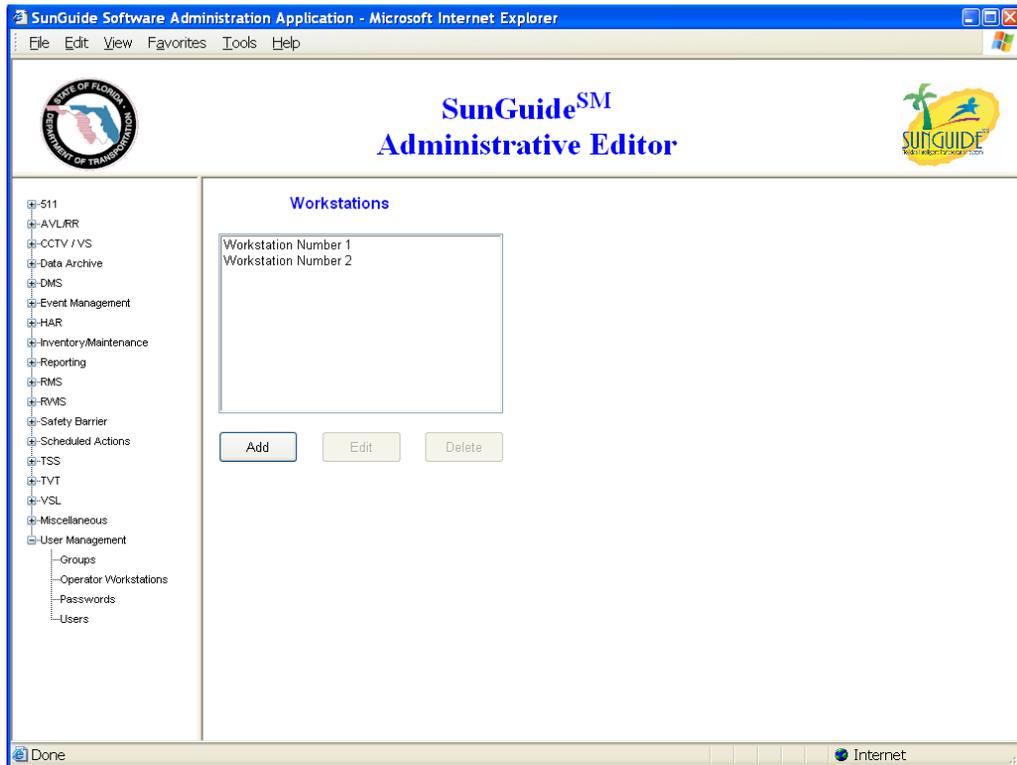

Figure 4–189 – Workstation List

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified. The **Add** and **Edit** options both route to the same page, with only a few differences in the display.

Whether adding or editing a workstation (see Figure 4–190), the page is initially loaded with a list of available (i.e., not yet associated with a workstation) monitors that are in the database. When adding, the list of associated monitors will be blank; when editing, the list is filled with the names of monitors currently associated with the selected workstation. The Workstation Name field is editable only when adding a new workstation.
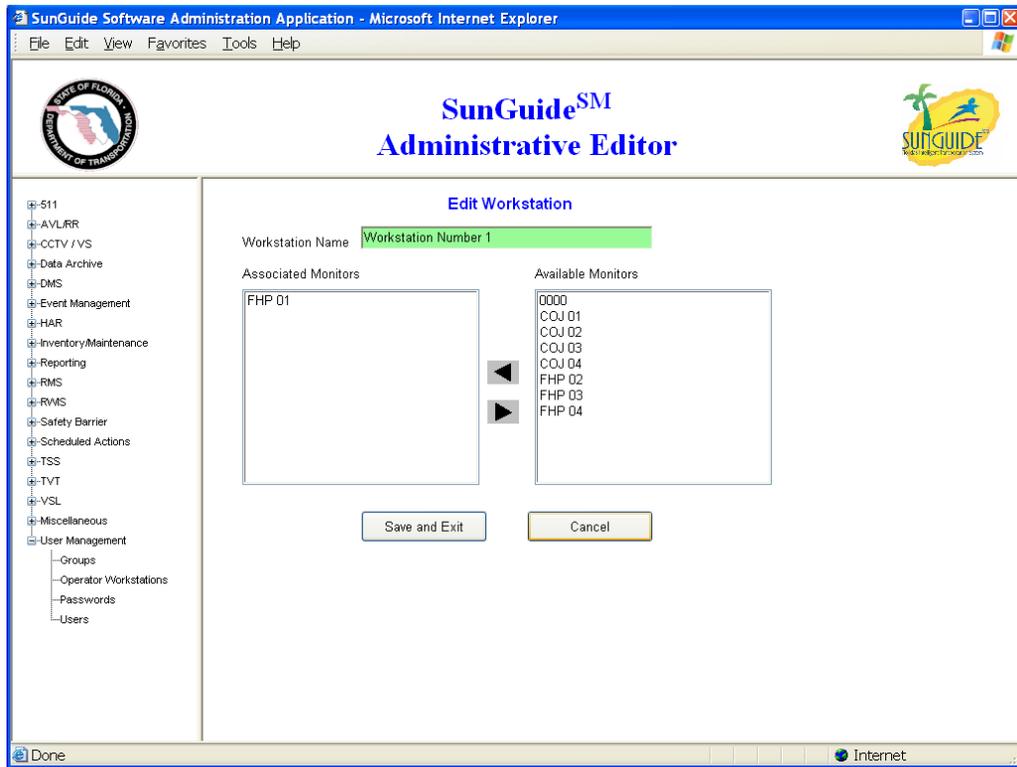
Figure 4–190 – Edit Workstation

Operations may be cancelled without altering the database by clicking on the **Cancel** button. Alternatively, the selections on the screen can be submitted to the database via selection of the **Save and Exit** button. When saving, required fields will be validated, and error messages will be displayed on the page when necessary. Users will be notified of errors encountered in accessing the database via informational messages sent to the Status Logger; messages will also appear on the page when needed. Critical errors will cause this page to remain in focus, forcing the user to manually cancel the operation. Non-critical errors as well as successful database access will result in browser redirection to the previous list page. If a new workstation was created, the user will see the name of this new workstation in the list on the list page.

4.4.19.3 Edit Users

The User Editor enables the system administrator to manipulate user data in the database. This editor is opened by expanding the User Management element of the Editor List Frame, then clicking on **Users** (Figure 4–191). The Administrative Editor will query the database and retrieve a list of all users currently in the database.
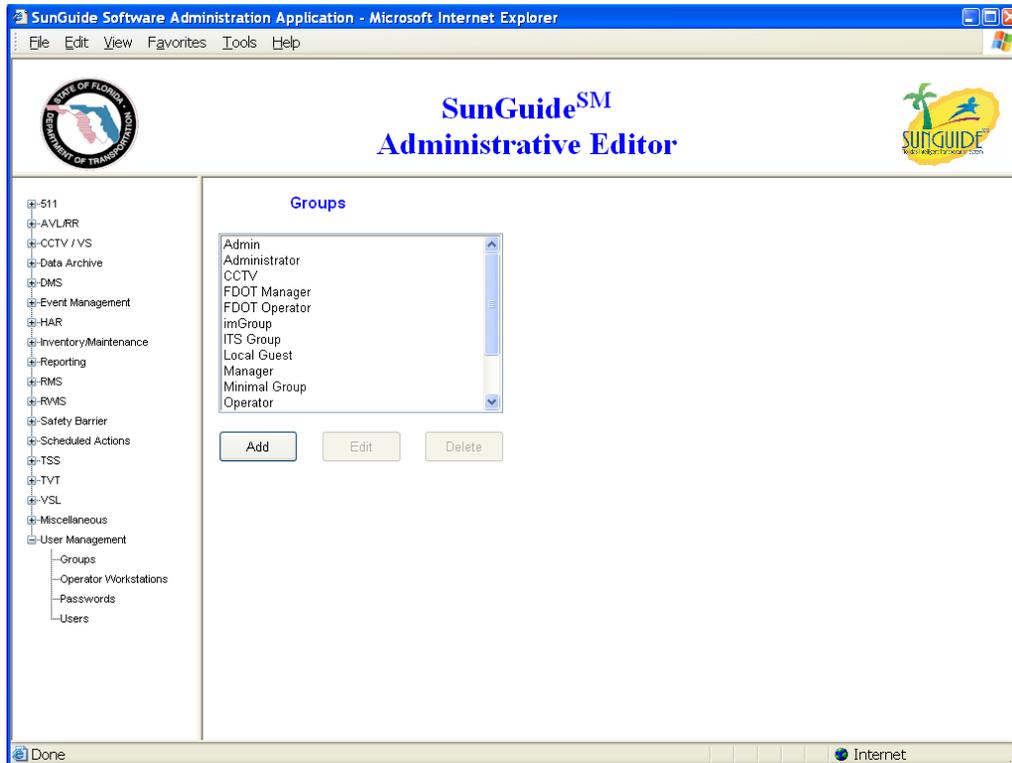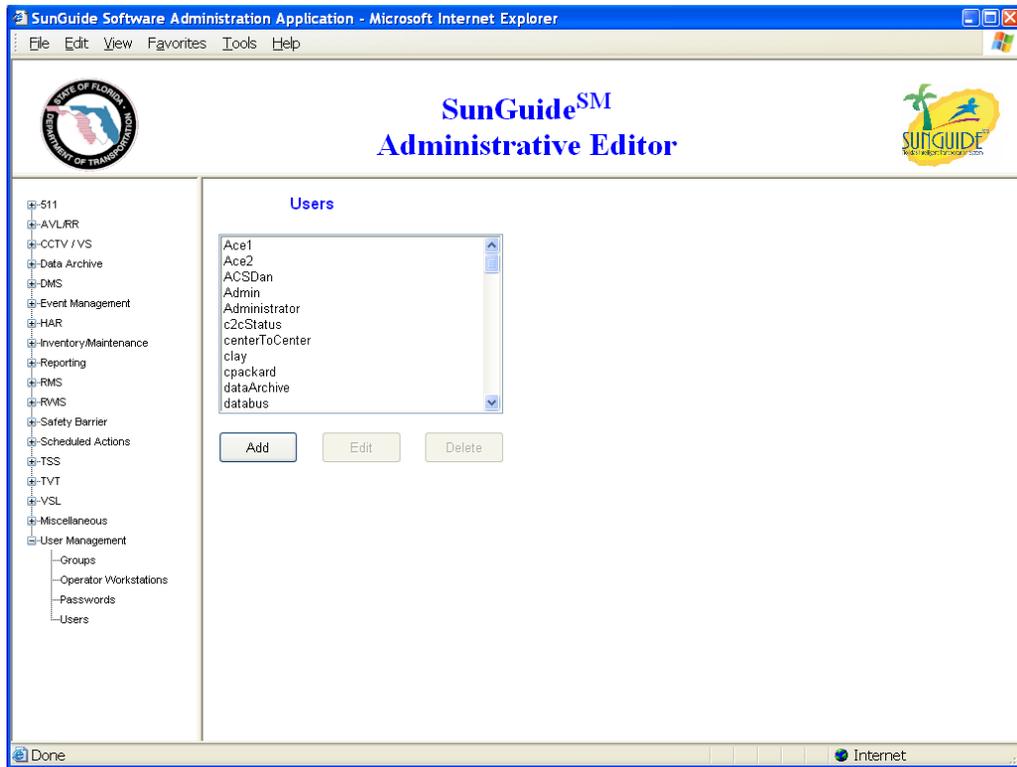
Figure 4–191 – User List

The **Add** button is always enabled; once a name is selected in the list, the **Edit** and **Delete** buttons are also enabled. Upon selecting either **Add** or **Edit**, the page will redirect to another page allowing detailed data to be entered/modified; the **Add** and **Edit** options both route to the same page, with only a few differences in the display.

When adding a new user (see Figure 4–192), the page is initially loaded with the list of permission groups that currently reside in the database, as well as the list of the permissions (by subsystem) that are in the database. The permission settings are initially deselected (or set to false). Once a group is selected, the permission settings are set on or off based on the default settings for that group. Individual permissions may then be selected / deselected specifically for the current user. Clicking on the Reset Permissions button will cause the permission settings shown on the screen to be reset to the default values for the currently selected group.
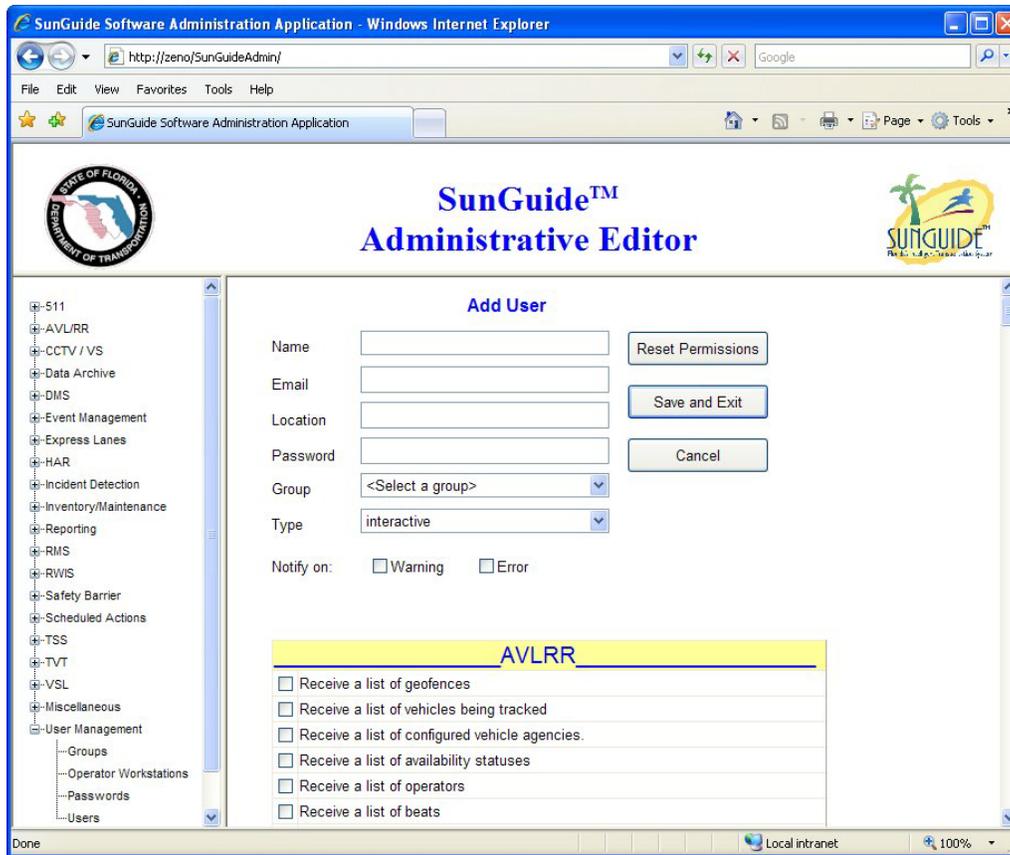
Figure 4–192 – Add User

When editing an existing user (see Figure 4–193), the page is initially loaded with the user's name and other vital information, and with a list of permission groups that currently reside in the database, with the user's currently assigned group selected. The user's current list of permissions (by subsystem) is also displayed, showing their individual settings. If the user is assigned to a different group, the permission settings are adjusted based on the default settings for the newly selected group. Individual permissions may then be selected / deselected specifically for the current user. Clicking on the **Reset Permissions** button will cause the permission settings shown on the screen to be reset to the values stored in the database for the current user.
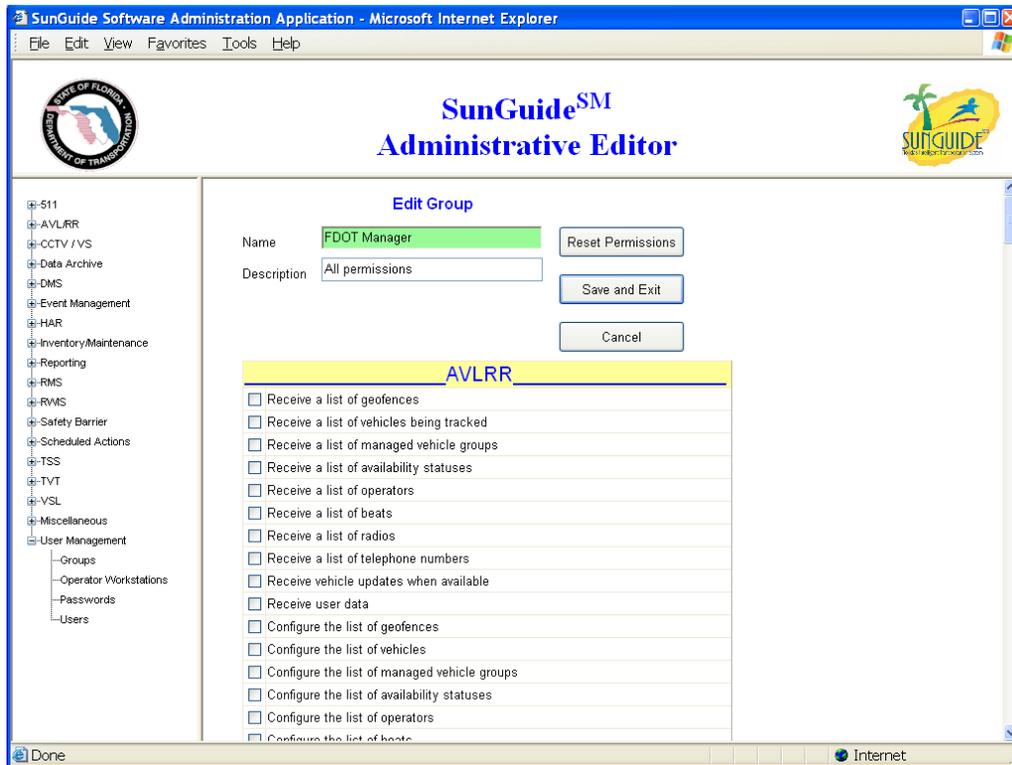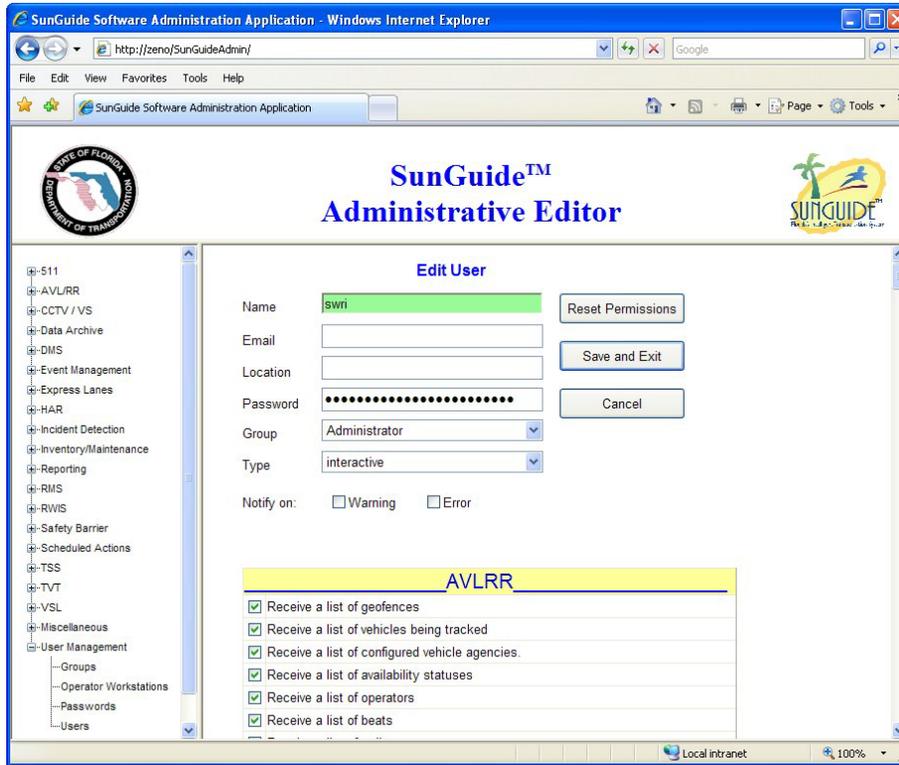
Figure 4–193 – Edit User

Operations may be cancelled without altering the database by clicking on the **Cancel** button. Alternatively, the selections on the screen can be submitted to the database via selection of the **Save and Exit** button. When saving, required fields will be validated, and error messages will be displayed on the page when necessary. For users, Email and Location fields are optional; all others are required. Users will be notified of errors encountered in accessing the database via informational messages sent to the Status Logger; messages will also appear on the page when needed. It is important to note that while errors may occur in writing individual permission settings to the database, this is not considered a critical error so processing does not terminate. Other permissions may write to the database successfully, so no rollback occurs on error; successful writes will be committed to the database, while unsuccessful writes will be logged for the user. Critical errors will cause this page to remain in focus, forcing the user to manually cancel the operation. Non-critical errors as well as successful database access will result in browser redirection to the previous list page. If a new user was created, the user will see the name of this new user in the list on the list page.

The following are the permissions that can be set for each user:

- Automatic Vehicle Location / Road Ranger
    - Receive a list of geofences
    - Receive a list of vehicles being tracked
    - Receive a list of configured vehicle agencies
    - Receive a list of availability statuses
    - Receive a list of operators
    - Receive a list of beats

- o   Receive a list of radios
- o   Receive a list of telephone numbers
- o   Receive vehicle updates when available
- o   Receive user data
- o   Configure the list of geofences
- o   Configure the list of vehicles
- o   Configure the list of vehicle agencies
- o   Configure the list of availability statuses
- o   Configure the list of operators
- o   Configure the list of beats
- o   Configure the list of radios
- o   Configure the list of telephone numbers
- o   Approve geofence violations
- o   Change vehicle service
- o   Change the vehicle state
- o   Set the op status of a vehicle
- o   Receive vehicle history data
- • C2C
  - o   Retrieve user permission data
  - o   Receive remote command approval messages.
  - o   Receive notification when local approval of remote message commands is enabled or disabled.
  - o   Receive Network Node updates.
  - o   Receive Network Link updates.
  - o   Receive remote event status updates.
  - o   Receive remote DMS status updates.
  - o   Receive remote CCTV status updates.
  - o   Receive remote CCTV snapshot status updates.
  - o   Receive remote HAR status updates.
  - o   Receive remote RWIS status updates.
  - o   Receive remote RemoteMsg status updates.
  - o   Receive link poll data.
  - o   Receive vehicle probe updates as link updates.
  - o   Receive remote Floodgate status updates.
  - o   Allow changing remote DMS devices
  - o   Allow changing remote CCTV devices
  - o   Allow changing remote HAR devices
  - o   Allow changing remote Floodgate messages
- • CCTV
  - o   Receive camera status updates
  - o   Receive camera data
  - o   Receive camera group data
  - o   Receive user data
  - o   Add, modify and delete cameras
  - o   Add, modify and delete camera groups
  - o   Add, modify and delete user

- o Control camera
- o Override lock
- o Perform advanced camera functions.
- o Acquire manual camera lock
- CVS
  - o Retrieve RSE Configuration Data
  - o Retrieve RSE Op Status Data
  - o Retrieve RSE Probe Data
  - o Retrieve Traveler Advisory Messages
  - o Retrieve Raw RSE Probe Data
  - o Retrieve Raw TAM Data
  - o Retrieve User Data
  - o Modify RSE Configurations
  - o Modify RSE Status
  - o Modify Traveler Advisory Messages
- DA
  - o Allows the holder to configure the DA properties.
  - o Allows the holder to retrieve the DA properties.
  - o Allows the holder to retrieve the user list.
- DMS
  - o Retrieve DMS data
  - o Retrieve dms groups
  - o Retrieve message libraries
  - o Retrieve sequences and libraries
  - o Retrieve approved words list
  - o Retrieve system configuration
  - o Retrieve active sequences
  - o Retrieve the list of users
  - o Retrieve the current status of a DMS
  - o Retrieve the message currently displayed on a DMS
  - o Retrieve the current operational status of a DMS
  - o Receive updates of the status of communication with a DMS
  - o Resolve both spelling and message conflicts
  - o Retrieve the fonts in the system
  - o Add, modify, and delete a DMS group
  - o Add, modify, and delete messages and libraries
  - o Add, modify, and delete sequences and libraries
  - o Add and delete approved words
  - o Modify the system configuration
  - o Modify user privileges
  - o Query and modify DMS status
  - o Set a DMS's brightness level
  - o Override the message on a DMS or DMSs (no conflicts)
  - o Echo the message on a DMS
  - o Send a message to a DMS or DMSs
  - o Terminate the current message on a DMS or DMSs

- o Reset a DMS controller
  - o Resolve spelling conflicts
  - o Resolve message conflicts
  - o Activate or terminate a scheduled sequence
  - o Log in to the DMS subsystem
  - o Add, modify, and delete a DMS
  - o Perform DMS operations for toll and toll gantry signs.
- EM
  - o Receive Activity Data
  - o Receive Agency Data
  - o Receive County Data
  - o Receive Event Type Data
  - o Receive Event Status Data
  - o Receive Injury Type Data
  - o Receive Offset Type Data
  - o Receive Organization Data
  - o Receive LaneMap Data
  - o Receive LaneType Data
  - o Receive Weather Condition Data
  - o Receive Vehicle Type Data
  - o Receive Vehicle Make Data
  - o Receive Roadway Data
  - o Receive Reference Point Data
  - o Receive Location Data
  - o Receive Maillist Data
  - o Receive Comment Type Data
  - o Receive State Data
  - o Receive Procedural Error Data
  - o Receive Color Data
  - o Receive User Data
  - o Receive Event Data
  - o Receive Event Vehicle Data
  - o Receive plan data
  - o Receive message and device template data
  - o Receive Device Linking Data
  - o Manage Response Plans
  - o Configure Email Alerts
  - o Access to Event Viewer
  - o Restricted Access to Event Viewer
  - o Audit Data
  - o Add, modify, and delete plans
  - o Add, modify, and delete message and device templates
  - o Generate response plan suggestions
  - o Modify Device Linking Data
- GUI
  - o Receive user type (system user, operator) data

- o Receive map shield definition information.
- o Receive system setting updates.
- o Receive user permission data
- o Set system settings
- o Enter a manual DMS message
- o Enter a manual HAR message
- o Edit a message in a MAS queue
- o Edit a message in an EM response plan
- o Allow changing map shield definitions
- HAR
  - o Allow retrieval of status.
  - o Receive add, modify and delete HAR information
  - o Receive HAR user privilege data
  - o Send HAR message
  - o Add, modify, and delete HARs
  - o Set HAR status to out-of-service or active state
  - o System access to HAR subsystem
- IDS
  - o Receive Citilog camera data
  - o Receive incident alarms update
  - o Receive list of events which have disabled cameras
  - o Receive IDS system-wide option data
  - o Receive and approve reminders regarding disabled VisioPaD detection
  - o Receive users and privileges from the system
  - o Resolve incident alarms
  - o Add, modify and delete Citilog cameras
  - o Manually enable or disable VisioPaD detection on a camera
  - o Set system-wide IDS options
  - o Modify state of event disabling of nearest camera
- IMS
  - o Receive notification for new, modified, or deleted equipment.
  - o Receive notification for new, modified, or deleted vendors.
  - o Receive notification for new, modified, or deleted locations.
  - o Receive notification that user permissions have been modified.
  - o Receive notification that status has changed for a piece of equipment.
  - o Allow adding, modifying, or deleting equipment.
  - o Allow adding, modifying, or deleting vendors.
  - o Allow adding, modifying, or deleting locations.
  - o Allow retrieving history for equipment.
- INRIX
  - o Retrieve Inrix Status Data
  - o Retrieve User Data
- MAS
  - o Receive queue data updates (actual queue contents)
  - o Receive queue update notices (only notification)
  - o Receive queue status updates

- o Receive queue failure messages
- o Receive updates to user privilege data
- o Blank the queue for a device
- o Modify the queue for a device
- o System access to the queuing system
- PS
  - o Retrieve express segment configurations
  - o Retrieve toll rate sign configurations
  - o Retrieve daily rate schedule configurations
  - o Retrieve segment rate sign configurations
  - o Retrieve holiday configurations
  - o Retrieve system configuration data
  - o Receive alerts
  - o Receive segment status updates
  - o Receive archive data
  - o Receive users and privileges
  - o Configure express segments, schedules, and holidays
  - o Configure system configuration parameters
  - o Set the state of a segment, associate an event, and describe the authorization.
  - o Acknowledge and clear alerts generated by segment failures.
  - o Manage offline synchronization.
- RMS
  - o Retrieve ramp meter controller status.
  - o Retrieve ramp meter controller data.
  - o Retrieve equipment group data.
  - o Retrieve user privileges.
  - o Retrieve default system data (e.g. fuzzy meter parameters).
  - o Add, modify and delete ramp meter controllers.
  - o Add, modify and delete ramp meter controller groups.
  - o Remove this permission.
  - o Modify default system data (e.g. fuzzy meter parameters).
- RS
  - o Receive report group data
  - o Receive User Data
  - o Receive reporting subsystem status
  - o Generate Report
  - o Generate Performance measures report
- RWIS
  - o Receive station data
  - o Modify the poll cycle for stations
  - o Set RWIS status to out-of-service or active state
  - o Receive station status updates
  - o Add, modify, delete stations
  - o Receive RWIS user privilege data
- SAS
  - o Receive sequence configuration data

- o Receive schedule configuration data
- o Receive user data
- o Receive sequence status data
- o Receive schedule status data
- o Receive SAS resource status data
- o Add, modify, and delete sequences and schedules
- o Control SAS resources
- SB
  - o Receive station data
  - o Receive event data
  - o Receive SB user privilege data
  - o Receive SB station status updates
  - o Add, modify, delete SB stations
  - o Set SB station status data
  - o Reset SB station
  - o Schedule events for SB stations
- TSS
  - o Add, modify and delete detectors
  - o Modify the poll cycle for detectors
  - o Map detectors to links and lanes
  - o Define highway links
  - o Modify alarm thresholds for links and lanes
  - o Receive link updates from detectors
  - o Receive tag read data
  - o Receive notification of triggered alarms
  - o Receive detector status updates
  - o Allows the holder to retrieve roadway link geometries
  - o Receive system configuration updates.
  - o Receive user notifications
  - o Receive Detector Failure Emails
  - o Receive System-wide Detector Failure Emails
  - o Receive Invalid Detector Data Emails
  - o Receive user permission information
  - o Allows the holder to modify roadway link geometries
  - o Configure dynamic linking
  - o Modify system configuration.
- TVT
  - o Receive travel time data
  - o Receive travel time link data
  - o Receive travel time message data
  - o Receive travel time option data
  - o Receive travel time device data
  - o Receive alternate route data updates.
  - o Receive matching route data updates.
  - o Receive user notifications
  - o Receive travel time user data

- - o Configure travel time parameters
    - o Alternate route configuration.
    - o Matching route configuration.
- VS
  - o Receive input status updates
  - o Receive output status updates
  - o Receive input data
  - o Receive output data
  - o Receive switch data
  - o Receive video tour data
  - o Receive active video tour data
  - o Receive layout data
  - o Receive user data
  - o Retrieve video snapshots
  - o Add, modify and delete inputs
  - o Add, modify and delete outputs
  - o Add, modify and delete switches
  - o Add, modify and delete video tours
  - o Start and stop video tours
  - o Add, modify and delete user
  - o Video switching
- VSL
  - o Receive data updates for VSL group configuration
  - o Receive data updates for VSL plan configuration
  - o Receive data updates for VSL zone traffic settings
  - o Handle and retrieve speed limit adjustment recommendations
  - o Receive users and privileges from the system
  - o Enable and disable plan recommendations
  - o Manually set the active VSL plan for a VSL group
  - o Configure VSL groups and plans
- VWS
  - o Retrieve user permission information
  - o Retrieve connection information
  - o Retrieve wall geometry information
  - o Retrieve video tour information
  - o Allow connections of source to viewer
  - o Configure the video wall

4.5 Map Administration with the Link Editor

The Link Editor is a browser-based application that enables administration of the Operator Map's GUI. This editor is used to place TSS (instrumented) or other (non-instrumented) roadway links on the Operator Map for use in displaying traffic data and creating events.

4.5.1 Software Familiarization

The TSS Link Editor application is accessed by selecting Edit Link Placement from the Traffic Detection context menu. While running the Link Editor, informational and error messages are

logged to the Systems Message dialog. Further Link Editor processing is described in the following sections.

Figure 4–194 – TSS Link Editor

4.5.2 Processing Procedures

When the map opens to the Link Editor the Edit Link Placement dialog will be displayed.
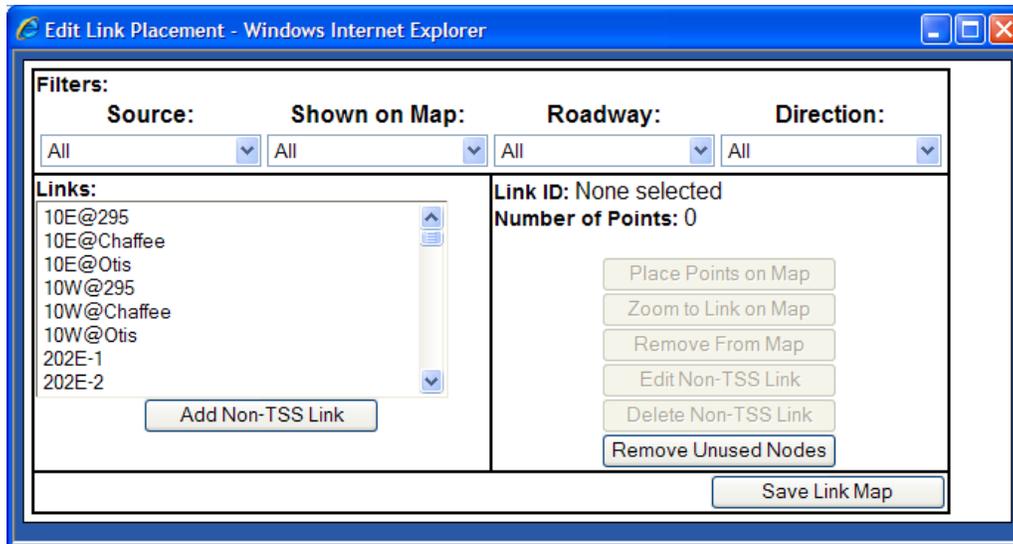
Figure 4–195 – Edit Link Placement

The Edit Link Placement dialog allows the user to add TSS links to the map in the desired location. The following filters are available:

- Source – Allows the user to filter links based on whether they are TSS or Non-TSS links.
- Shown on Map – Allows the user to filter links based on whether they are already being shown on the map.
- Roadway – Allows the user to filter links based on roadway location.
- Direction – Allows the user to filter links based on placement direction.

TSS links can be placed by selecting a link that is not already on the map from the Links list and pressing the Place Points on Map button, then clicking one or more times on the map. Each click will place a node at the point of the mouse with a link extending along the points. Once the desired points are placed the link can be modified by adjusting the points or right clicking on the link and selecting one of the following options:

- Add Midpoint-Inserts a point at the location of the mouse. Adding midpoints allows the link to more closely follow the true path of a road. After adding a midpoint, you can press the left mouse button down on it and drag it to a new location. The link will follow all midpoints, as well as try to curve adjacent links together. To remove a midpoint, right click on it and select **Delete Midpoint** from the context menu.
- Delete Non-TSS Link- This option is only available for Non-TSS links. It deletes the link.
- Edit Non-TSS Link- This option is only available for Non-TSS links. It opens the Edit Non-TSS Link dialog.
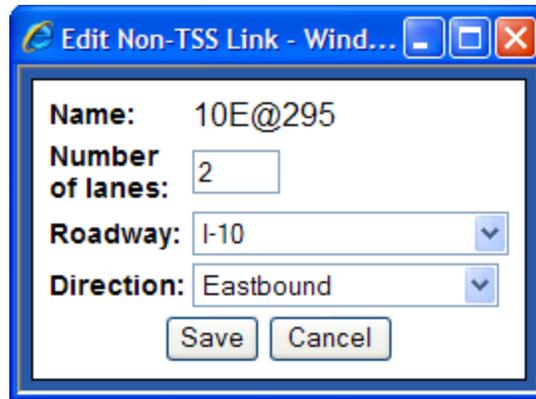
Figure 4–196 – Edit Non-TSS Link

- Remove Link From Map-removes the link from the map.

Once the operator is satisfied with the link placement pressing the **Save Link Map** button on the Edit Link Placement dialog will save the link to the map.

Closing the Edit Link Placement dialog or selecting Exit Link Editor from the TSS Link Editor will close the TSS Link Editor and take the user to the Operator Map.
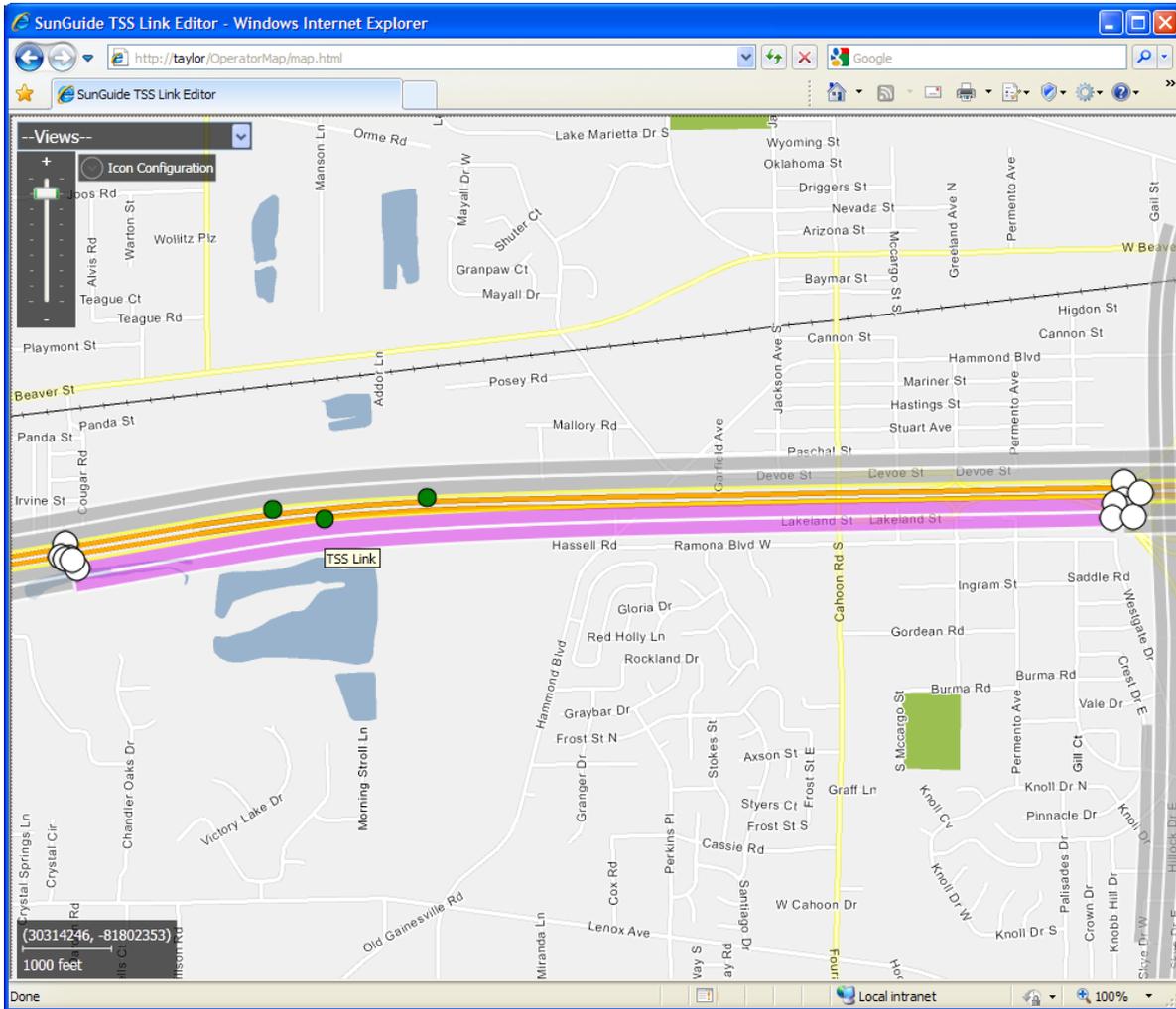
Figure 4–197 – TSS Link Editor with New Link

4.6 Device Sequencing Editor

The DMS Sequencing Editor is a browser-based application that enables administration of the "sequencing" of DMS devices (i.e., which DMS's appear on the road before others); this information is used by the SunGuide Incident Management system to determine what DMS should be provided with recommended messages when generating response. This editor is used to establish links between the signs on a roadway network so that it is possible to track which signs could logically be seen by a driver before seeing another particular sign. This data is used to trace back from an event and select the most appropriate signs to use in displaying messages.

4.6.1 Software Familiarization

The DMS Sequencing Editor application is started by selecting Edit Device Sequencing from the Event Management context menu; see 3.2.3. While running the DMS Sequencing Editor, informational and error messages are logged to the Systems Message dialog.

4.6.2   Processing Procedures

The initial view of the map will look like the image in Figure 4–198. The goal of this editor is to link signs in each direction, against the flow of traffic. To establish these links, right click on a DMS and choose **Select Upstream Nodes** (see Figure 4–199).

Figure 4–198 – DMS Sequence Editor Initial View

Figure 4–199 – Select Upstream DMS

The next step is to select the devices which are immediately upstream from this sign; for instance, if you select a sign on I-95 Northbound, the next sign immediately upstream from it will be the first sign SOUTH of it, but also on I-95 Northbound (see Figure 4–200). Signs must be linked against the flow of traffic. Note that arrows will appear in the direction of traffic to assist in verifying that links have been created correctly. These arrows will appear green when linking two devices or nodes which have the same roadway and direction, or will appear blue when linking devices or nodes which differ in roadway or direction.

Figure 4–200 -- Virtual Nodes at Highway Interchange

To handle intersections of freeways where traffic may change route and direction, a concept of virtual nodes are used (see Figure 4–200). These nodes are placeholders used to indicate traffic merge point, and can be linked just like DMS signs. For instance, consider a main freeway where intersecting highway traffic can merge onto the main freeway. Notifications from the main freeway should be made available to approaching traffic on the intersecting freeway in case that traffic should elect to merge onto the main freeway. To fix this problem add a virtual node at the point on the main freeway where traffic merges onto it and mark it as being downstream from the DMS sign immediately after the merge point. Then select the virtual node and mark the sign on the opposite side of the interchange and the two signs on the opposite sides intersecting freeway as being upstream from the virtual node. This allows traffic approaching from all directions to receive notifications.

To create a node, right click on the map and select **Add Node**. This will display the Create Virtual Node dialog (see Figure 4–201). Select the roadway and direction for the node, and then press the **Create** button to place the node on the map.
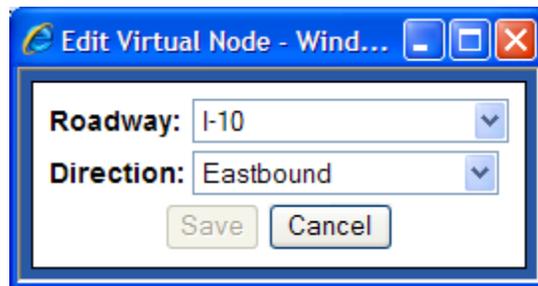
Figure 4–201 – Create Virtual Node Dialog

Once placed, the node can be moved by pressing the left mouse button on it and dragging it to a new location. The node will also have the same options in the context menu as a regular DMS would have. Additionally, it will have a Delete Node option that allows you to remove the node from the map and a Modify Roadway option that will display the Edit Virtual Node dialog (see Figure 4–202) allowing you to edit the roadway and direction.

Figure 4–202 – Edit Virtual Node Dialog

Once links have been established, you can verify that all links are correct by using additional tools in the context menu. When right clicking on a device, select **Display All Upstream Nodes** to have the map highlight the devices and virtual nodes which are considered upstream from this sign, even through other signs or nodes. If the last sign on a freeway is selected, each sign before it on that freeway should be highlighted if all links are correct. Additionally, **Display All Links** will cause the map to highlight all linked nodes, and display all the links between nodes (see Figure 4–203). This allows a fairly quick way to make sure no particular device has been completely left out of linking.
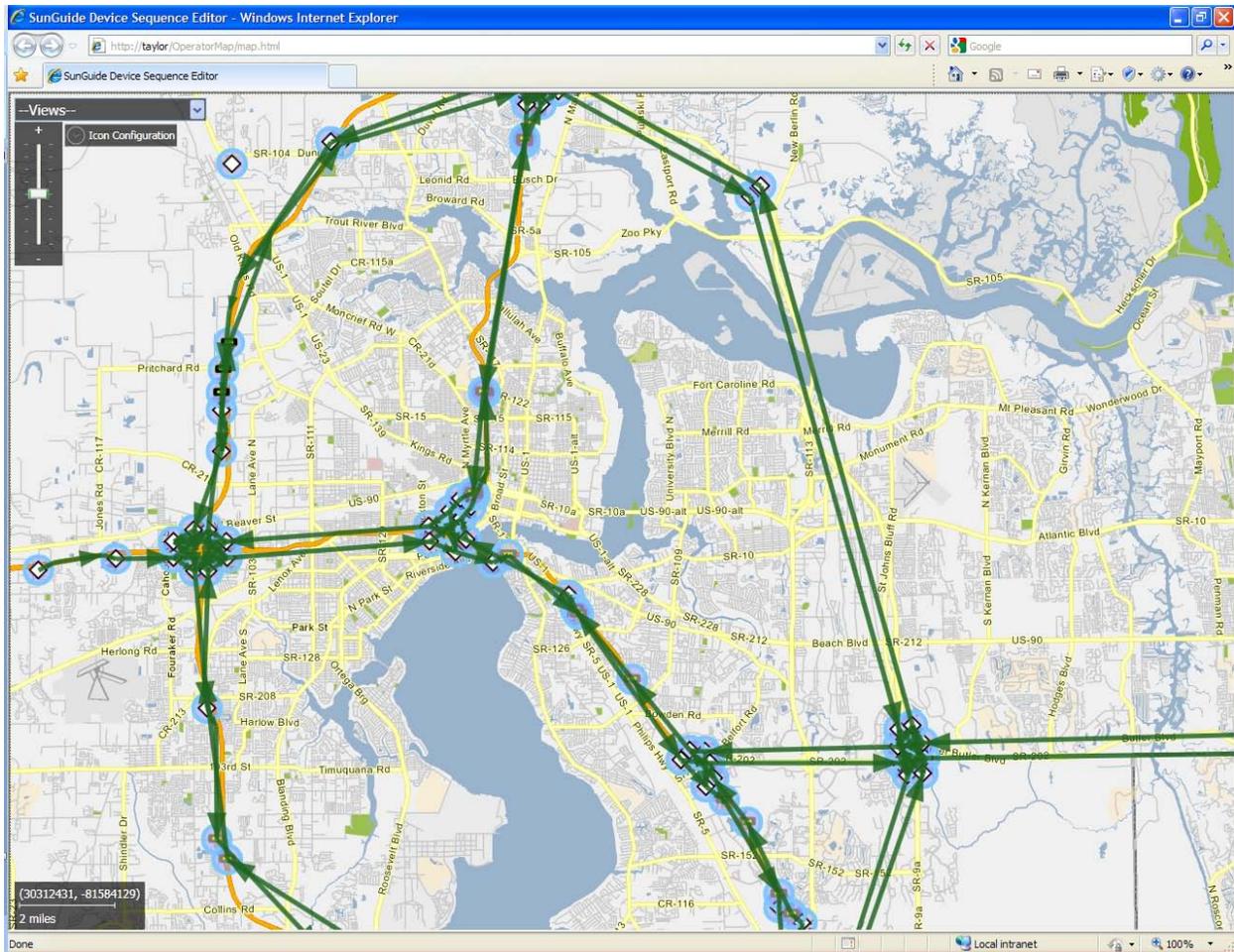

Figure 4–203 – DMS Sequence Editor Showing All Links

Once all devices have been linked, right click on the map context menu and select **Save Device Sequencing Data** to store the information on the server. Check the System Messages window to verify that everything was saved correctly.

Note that the device linking editor stores the short roadway names for newly added nodes and Incident Management subsystem compares roadway information with the long names for the link-map algorithm used to generate response plans. If the roadway names are changed AFTER the device linking file is created, problems will arise (this implies that if roadway names are changed the device linking editor should be run again to rectify the name changes).

After the file is edited the Repose Plan Generator (RPG) subsystem must be restarted.

4.7 Geo-fence Editor

The Geo-fence Editor is a browser-based application that allows geofences to be graphically drawn. Geofences are used by SunGuide to determine whether a Road Ranger has exceeded the boundaries of where they are to be located. The geofences created by the editor are published to SunGuide where they can be used immediately by applications. The Geo-fence Editor application is started by selecting Edit Geo-fences from the Responders context menu.

After starting the editor, the user may right click on the map to bring up the context menu. This context menu will allow the editor to be placed into a mode for editing existing geofences or adding new geofences. When the user elects to Create New Geo-fence, the SunGuide Dereference Creation dialog is displayed. A **Name** must be entered as well an **Offset**. The offset is the distance from the geofence that the Road Ranger is allowed to move without triggering an alarm.   If the **Enabled** checkbox is selected, the geofence will be evaluated for alarms. If not, no alarms will be generated against the geofence.
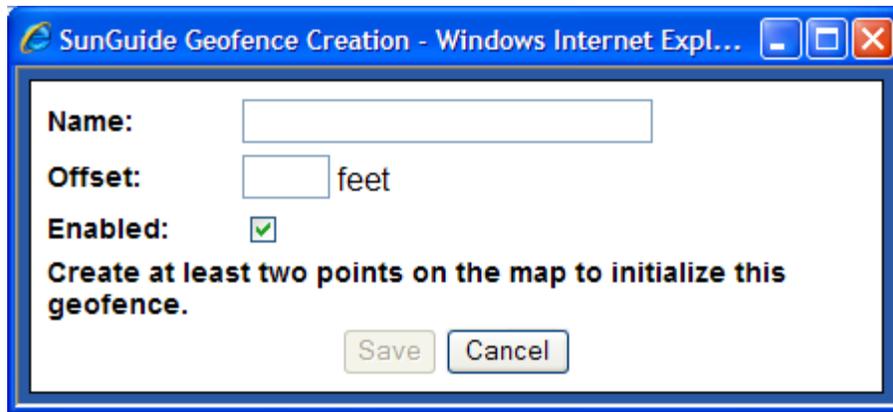
Figure 4–204 – Geo-fence Creation

To create the geofence itself, the user must click a series of points on the map. While the "Geo-fence Creation" dialog is displayed, normal map movement controls are disabled, so the entire geofence area should be visible before launching the dialog. Any changes that need to be made after creation can be made using the "Edit Geofences" dialog. Once the geofence is created, it can be stored by pressing **Save** or can be discarded by pressing **Cancel**. As points are entered for the geofence, a graphical depiction is shown on the graphical map.

When the user elects to edit geofences, the SunGuide Dereference Editor dialog will be displayed along with the graphical map. This dialog allows maintenance of existing geofences to be performed or a new geofence can be created.
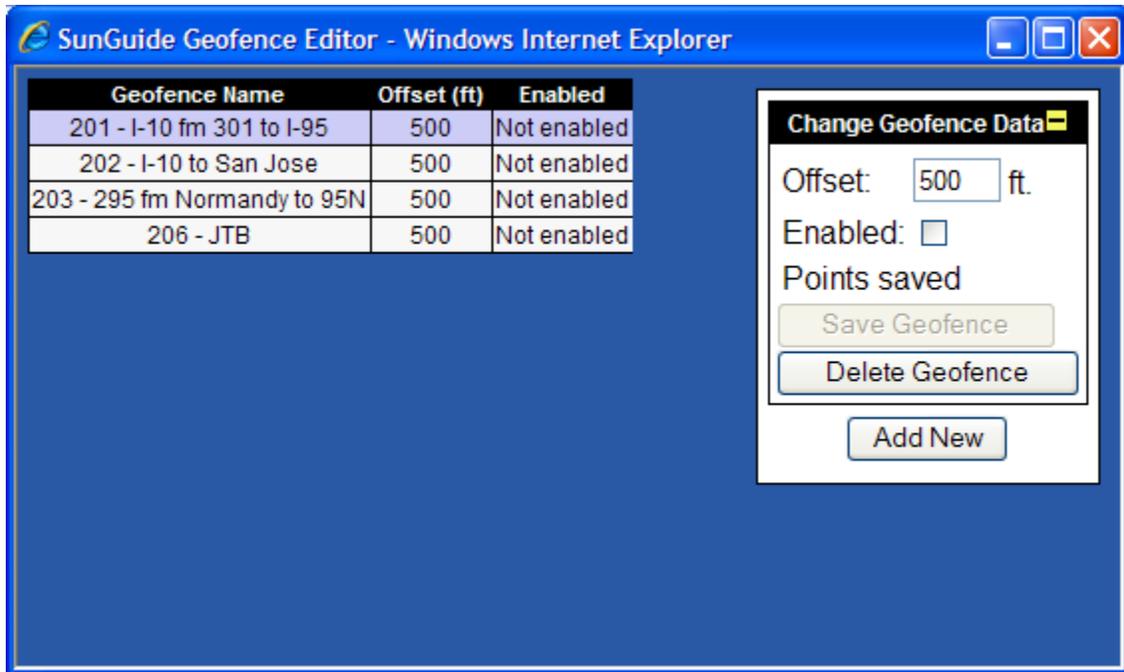
Figure 4–205 – Geo-fence Lists

To edit a geofence, the user must select a geofence by clicking on it. The user may then modify the offset or enabled status of the geofence in the right side of the dialog, and may modify the points on the map by clicking on a point and dragging it to a new location. To delete a midpoint, the user may right click on it and select "Delete Midpoint". (The end points may not be deleted, but may be moved.) To add a new midpoint, the user may right click on the black line and select "Add Midpoint".
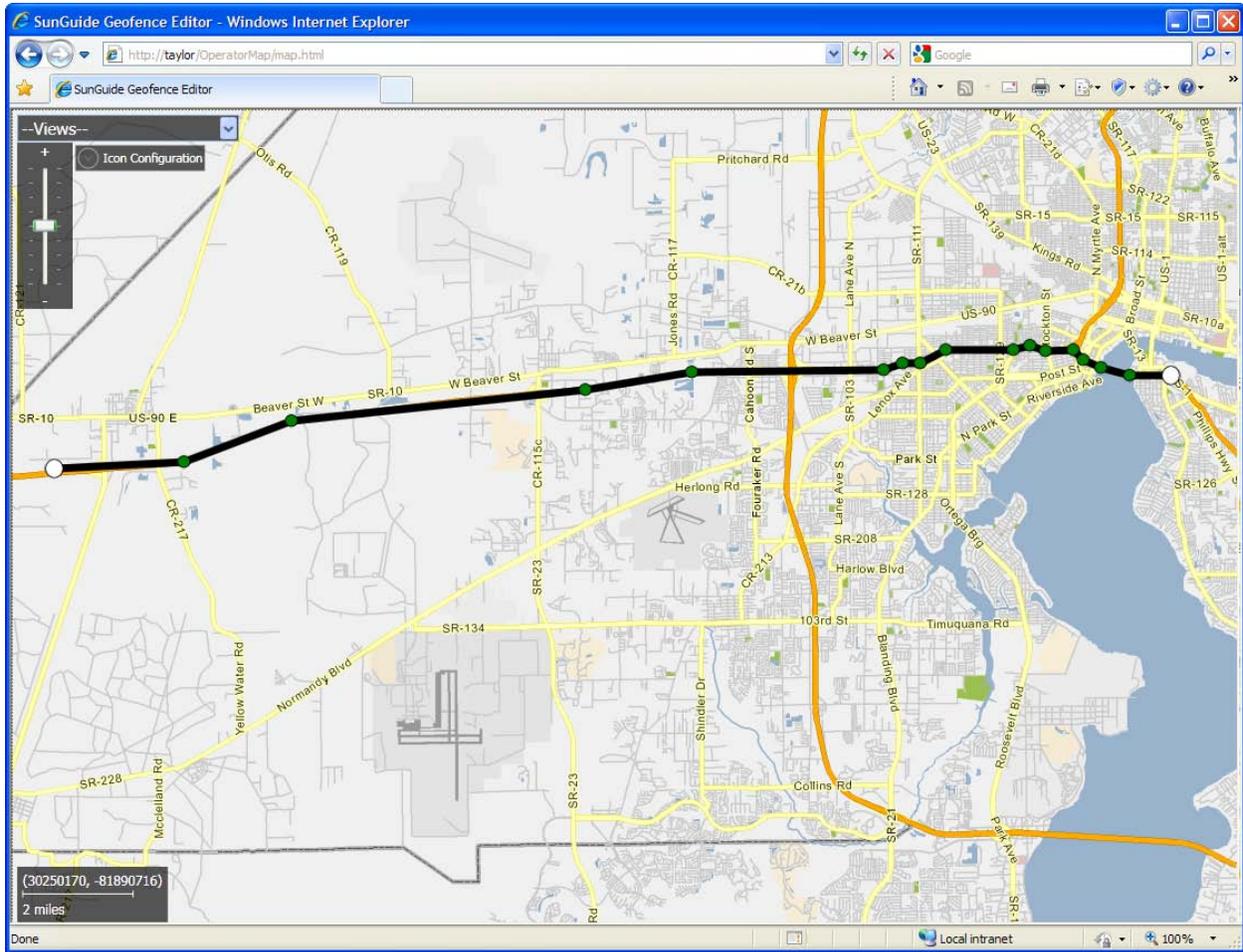
Figure 4–206 – Geo-fence Display

4.8 Operational Data Store and Reporting

The SunGuide system maintains historical data in several different places for use in report generation. Those historical records are described in a general way in this section.

4.8.1 Historical Event Data

The EM subsystem tracks changes to events that the user "stores" from the EM GUI. These changes are stored in place within the SunGuide database in the various EM tables (EM_*). Reports which display, count, or otherwise summarize event data reference the historical information stored in these tables. There is no mechanism within SunGuide to remove this historical event data.

4.8.2 Operational Data Store

The SunGuide Operational Data Store (ODS) consists of a number of tables for storing DMS, Travel Time, TSS Poll Data, and TSS Rollup Data in dedicated Oracle tablespaces designed (segregated and sized) for the efficient insertion, updating, and retrieval of data

4.8.2.1 DMS Messages

Messages sent to DMS are stored in the ODS with time stamps corresponding to the time the message was sent to the sign. The SunGuide system does not delete historical DMS message data.

4.8.2.2 Travel Times

Travel times for all defined TVT links are stored in the ODS at the rate that travel times are calculated by the system. Typically travel times are calculated on a 20 second period, so SunGuide will store 3 travel times per minute for each link defined. Travel times are stored to facilitate the generation of various DMS reports that require reference to historical computed travel times. The SunGuide system does not delete historical TVT calculated data.

4.8.2.3 TSS Detector Poll Data

TSS detector poll data is stored in the ODS. This is speed, occupancy, and volume data from detectors as reported at the lane level. Typically detectors are polled on a 20 second period, so lane poll data is stored 3 times per minute per lane defined within the system. The CONFIG.XML file parameter rawDataPurgeInDays controls how long the raw lane poll data is maintained in the ODS.

4.8.2.4 TSS Rollup Data

TSS data is "rolled up" for 15 minute, hourly and 24 hour periods at the lane level. The CONFIG.XML file parameter processedDataPurgeInDays controls how long the rolled up data is maintained in the ODS.

5. Event Viewer

The following discussions describe using the SunGuide Event Viewer.

5.1 Software Familiarization

The Event Viewer is started by opening a web browser and navigating to the appropriate Uniform Resource Locator (URL); it is closed by simply closing the browser window. Data for the Event Viewer is provided by the SunGuide Data Bus which implies that the Event Viewer will only provide data for one SunGuide implementation.

The SunGuide Event Viewer is often used by personnel outside the Traffic Management Center to view the current event information. A user id/password are required to access the site, user ids can have restricted permissions as configured by the SunGuide Administrator. The data classified as "restricted" within the Event Viewer is the following:

- Injuries / fatalities
- Vehicle tags
- Operator comments
- Any event that does not have Public agency personnel on scene will not be displayed to any information dissemination platform

5.2 Processing Procedures

When the SunGuide Event Viewer is accessed a login screen is displayed. The image shown in Figure 5–1 shows the login screen.
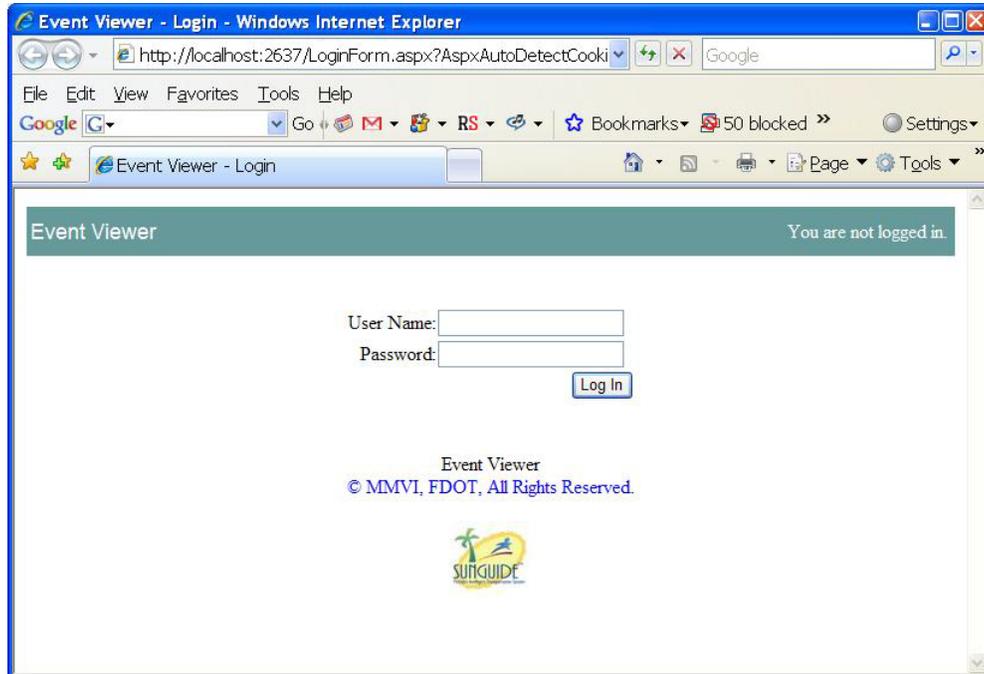
Figure 5–1 – Event Viewer Login Screen

Once the user successfully logs into the Event Viewer the screen shown in Figure 5–2 is displayed. Events are grouped into three categories on this screen:

- Active events where lane blockages exist
- Active events where no lane blockages exist
- Recent inactive events

Figure 5–2 – Event Viewer Summary Screen

When a user selects an event from the summary screen, details about the selected event are displayed on another screen. Figure 5–3 shows an example of a detailed event screen; note that the "restricted" data will not be displayed unless the user has the proper credentials to access this data.
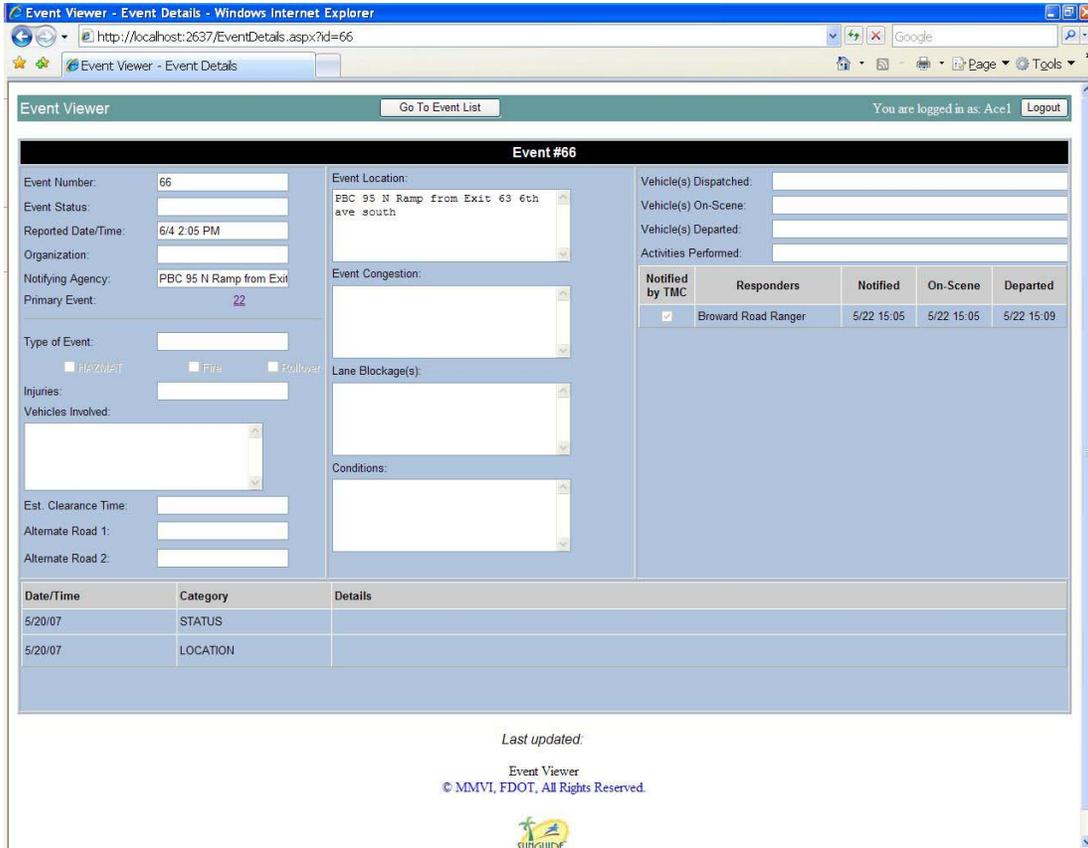

Figure 5–3 – Event Viewer Detail Screen

6. Toll Viewer

The following discussions describe using the SunGuide Toll Viewer.

6.1 Software Familiarization

The Toll Viewer is started by opening a web browser and navigating to the appropriate Uniform Resource Locator (URL); it is closed by simply closing the browser window. Data for the Toll Viewer is provided by the SunGuide Data Bus which implies that the Toll Viewer will only provide data for one SunGuide deployment.

The SunGuide Toll Viewer is intended to be used by Customer Service personnel in order to evaluate Toll Rate price changes and supporting information of those changes.

6.2 Processing Procedures

When the SunGuide Toll Viewer is initially accessed a Selection screen is displayed. The image shown in Figure 6–1 depicts the Selection screen.
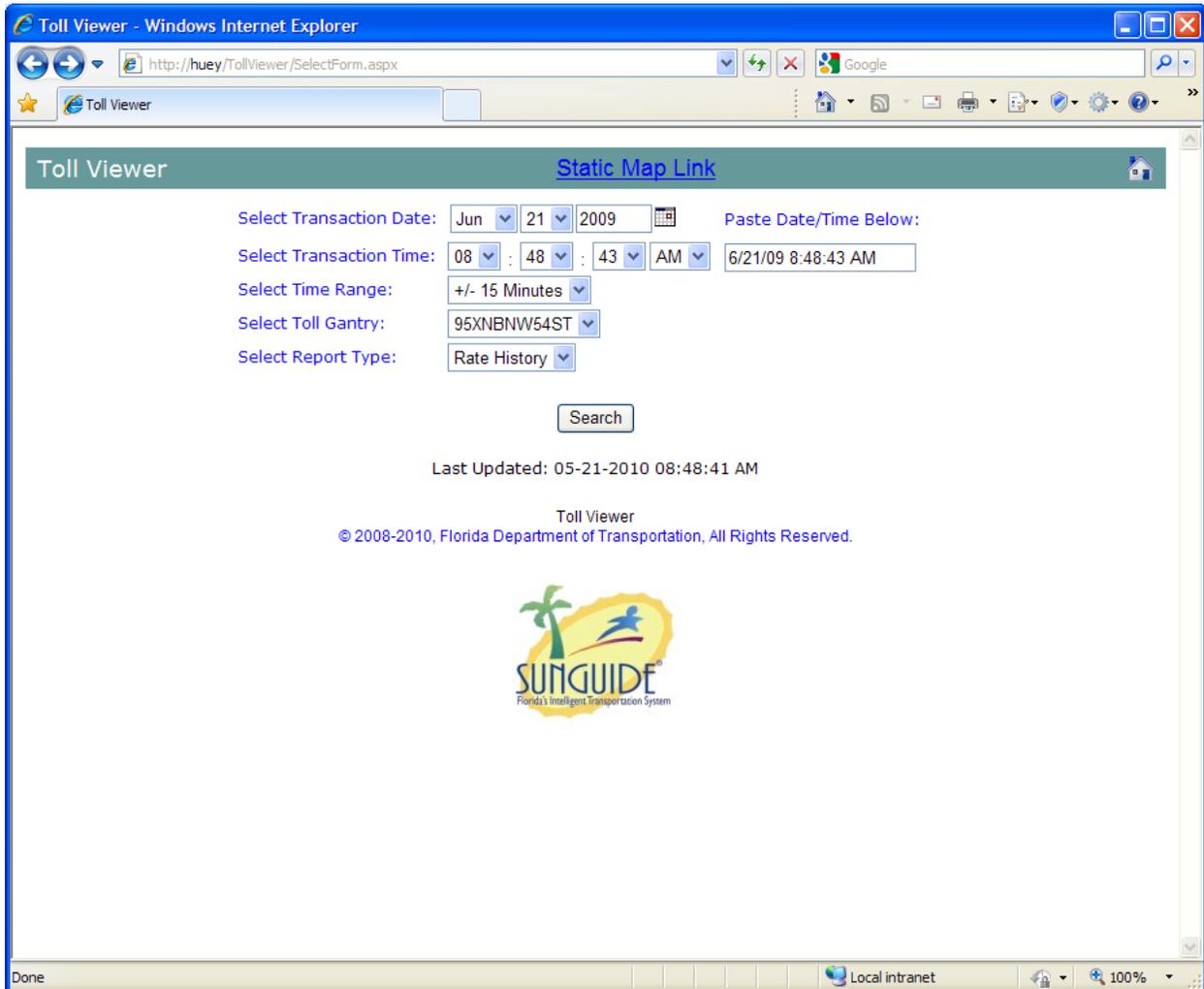

Figure 6–1 – Toll Viewer Selection Screen

Once the user has selected options for the Transaction Date, Transaction Time, Toll Gantry, Time Range, and selects "Summary" for the Report Type, then clicks on the Search button the Toll Viewer the Summary View screen shown in Figure 6–2 is displayed. Summary data is grouped into two categories on this screen:

- **Toll Rates**: Displays Toll Rate action messages for the selected search criteria.
- **Traffic Events**: Lists where blockages existed during the Time Range for the selected search criteria.
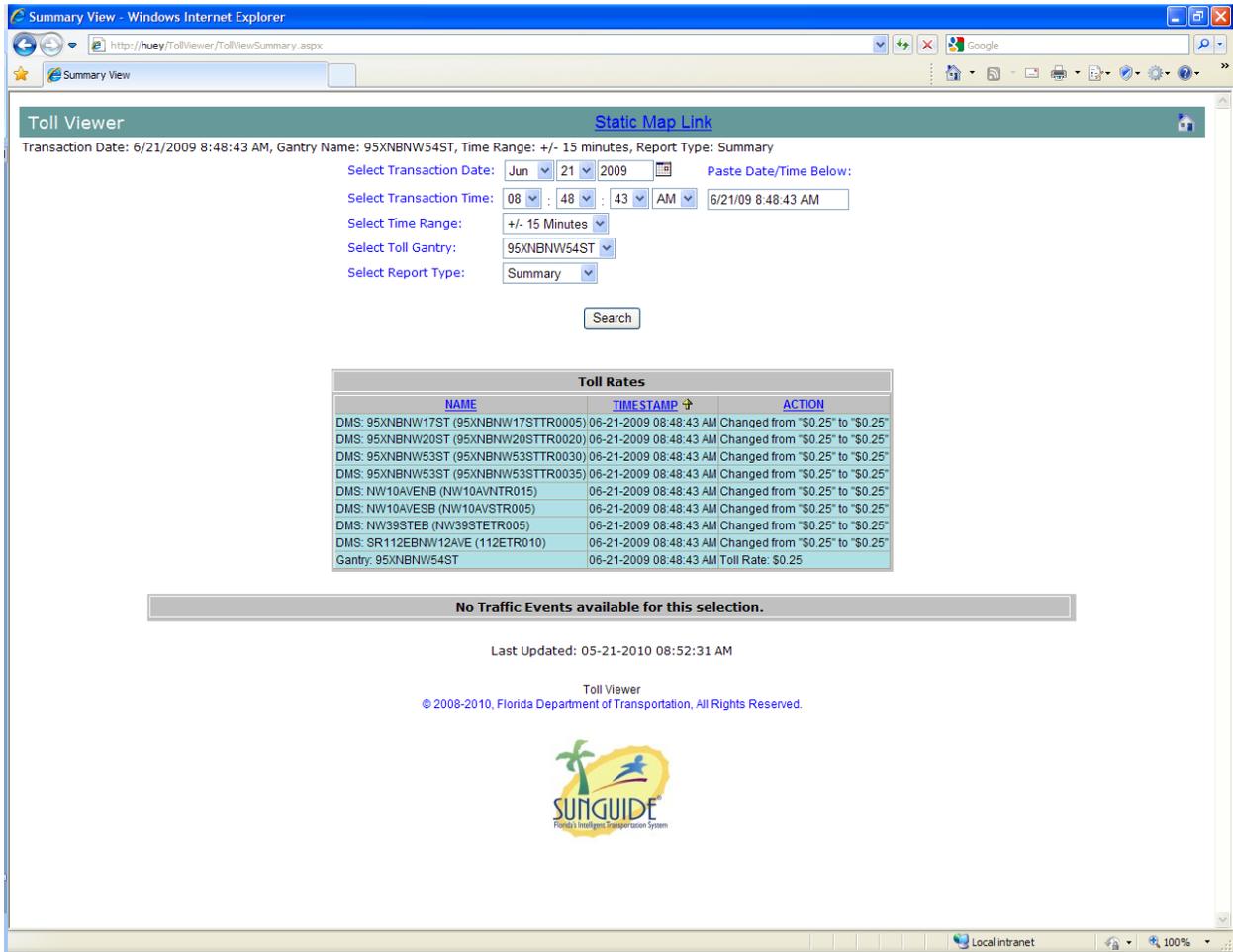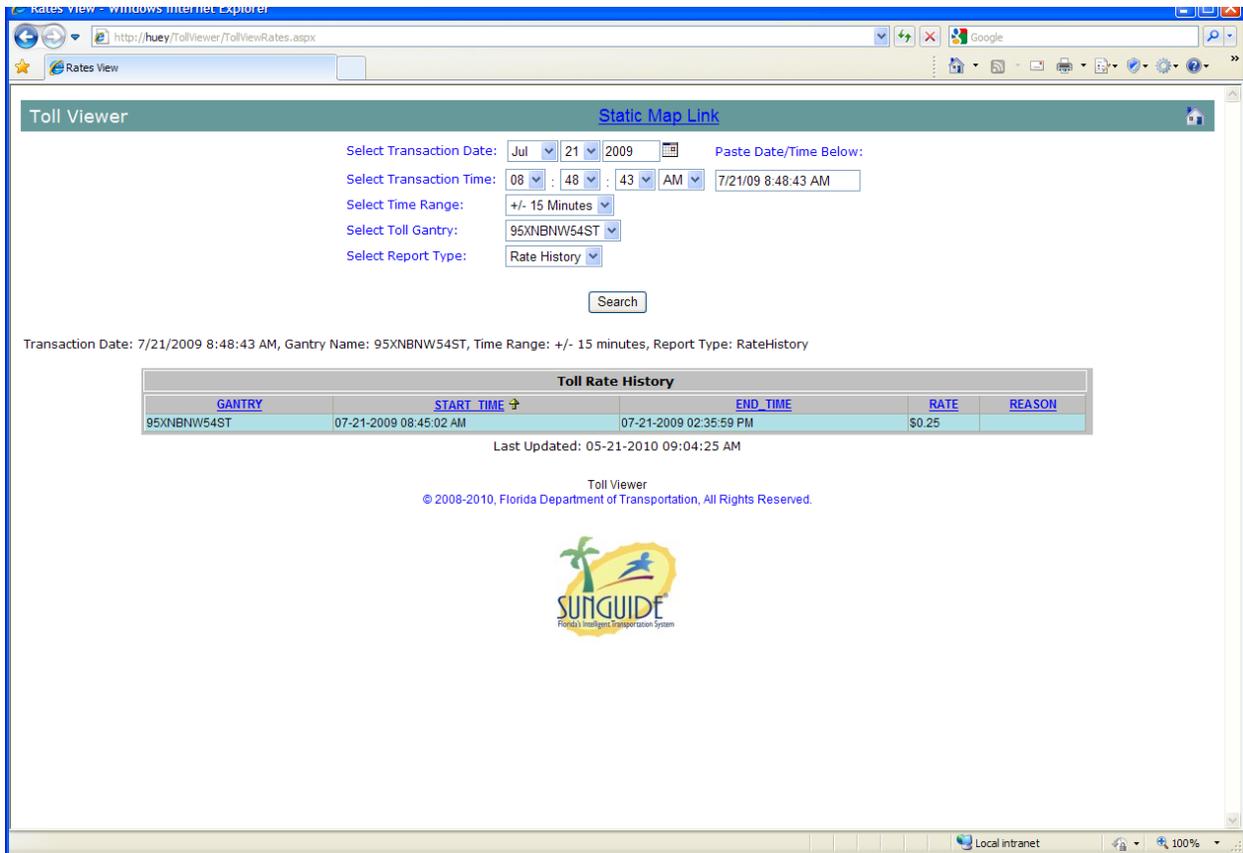

Figure 6–2 – Toll Viewer Summary Screen

When the user selects Rate History for the Report Type then clicks on the Search button, details about the Toll Rate history for the selected search criteria are displayed as shown in Figure 6–3.

Figure 6–3 – Toll Viewer Rate History Screen

When a user selects "Detail" for the Report Type, then clicks on the Search button the from the Selection screen, details about the selected search criteria are displayed as shown in Figure 6–4. Detail data is grouped into four categories on this screen:

- **Toll Rate History**: Displays Toll Rate history for the selected search criteria.
- **Toll Rate Communication:** Displays detailed Toll Rate information for the selected search criteria.
- **Mode History**: Displays mode history information for the selected search criteria.
- **DMS Communication**: Displays rate change information for the selected search criteria.

Figure 6–4 – Toll Viewer Detail Screen

7. American Dynamics Keyboard Operation

As an alternative to using the GUI to control camera and video switch operations, an American Dynamics keyboard can be used to provide input. This input comes through a subsystem known as the Manual Control Panel (MCP) subsystem.

Since the American Dynamic keyboards do not support alphanumeric; the MCP subsystem utilizes the name of CCTV devices, video monitors or video wall viewers to provide access through the MCP. When the video source or destinations are created, they must be prefaced with an integer value (0 to 999) that the MCP subsystem will use as a reference. If a video source or destination does not start with a number, it will not be accessible to the MCP subsystem (this implies that for deployments that do not use the American Dynamics keyboard, there is no need to use numbers in names).

The following sections detail the operations of the keyboards supported.

7.1 AD2088 Keyboard

The following image is of the American Dynamics 2088 (AD2088) keyboard:

The following operations are supported by the AD2088 keyboard:

- Select a Camera:
    - Enter the 3 digit numeric camera identifier using the keypad.
    - Press the CAM key. The identifier will be displayed on the camera LED.

- Move a Camera (Pan, Tilt, Zoom, Focus, Iris):
    - Toggle the joystick (left/right, up/down) to adjust camera pan/tilt.
    - Twist the joystick (clockwise/counterclockwise) to adjust camera zoom.
    - Press the focus NEAR or FAR keys to adjust camera focus.
    - Press the iris CLOSE or OPEN keys to adjust camera iris.

- Override a Camera Lock:
    - Press the F1 key.

- Define a Camera Preset:
    - Turn the keyboard key to PROGRAM.
    - Enter the 2 digit numeric preset identifier (1-99) using the keypad.

- o   Press the PRESET key.
- o   Turn the key back to OPERATE.

- Move to a Specified Camera Preset:

    - o   Enter the 2 digit numeric preset identifier (1-99) using the keypad.
    - o   Press the PRESET key.

- Move to Next Camera Preset:

    - o   Press the PRESET key. The selected camera will be moved to the next preset in the list of defined presets, starting with the first preset in the list. When the last preset in the list is reached, the key function is disabled. To re-enable it and reset it to the first preset, the camera must be reselected.

- Select Next or Last Camera:

    - o   Enter the 3 digit numeric monitor identifier using the keypad.
    - o   Press the MON key. The identifier will be displayed on the monitor LED.
    - o   Press either the NEXT or LAST key. The next or last camera in the list of active cameras will be switched to that monitor.

- Video Switching:

    - o   Enter the 3 digit numeric monitor identifier using the keypad.
    - o   Press the MON key. The identifier will be displayed on the monitor LED.
    - o   Enter the 3 digit numeric camera identifier using the keypad.
    - o   Press the CAM key. The identifier will be displayed on the camera LED and that camera will also become the selected camera.

- Notes:

    - o   A camera must be selected prior to any camera control operations. If control is attempted without selecting a camera, an error will be reported as described below.
    - o   If an error occurs controlling the camera, the keyboard will sound a warning tone (beep) and the message "Err" will be displayed on the enter LED. Refer to the MCP Manager messages in the Status Logger log file for the specific cause of the error.
    - o   If camera motion is attempted on a camera locked by another operator, the keyboard sound a warning tone (beep) and the message "Loc" will be displayed on the enter LED. Override the lock as described above.
    - o   If a monitor is selected and video switch is not completed within 5 seconds, the switch operation will be aborted the keyboard will sound a warning tone (beep).

7.2 ADCC0300 Keyboard

The following image is of the American Dynamics 300 (ADCO300) keyboard:

The following operations are supported by the AD2088 keyboard:

- Select a Camera:

    o Enter the 3 digit numeric camera identifier using the keypad.
    o Press the CAMERA key. The identifier will be displayed on the camera LED.

- Move a Camera (Pan, Tilt, Zoom, Focus, Iris):

    o Toggle the joystick (left/right, up/down) to adjust camera pan/tilt.
    o Twist the joystick (clockwise/counterclockwise) to adjust camera zoom.
    o Press the focus NEAR or FAR keys to adjust camera focus.
    o Press the iris CLOSE or OPEN keys to adjust camera iris.

- Override a Camera Lock:

    o Press the F1 key

- Define a Camera Preset:

    o Enter the 2 digit numeric preset identifier (1-99) using the keypad.
    o Press the SHIFT and PRESET keys simultaneously.

- Move to a Specified Camera Preset:

    o Enter the 2 digit numeric preset identifier (1-99) using the keypad.
    o Press the PRESET key.

- Move to Next Camera Preset:

    o Press the SEQUENCE key. The selected camera will be moved to the next preset in the list of defined presets, starting with the first preset in the list. When the last preset in the list is reached, the key function is disabled. To re-enable it and reset it to the first preset, the camera must be reselected.

- Select Next or Last Camera:

    o Enter the 3 digit numeric monitor identifier using the keypad.
    o Press the MONITOR key. The identifier will be displayed on the monitor LED.

- o Press either the NEXT or LAST key. The next or last camera in the list of active cameras will be switched to that monitor.

- Video Switching:

  - o Enter the 3 digit numeric monitor identifier using the keypad.
  - o Press the MONITOR key. The identifier will be displayed on the monitor LED.
  - o Enter the 3 digit numeric camera identifier using the keypad.
  - o Press the CAMERA key. The identifier will be displayed on the camera LED and that camera will also become the selected camera.

- Notes:

  - o A camera must be selected prior to any camera control operations. If control is attempted without selecting a camera, an error will be reported as described below.

  - o If an error occurs controlling the camera, the keyboard will sound a warning tone (beep). Refer to the MCP Manager messages in the Status Logger log file for the specific cause of the error.

  - o If camera motion is attempted on a camera locked by another operator, the keyboard will sound a warning tone (beep). Override the lock as described above.

  - o If a monitor is selected and video switch is not completed within 5 seconds, the switch operation will be aborted the keyboard will sound a warning tone (beep).

8. Notes

8.1 NTCIP CCTV Features/Limitations

The following table provides a listing of which cameras support the NTCIP functions that are part of the SunGuide requirements ("x" implies the function is supported, "-" implies no support for the function):

NTCIP Function	Vicon	Pelco	Cohu	AD
Absolute Position	X	X	X	X
Alarm Latch Status	-	X	X	X
Alarm Status	-	X	X	X
Camera Equip. Avail.	X	X	X	X
Camera Feat. Status	-	X	X	X
Camera Label	-	X	-	-
Input Latch Status	-	X	X	X
Input Status	X	X	X	X
Lens Equip. Avail.	X	X	X	X
Lens Feat. Status	X	X	X	X
Output Status	X	X	X	X
Pressure Alarm Thresh.	-	X	X	X
Pressure Alarm Value	-	X	X	X
Range Objects	X	X	X	X
Temp. Alarm Thresh.	-	X	X	X
Temp. Alarm Value	-	X	X	X
Timeout Parameters	X	X	X	X
Washer Fluid Alarm Threshold	-	X	X	X
Washer Fluid Alarm Value	-	X	X	X

For SunGuide Release 2.0, the capability to control the NTCIP CCTV menus from the operator GUI was added. The support of this functionality is limited by the support provided by the different camera manufacturers. The following is a summary of the menu support offered by the different NTCIP CCTV cameras:

- Vicon – NTCIP menu commands function as follows:
    - o Up, Down, Enter: Select menu item.
    - o Left, Right: Adjust selected item.
    - o Page Up: Go back one screen.

- Pelco (via IDI NTCIP translator) – NTCIP menu commands not supported

o Note: IDI indicated that the version of the translator provided to FDOT does not support (was not a requirement at the time according to IDI). They have indicated that they can provide an upgrade that will add menu support.

- American Dynamics – NTCIP menu commands function as follows:
    o Up, Down, Enter: Select menu item.
    o Left, Right: Adjust selected item.
    o Note: Menu display time not honored.

- Cohu (camera not used by FDOT) – NTCIP menu commands not supported

8.2 American Dynamics CCTV Driver

The American Dynamics Speed Dome Ultra VII camera that was used during development was running (the most recent version available) firmware version 2.03, dated January 24, 2006. According to AD, this is the most current version of the firmware.

The driver was tested against an American Dynamics Speed Dome Ultra 8 camera that was running firmware version 1.09, FPGA version 2006/10/31 15:18. Firmware updates for the American Dynamics Speed Dome Ultra cameras are available from at:

http://www.americandynamics.net/support/downloads_speeddome.aspx

The American Dynamics CCTVs do not support all of the capability provided by a NTCIP CCTV. The features supported by the driver include:

- Pan
- Tilt
- Zoom
- Focus
- Iris
- Nudge pan
- Nudge tile
- Store preset
- Move to preset

Note that the "nudge" command is "backwards" on the Ultra 8, the vendor has verified that the version SwRI tests against has an error in the firmware. In order to ensure that that the cameras are functioning properly with the SunGuide system, they should be reset to factory default settings prior to installation. This is done using the Speed Dome Configuration utility (available from American Dynamics). For the Speed Dome Ultra VII, this is described in the "American Dynamics SpeedDome Ultra VII Day/Night Camera Dome Configuration Utility Operator's Manual". For the Speed Dome Ultra 8, this is described in the "American Dynamics Speed Dome Ultra 8 Camera Dome Configuration Utility Version 1.01 Operator's Guide". Both of these documents are available from at:

http://www.americandynamics.net/support/documents_index.aspx?docType=7

Also, unless the cameras are installed in a multi-drop configuration, the address switches should be set to switch 1 = 1, switch 2 = 0, and switch 3 = 0.

8.3 McAfee Virus Scan Message

When IE7 is being run in a Microsoft Windows XP environment with McAfee Virus scanning software alerts are sometimes generated that indicate "Buffer Overflow" (the message seems to occur during high data transfer periods on a marginal connection, e.g. logging in over a wireless connection). The message is harmless to the SunGuide application and can be stopped by disabling buffer overflow protection in the VirusScan engine.
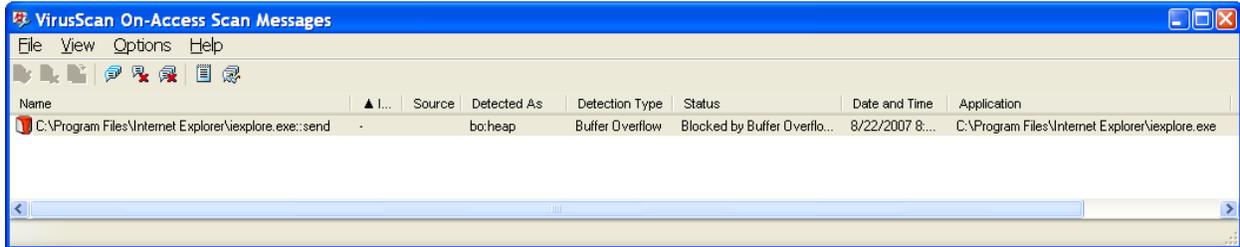

Figure 8–1 -- McAfee Virus Software Buffer Overflow Messages

8.4 Event Management Location Specification

Locations in SunGuide are entered as sub-records of a specified Reference Point on a specified Roadway in a specified County, and going in a specified Direction. Note that the SunGuide Administrative Editor asks you to choose all of those things (County, Roadway, Direction and Reference Point) before entering a Location's information. Locations and Reference Points both have Sort Order properties. The following sections describe the proper way to configure locations.

8.4.1 Incorrect Configuration

In an incorrect configuration, the Sort Order property of Reference Points dictated what order those Reference Points appeared in. Within a specific Reference Point (in a specified County, on a specified Roadway, in a specified Direction), the Sort Order property of the Locations dictated what order the Locations appeared in (see Figure 8–2)

Figure 8–2 – Incorrect Location Configuration

This creates two major issues: first, in the event that a Reference Point (for example, a Cross-Street) crosses two Roadways, that Reference Point can only have one Sort Order value, creating sorting conflicts over those two Roadways that can be difficult or impossible to reconcile without creating Reference Points specific to Roadways. Second, if the same Cross-Street crosses a roadway at two distant points, two different Reference Points would have to be created to represent that Cross-Street. All this duplication of Reference Points would make Performance Measures involving a specific Cross-Street much less valuable, as multiple Reference Points would have to be grouped together to represent what is in reality just one Cross-Street.

8.4.2 Correct Configuration

To avoid these issues, the following methodology has been adopted: the Sort Order property of Reference Points is for SunGuide Administrative Editor use only. The Sort Order property of Locations determines how their parent-record Reference Points will be ordered in the GUI. To clarify: for a given County, Roadway, and Direction, all Locations that match those criteria are considered. They are then sorted according to their Sort Order, and each Location's Reference Point is in turn added to a list. When the Reference Point is unchanged from one Location in the list to the next, the latter Reference Point is discarded. And what we end up with is a list of (not-necessarily-unique) Reference Points, sorted by Location Sort Order (see Figure 8–3)

Figure 8–3 – Correct Location Configuration

In this way, Reference Points on multiple Roadways will not have to worry about sorting conflicts, because their associated Locations (which are unique to a County/Roadway/ Direction combination) will determine their sequence. And in the case of a Cross-Street crossing a Roadway at two distant points, it will appear twice in the list because of the Sort Order property of its Locations.

Note that Locations should now be given Sort Orders from beginning to end of a Roadway in whatever direction they are attached.