DEVELOPMENT OF AN INTERFACE BETWEEN FDOT'S CRASH ANALYSIS REPORTING SYSTEM AND THE SAFETY ANALYST

Contract No.: BDK84 977-01

Written by:

Linjun Lu
Research Assistant

Jian John Lu, Ph.D., P.E., (Principal Investigator)
Professor

Pei Sung Lin, Ph.D., P.E., PTOE, (Co- Principal Investigator)
Program Director of CUTR

And

Zhenyu Wang, Ph.D.
Research Associate

Hongyun Chen
Research Assistant

Transportation Group
Department of Civil and Environmental Engineering
4202 E. Fowler Ave., ENB 118
&
Center for Urban Transportation Research
4202 E. Fowler Ave., CUT100

University of South Florida
Tampa, Florida 33620

Presented to:
Florida Department of Transportation

A Project Sponsored by:
Florida Department of Transportation

July 2009

DISCLAIMER

The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the State of Florida Department of Transportation.

METRIC CONVERSION CHART

SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
LENGTH				
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
SYMBOL	**WHEN YOU KNOW**	**MULTIPLY BY**	**TO FIND**	**SYMBOL**
AREA				
in^2	squareinches	645.2	square millimeters	mm^2
ft^2	squarefeet	0.093	square meters	m^2
yd^2	square yard	0.836	square meters	m^2
ac	acres	0.405	hectares	ha
mi^2	square miles	2.59	square kilometers	km^2
SYMBOL	**WHEN YOU KNOW**	**MULTIPLY BY**	**TO FIND**	**SYMBOL**
VOLUME				
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft^3	cubic feet	0.028	cubic meters	m^3
yd^3	cubic yards	0.765	cubic meters	m^3
NOTE: volumes greater than 1000 L shall be shown in m^3				
SYMBOL	**WHEN YOU KNOW**	**MULTIPLY BY**	**TO FIND**	**SYMBOL**
LENGTH				
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
m	meters	1.09	yards	yd
km	kilometers	0.621	miles	mi
SYMBOL	**WHEN YOU KNOW**	**MULTIPLY BY**	**TO FIND**	**SYMBOL**
AREA				
mm^2	square millimeters	0.0016	square inches	in^2
m^2	square meters	10.764	square feet	ft^2
m^2	square meters	1.195	square yards	yd^2
ha	hectares	2.47	acres	ac
km^2	square kilometers	0.386	square miles	mi^2
SYMBOL	**WHEN YOU KNOW**	**MULTIPLY BY**	**TO FIND**	**SYMBOL**
VOLUME				
mL	milliliters	0.034	fluid ounces	fl oz
L	liters	0.264	gallons	gal
m^3	cubic meters	35.314	cubic feet	ft^3
m^3	cubic meters	1.307	cubic yards	yd^3

TECHNICAL REPORT DOCUMENTATION PAGE

<table>
<tr><td>1. Report No.</td><td>2. Government Accession No.</td><td colspan="2">3. Recipient’s Catalog No.</td></tr>
<tr><td colspan="2" rowspan="2">4. Title and Subtitle
Development of An Interface between FDOT's Crash Analysis Reporting System and the Safety Analyst</td><td colspan="2">5. Report Data
July. 2009</td></tr>
<tr><td colspan="2">6. Performing Organization Code</td></tr>
<tr><td colspan="2">7. Author(s)
Linjun Lu, Jian John Lu, Pei Sung Lin, Zhenyu Wang, and Hongyun Chen</td><td colspan="2">8. Performing Organization Report No.</td></tr>
<tr><td colspan="2" rowspan="2">9. Performing Organization Name and Address
Transportation Group, Department of Civil & Environmental Engineering, University of South Florida, 4202 East Fowler Avenue, ENB 118, Tampa, FL 33620</td><td colspan="2">10. Work Unit No. (TRAIS)</td></tr>
<tr><td colspan="2">11. Contract or Grant No.
BDK84 977-01</td></tr>
<tr><td colspan="2" rowspan="2">12. Sponsoring Agency Name and Address
Florida Department of Transportation
605 Suwannee Street, MS 30
Tallahassee, FL 32399</td><td colspan="2">13. Type of Report and Period Covered
Final, July 2008 to July 2009</td></tr>
<tr><td colspan="2">14. Sponsoring Agency Code</td></tr>
<tr><td colspan="4">15. Supplementary Notes</td></tr>
<tr><td colspan="4">16. Abstract
Safety Analyst (SA) is a set of software tools that can be used by state and local highway agencies for highway safety management. It includes a set of tools to implement the procedures that will be presented in Parts IV and V of the forthcoming Highway Safety Manual. These tools include: a Network Screening Tool, a Diagnosis Tool, a Countermeasure Selection Tool, an Economic Appraisal Tool, a Priority Ranking tool, and an Evaluation tool. By using these tools, Safety Analyst can automate procedures that are now performed manually by highway agencies.
FDOT maintains a very large crash database called Crash Analysis Reporting (CAR) System. The database was originally generated by merging crash data from the Department of Highway Safety and Motor Vehicles (DHSMV) with roadway information from FDOT. The database is updated yearly. All reported crashes with a fatality, an injury, and high property damage occurred on state roads are included in this database. The database basically contains all the information recorded in the long form crash report.
This project report mainly presents a method to convert all information being stored in CAR system to a format that can be used by SA. In addition, a program interface is developed, basing on this method, to transfer CAR variables and codes into SA variables and codes automatically. Besides CAR system, information in other databases is also used to meet SA requirements, such as Roadway Characteristics Inventory (RCI) database. The program interface has been tested for its validity, reliability, stability and etc. Also, several crash examples are implemented integrally by SA, which are converted from CAR and other databases.</td></tr>
<tr><td colspan="2">17. Key Word
Crash Analysis Reporting System, Safety Analyst, Interface, Converting, Variables and Codes</td><td colspan="2">18. Distribution Statement
No Restriction</td></tr>
<tr><td>19. Security Classif.
(of this report)
Unclassified</td><td>20. Security Classif.
(of this page)
Unclassified</td><td>21. No. of Pages
282</td><td>22. Price</td></tr>
</table>

Form DOT F 1700.7 (8-72) **Reproduction of completed page authorized**

ACKNOWLEDGEMENTS

This project was sponsored by Florida Department of Transportation. The authors of this report would like to take this opportunity to acknowledge supports from FDOT Safety Office for their assistance and suggestions leading to the success completion of the project.

The contents of the report reflect the views of authors, who are responsible for the facts, opinions, and accuracy of the information presented here. The contents do not necessarily reflect official views or policies of the sponsoring agency.

EXCLUSIVE SUMMARY

The Safety Analyst (SA) is currently being developed through a cooperative effort between FHWA and twenty seven state highway agencies. Before the software can be used in each state, it is very important to figure out how to make good use of large database in each state by SA.

The objective of the proposed study is to develop an interface/software which can be used to automatically convert data stored in the FDOT's CAR system into the format used by the Safety Analyst.

The completed interface, Safety Analyst Data Convertor (SADC), can convert data in all necessary databases in Florida into the SA data automatically. This great amount of data can help implement projects for safety analysis in Florida, whose results and conclusions could provide precious experiences for more safety projects in Florida and similar projects in other states.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGHURES

CHAPTER 1

INTRODUCTION

1.1 Introduction of Safety Analyst (SA)

Safety Analyst is a set of software tools that can be used by state and local highway agencies for highway safety management. It includes a set of tools to implement the procedures that will be presented in Parts IV and V of the forthcoming Highway Safety Manual. The Safety Analyst toolkits include six software programs, including a Network Screening Tool, a Diagnosis Tool, a Countermeasure Selection Tool, an Economic Appraisal Tool, a Priority Ranking tool, and an Evaluation tool. By using these tools, Safety Analyst can automate procedures that are now performed manually by highway agencies. More importantly, the Safety Analyst will incorporate state-of-the-art safety management approaches into computerized analytical tools for guiding the decision-making process to identify safety improvement needs and develop a system-wide program of site-specific improvement projects. The major functions of Safety Analyst include, but are not limited to: (1) identify sites with potential for safety improvements; (2) help users diagnose the nature of safety problems at specific sites; (3) assist users in the selection of countermeasures at specific sites; (4) perform an economical analysis of a specific countermeasure or several alternative countermeasures for a specific site; (5) provide a priority ranking of sites and proposed improvement projects based on the benefit and cost estimates determined by the economic analysis; and (6) provide the capability to conduct before/after evaluations of implemented safety improvement projects.

The Safety Analyst is currently being developed through a cooperative effort between FHWA and twenty seven state highway agencies (shown in Table 1.1 and Figure 1.1). Florida is one of the states who participated in the Safety Analyst program. The Safety Analyst will be released in 2009.

Table 1.1 27 Participant States for Safety Analyst (Source: www.safetyanalyst.org)

No.	States
1	Arizona Department of Transportation
2	California Department of Transportation
3	Colorado Department of Transportation
4	Florida Department of Transportation
5	Georgia Department of Transportation
6	Illinois Department of Transportation
7	Indiana Department of Transportation
8	Iowa Department of Transportation
9	Kansas Department of Transportation
10	Kentucky Transportation Cabinet
11	Louisiana Department of Transportation
12	Maryland State Highway Administration
13	Massachusetts Highway Department
14	Michigan Department of Transportation
15	Minnesota Department of Transportation
16	Mississippi Department of Transportation
17	Missouri Department of Transportation
18	Montana Department of Transportation
19	Nevada Department of Transportation
20	New Hampshire Department of Transportation
21	New York State Department of Transportation
22	North Carolina Department of Transportation
23	Ohio Department of Transportation
24	Vermont Agency of Transportation
25	Virginia Department of Transportation
26	Washington State Department of Transportation
27	Wisconsin Department of Transportation

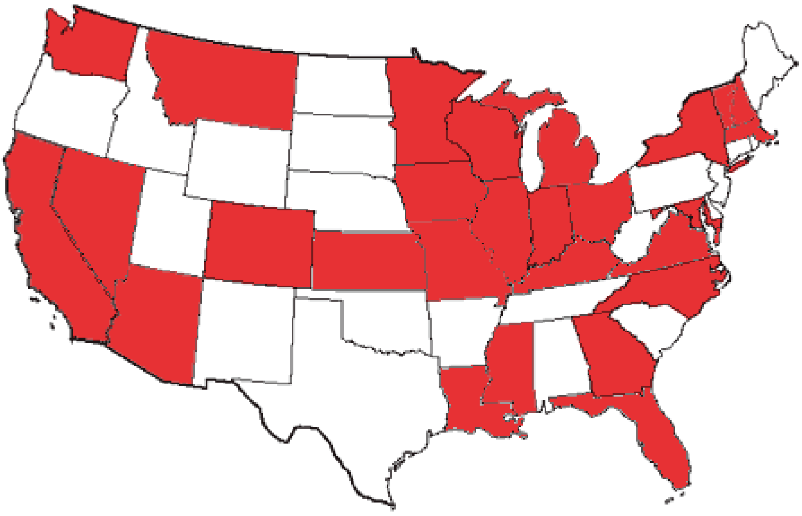


Figure 1.1 27 Participant States for Safety Analyst (Source: www.safetyanalyst.org)

1.2 Introduction of Crash Analysis Reporting (CAR) System

FDOT maintains a very large crash database called Crash Analysis Reporting (CAR) system. The database was originally generated by merging crash data from the Department of Highway Safety and Motor Vehicles (DHSMV) with roadway information from FDOT. The database is updated yearly. All reported crashes with a fatality, an injury, and high property damage occurred on state roads are included in this database. The database basically contains all the information recorded in the long form crash report. For each crash, there are more than 300 variables used to describe the site and time of the crash, the geometric conditions, the traffic control, and drivers and pedestrian's characteristics. The variables can be classified into three major categories, including person, vehicle, and crash. For each variable, several code values were assigned to represent different categories of the variable. For example, for the variable "LIGHT", the code value 01 is used to denote "daylight", 02 denotes "dusk", 03 denotes "dawn", 04 denotes "dark with street light", 05 denotes "dark with no street light", and 88 denotes unknown. A picture for the data downloaded from the CAR system is given in Figure 1.2.

CARNUM	CRASHDTE	TIMEOFAC	DAYOWEEK	MANDIST	CONTYDOT	SECTNMBR	SUBSECT	LOCMP	LOCNODE	LOCDIST
586234860	2001-01-01	20:20	1	04	93	150	000	001.339	02042	0000.005
586619770	2001-01-01	17:30	1	02	72	000	000	000.000		0000.000
584959240	2001-01-01	19:31	1	04	93	004	000	004.634	02391	0000.000
584919270	2001-01-01	18:42	1	04	93	000	000	000.000		0000.000
587176530	2001-01-01	16:42	1	02	72	014	000	005.792	04616	0000.000
584856590	2001-01-01	16:30	1	03	60	000	000	000.000		0000.000
584839710	2001-01-01	15:36	1	03	60	000	000	000.000		0000.000
584799720	2001-01-01	03:30	1	04	86	000	000	000.000		0000.000
585035320	2001-01-01	03:15	1	06	87	000	000	000.000		0000.000
588375620	2001-01-01	17:35	1	02	72	070	000	008.358	01308	0000.000
585951690	2001-01-01	01:30	1	02	72	000	000	000.000		0000.000
584771690	2001-01-01	15:55	1	04	86	012	000	000.502	03518	0000.000
588388420	2001-01-01	14:30	1	02	72	000	000	000.000		0000.000
586358140	2001-01-01	18:15	1	01	16	000	000	000.000		0000.000
584765270	2001-01-01	13:34	1	04	86	000	000	000.000		0000.000
587166040	2001-01-01	14:49	1	02	72	000	000	000.000		0000.000
584730180	2001-01-01	02:45	1	07	10	250	000	007.003	01355	0000.000
584716230	2001-01-01	00:30	1	07	10	020	000	001.264	01120	0000.000
588472020	2001-01-01	01:26	1	02	78	000	000	000.000		0000.000
584799620	2001-01-01	07:18	1	04	86	000	000	000.000		0000.000
585210540	2001-01-01	02:30	1	04	93	000	000	000.000		0000.000
585623930	2001-01-01	17:20	1	06	87	000	000	000.000		0000.000
585616210	2001-01-01	03:10	1	06	87	000	000	000.000		0000.000
585480480	2001-01-01	23:15	1	07	10	000	000	000.000		0000.000
585474350	2001-01-01	19:30	1	07	10	190	000	027.700	05376	0000.000
586679440	2001-01-01	18:33	1	04	93	060	000	003.683	00146	0000.011
585646970	2001-01-01	18:30	1	06	87	080	001	001.530	06262	0000.000
587462120	2001-01-01	00:55	1	04	88	000	000	000.000		0000.000
584993830	2001-01-01	02:25	1	04	93	150	000	003.004	03404	0000.000
589059120	2001-01-01	21:10	1	04	86	000	000	000.000		0000.000
584959170	2001-01-01	03:30	1	04	93	000	000	000.000		0000.000
585208970	2001-01-01	11:55	1	06	87	140	000	011.593	01738	0000.008
585940170	2001-01-01	16:40	1	02	72	291	000	002.875	04968	0000.002
589026070	2001-01-01	14:30	1	04	86	095	000	006.717	04052	0000.028

Record: 1 of 1903653

Figure 1.2 Crash Data Download from the CAR system

1.3 Project Objective

Safety Analyst is a safety analytical tool. The software can help traffic safety engineers conduct safety analysis based on the data provided by the users. The Safety Analyst provides two different data input methods, including a user input method and an automated input method. The user input method requires users to manually input data while the automated input method allows users to load data from some computer based databases such as the geometric design database, accident record database, and traffic volume database. More specifically, the data to be used by the Safety Analyst include: geometric design features, traffic control features, traffic volumes, crash history, crash characteristics, and safety performance functions.

There are more than 200,000 crashes on Florida state highways each year. Most of the information related with these crashes is stored in FDOT's CAR system. It could have great benefits to use the Safety Analyst with the data from the CAR system to analyze safety data and make safety improvement recommendations.

Therefore, the major objective of this project is that Safety Analyst can be used for analyzing existing data being stored in FDOT's databases, such as the CAR system.

1.4 Problem Statement

Before the SA software can be used in the State of Florida, a major difficulty must be solved, which is the compatibility of the input data for the Safety Analyst and the data stored in some databases maintained by the FDOT.

This kind of compatibility between SA and CAR includes two major problems. Firstly, the definitions of variables and codes in CAR are different from those used by the Safety Analyst. A tool is needed to convert the variables in CAR into the variables used by the Safety Analyst. Secondly, the data format in the CAR system is different from that in Safety Analyst. If the data in the CAR system is to be used for the Safety Analyst, the data should be converted to the format that can be used by the Safety Analyst.

1.5 Major Tasks

To solve all problems and complete data conversion for SA analysis, the whole project is suggested by the following tasks and steps:

Task 1: Literature Search and Review

Information databases will be searched to identify whether or not there are any past similar studies that could be reviewed as references, and to search for existing methodologies and practices related to the research project.

Technical reports and papers related to the research project will be searched and reviewed. Internet web sites will be searched to find similar information. Twenty seven states and local agencies are participating in the Safety Analyst tool development including the FDOT. Other states will be contacted to determine how they have or are customizing and implementing this tool

Task 2: Study the Definitions of Variables and Data Formats

The definitions of variables and data formats in the CAR system and the Safety Analyst will be carefully studied. The variables that will be used in the Safety Analyst will be selected from the CAR system. A variable comparison table will be developed to compare the definitions of variables in the CAR system with those in the Safety Analyst. The variable comparison table will later become an integral part of the proposed software to allow users to edit and update the variable definitions.

Task 3: Development of Translation Methods and Procedures

Before starting to develop the software, methods should be developed to translate the variables used in the CAR system into those used by the Safety Analyst. It is also important to develop a procedure to convert the data stored in the CAR system into a format used by the Safety Analyst.

In this task, the variable translation philosophy will be developed. The translation philosophy must be reasonable so that the conversion of variables will not result in loss of important information in the original data.

Task 4: Software Development

Once the translation methods and procedures have been developed, the next step is to develop software which can be used to automatically convert the data stored in FDOT’s CAR system into the format used by the Safety Analyst. This is the major task of this study.

Task 5: Test of the Software

This is an extremely task in the whole software development procedure. Before sending to

FDOT, proposed software will be tested by the USF research team. Different data sets representing various crash scenarios will be prepared and tested by the research team to ensure the data translated by the software is correct.

Final applications will be prepared for acceptance testing in the FDOT testing environment. Sufficient time will be allocated for the FDOT to examine and test all aspects of the new applications and provide review comments on bugs and suggested functionality changes. Following the review of these comments, a feasible modification will be provided. The process will continue until all bugs and problems are resolved and the final product has been accepted by the Project Manager.

Task 6: Case Study

This is an additional part for this project, in order to confirm the practicability of this project. All converted data of several test sites will be chosen for SA analysis. These case studies demonstrate completed procedures of SA analysis and display all results produced by SA.

CHAPTER 2

LITERATURE REVIEW

2.1 Review of Past Similar Studies

Relevant information has been searched to identify whether or not there are any past similar studies that could be reviewed as references, and to search for existing methodologies and practices related to the research project.

A questionnaire is designed to collect such information by sending them to the twenty-three States who are participated in Safety Analyst Project (detailed questionnaire form is shown in Appendix A). All respond information and feedbacks are shown in Table 2.1.

Bases on the survey, it seems that there are not any State has started projects which use local available databases for SA analysis. And Florida might be the first State which develops SA applications by using existing databases.

2.2 Review of SA Materials

Safety Analyst is a set of computerized analytical tools being developed for the Federal Highway Administration (FHWA) to aid state and local highway agencies in highway safety management (shown in Figure 2.1). The main purpose of Safety Analyst is to improve a highway agency's system-wide programming of site-specific safety improvements. Safety Analyst incorporates state-of-the-art safety management approaches for guiding the decision-making process to identify safety improvement needs, and has a strong basis in cost-effectiveness analysis. Safety Analyst will help highway agencies get the greatest possible safety benefit from each dollar spent in the name of safety [1].

A typical SA analysis procedure normally contains six main steps, which are shown as followings:

Step 1 - Identification of sites with potential for safety improvement

Step 2 - Diagnosis of the nature of safety problems at specific sites

Step 3 - Selection of countermeasures at specific sites

Step 4 - Economic appraisal for sites and countermeasures under consideration

Step 5: Priority rankings of improvement projects

Step 6 - Safety effectiveness evaluation of implemented countermeasures

Table 2.1 Survey Results

No	State	Contact	Replay	Plan	Similar Project	Note
1	Wisconsin	✓	✓	✓	✓	In the stage of connecting the original data into SA;
2	Michigan	✓	✓	✓	✓	In the stage of connecting the original data into SA;
3	Vermont	✓	✓	✓	✓	In the stage of connecting the original data into SA;
4	North Carolina	✓	✓	✓	✓	In the stage of connecting the required data into SA;
5	Ohio	✓	✓	✓	✓	In the stage of revising new codes and formats data into SA;
6	Nevada	✓	✓	✓	☒	In the stage of considering the application in the state;
7	Georgia	✓	✓	✓	☒	In the stage of considering the application in the state;
8	Maryland	✓	✓	✓	☒	In the stage of Evaluation;
9	New York	✓	✓	✓	☒	In the stage of Evaluation;
10	Delaware	✓	✓	☒	☒	SA in test stage in FHWA, not considered to use it yet;
11	Iowa	✓	✓	☒	☒	SA in test stage in FHWA, not considered to use it yet;
12	California	✓	✓	☒	☒	SA in test stage in FHWA, not considered to use it yet;
13	Indiana	✓	✓	☒	☒	SA in test stage in FHWA, not considered to use it yet;
14	Kansas	✓	✓	☒	☒	SA in test stage in FHWA, not considered to use it yet;
15	Kentucky	✓	✓	☒	☒	SA in test stage in FHWA, not considered to use it yet;
16	Washington	✓	✓	☒	☒	SA in test stage in FHWA, not considered to use it yet;
17	Massachusetts	✓	✓	☒	☒	No plan to use SA right now as limited road database;
18	Colorado	✓	✓	☒	☒	No plan to use SA since Colorado already had its own safety manual which seems more useful right now;
19	Virginia	✓	☒	☒	☒	N/A
20	Illinois	✓	☒	☒	☒	N/A
21	Louisiana	✓	☒	☒	☒	N/A
22	North Jersey	✓	☒	☒	☒	N/A
23	Minnesota	✓	☒	☒	☒	N/A

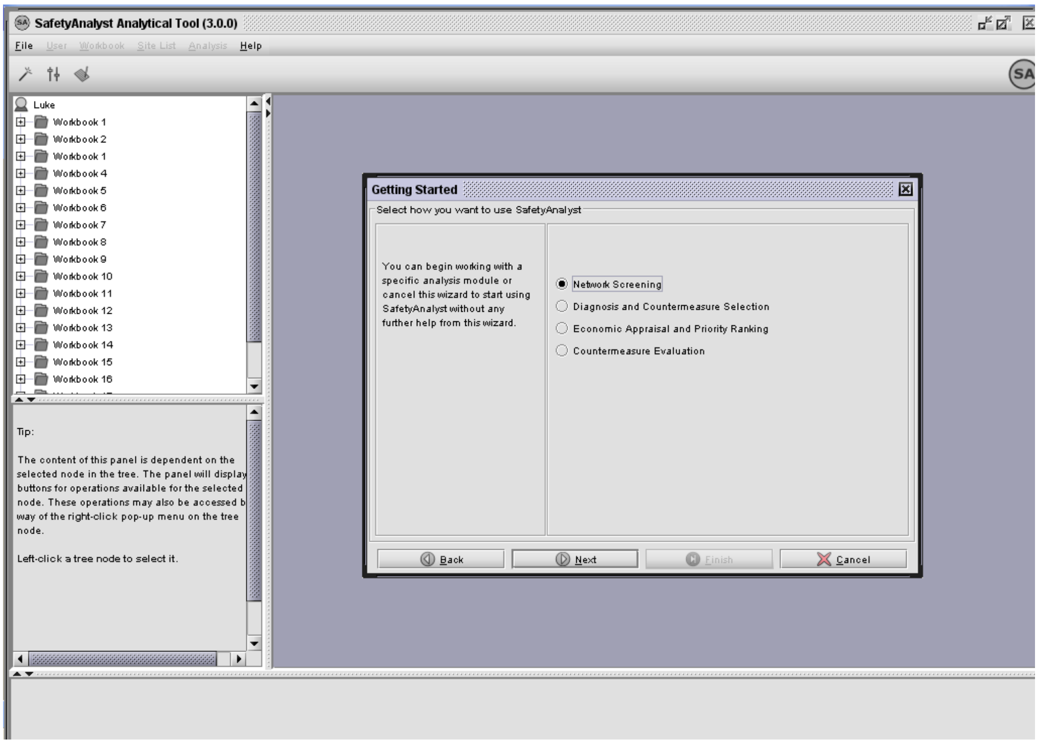


Figure 2.1 SA Window

And there are four modules in SA that implement the six main steps of analysis above. These modules are:

Module 1 - Network screening

Module 2 - Diagnosis and countermeasure selection

Module 3 - Economic appraisal and priority-ranking

Module 4 - Countermeasure evaluation

Safety Analyst provides tools to import an agency's highway system inventory, traffic count, and crash data and to convert those data into a format usable by Safety Analyst for conducting safety analyses. Safety Analyst is packaged with default safety performance function, countermeasure, site diagnosis, and crash distribution data used by the analysis algorithms. Furthermore, Safety Analyst provides tools that enable an agency to modify those default data or to provide its own values.

There are three application tools in SA, Administration Tool, Data Management Tool, and Analytical Tool. The organizations and data flows are shown in Figure 2.2. Administration tool is used to set up and manage the Safety Analyst deployment. Data Management Tool is used to import and prepare an agency's inventory, traffic volume, and accident (crash) data for analysis. Analytical Tool is used to conduct safety analyses of an agency's inventory.

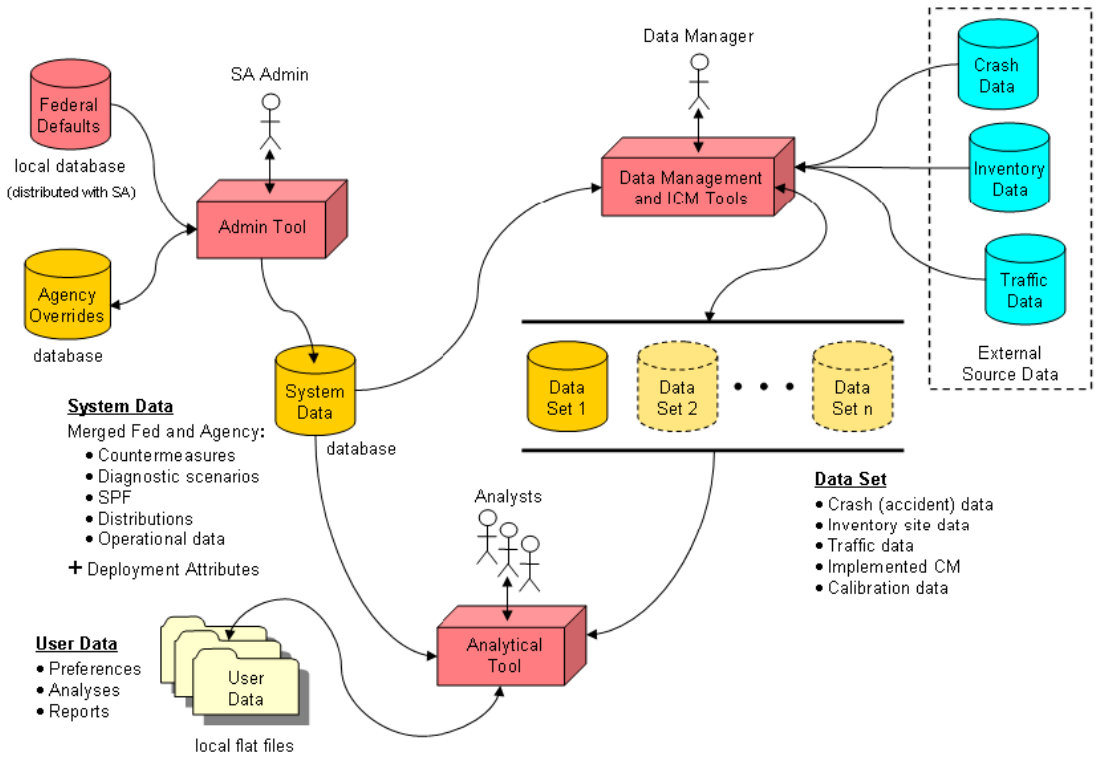


Figure 2.2 SA Data Model (Source: SA Data Management Tool Manual)

2.3 Review of CAR Materials

FDOT's Crash Analysis Reporting (CAR) system is a tool that can be used for crash analysis and countermeasure planning. The Crash Analysis Report (CAR) system is maintained by FDOT Safety Office. The database was originally generated by merging crash data from the Department of Highway Safety and Motor Vehicles (DHSMV) with roadway information from FDOT. The database is updated yearly. All reported crashes with a fatality, an injury, and high property damage occurred on state roads are included in this database. The database basically contains all the information recorded in the long form crash report. For each crash, there are more than 300 variables used to describe the site and time of the crash, the geometric conditions, the traffic control, and drivers and pedestrian's characteristics.

2.4 Review of the Roadway Characteristics Inventory (RCI) Materials

RCI is the Roadway Characteristics Inventory database, maintained by District and

Transportation Statistics Office. The RCI is a computerized database of information related to the roadway networks that are maintained by or are of special interest to the Department. In addition to data required by the Department, the RCI contains other data as required for special Federal and State reporting obligations. There are many other important databases maintained by the Department (several that contain more highly technical data such as bridge specifications, highway design, or pavement), the RCI remains the largest database with over one million records [3].

2.5 Review of Other Materials

Besides CAR, RCI, there are other available source databases, such as the Linear Referencing System (LRS), Traffic, and Intersection Node List, and etc.

FDOT maintains LRS, which is similar to the RCI. The Traffic database contains some traffic information, especially AADT data. The Intersection Node List database assigns a unique number (or intersection ID) to each intersection on state road, not including off state road intersections. Each intersection ID indicates roadway ID for all intersecting roadways.

All these source databases above will be studied and used for SA application, after conversion of variables and codes is finished.

CHAPTER 3

DATA COLLECTION

This chapter mainly demonstrates basic information of all available source databases (including CAR) and SA, which focuses on definitions of variables and codes, data format and configuration.

3.1 Definition of Variables and Codes in SA

Safety Analyst data cover roadway segments, ramps, and intersections, which include inventory information, traffic information and crash information exclusively. There are ten sections of data in SA, shown in Table 3.1.

Table 3.1 Sections of Variables and Codes in SA

No.	SA Sections	Category 1	Category 2
1	Roadway Segment	Inventory	Segment
2	Segment Traffic	Traffic	Segment
3	Ramp	Inventory	Ramp
4	Ramp Traffic	Traffic	Ramp
5	Intersection	Inventory	Intersection
6	Major Road Traffic	Traffic	Intersection
7	Minor Road Traffic	Traffic	Intersection
8	Leg	Inventory	Intersection
9	Leg Traffic	Traffic	Intersection
10	Accident	Crash	Segment, Ramp and Intersection

Most variables and codes in crash part, that is Section 10 Accident, can be converted from database of the CAR system. Variables in inventory part can be found in the RCI and LRS. And traffic variables come from traffic source database. Detailed information of SA variables is shown in Appendix B-I.

3.2 Definition of Variables and Codes in CAR

CAR variables can be classified into four major categories, including person, vehicle, crash, and citation, shown in Table 3.2. For each variable, several code values were assigned to represent different categories of the variable. For example, for the variable “LIGHT”, the code value 01 is used to denote “daylight”, 02 denotes “dusk”, 03 denotes “dawn”, 04 denotes “dark with street light”, 05 denotes “dark with no street light”, and 88 denotes unknown.

Table 3.2 CAR Category

No.	CAR Category	Number of Variables	Database File
1	Crash	193	RDWTBL_50
2	Vehicle	57	RDWTBL_51
3	Person	31	RDWTBL_52
4	Citation	8	RDWTBL_53

Detailed information of CAR variables is shown in Appendix B-II.

3.3 Definition of Variables and Codes in RCI

Transportation Statistics RCI Field Handbook [4] shows definitions of all variables and codes. Detailed information is shown in Appendix B-III. Roads functionally classified as arterial and collectors are to receive a Roadway ID number in the RCI and be mapped. Some low ranking or local roadways are not recorded in the RCI.

3.4 Other Source Databases

Other available source databases include the LRS database, Traffic databases, and Node List database. All detailed information of these databases is shown in Appendix B-IV, V, and VI.

CHAPTER 4

METHODOLOGY

As mentioned in chapter 1, the objective of the project is to develop an interface/software which can be used to automatically convert data stored in FDOT's CAR system into the format used by the Safety Analyst. The major task is to develop a methodology to convert all variables and codes from source databases (including CAR) to SA. As the definitions of variables and codes and data formats in source databases and SA have been carefully studied in chapter 3, this chapter focuses on data conversion.

Variable and code comparison table will be created to help converting variables between source databases and Safety Analyst. The variable and code comparison table reflects the variable translation philosophy which has been carefully designed to ensure that the conversion does not result in loss of important information in the original data. In addition, the comparison table will serve as an integral part of the proposed software and users can easily access and edit the comparison table. The purpose of doing so is to provide an environment which is flexible and easy to update in the future. The current comparison table will serve as a default translation philosophy in the software. In the future, if the definitions of variables and codes in either source databases or Safety Analyst are changed, users simply need to update the variable comparison table without making significant changes to the entire software.

The translation philosophy will mainly be determined based on both literature review results and the subjective judgments of professionals. However, the final translation philosophy will be tested to ensure that the translation of data will not significantly affect safety analysis results. The final variable translation philosophy will be determined in a project meeting with FDOT project managers.

For those variables which do not have codes, conversion is simple, matched or unmatched. While, there are several cases for converting variables with codes. When one variable in source database can match another variable in SA, which means the meaning of these two variables is same or much close, and then these two variables can match each other. Also, all these codes should be matched too. The followings show different cases for codes matching when variables being matched.

4.1 Case I

Number of codes of a variable in source database is same as number of codes of the matched variable in SA. Furthermore, each code of former variable can match each code of SA variable exclusively. This is a perfect data conversion, that all codes under certain variables can find corresponding codes and variables from source database. No information is missed after data conversion (Table 4.1).

Table 4.1 Codes Match of Case I

No.	Codes in Source Database	Codes in Safety Analyst	Matching
1	A	A’	B→A’
2	B	B’	D→B’
3	C	C’	A→C’
4	D	D’	C→D’
5	E	E’	E→E’

4.2 Case II

Number of codes of a variable in source database is same as number of codes of the matched variable in SA. But not all codes in SA can be matched from source database, and only a part of them can be done. This case is still fine even some information will be lost after data conversion. Take the following table as an example, code B’ and D’ in SA cannot be matched from source database, which means there will be no information of code B’ and D’ by converting data. This problem is caused by different definitions of codes between SA and source database. No logical mistakes happen.

Table 4.2 Codes Match of Case II

No.	Codes in Source Database	Codes in Safety Analyst	Matching
1	A	A’	B→A’
2	B	B’	
3	C	C’	A→C’
4	D	D’	
5	E	E’	E→E’

4.3 Case III

Number of codes of a variable in source database is more than number of codes of the matched variable in SA. And each code of SA variable can be matched from source database exclusively, even some codes in source database have never been used. In this case, source database provides more than what SA needs.

Table 4.3 Codes Match of Case III

No.	Codes in Source Database	Codes in Safety Analyst	Matching
1	A	A’	B→A’
2	B	B’	D→B’
3	C	C’	F→C’
4	D	D’	C→D’
5	E	E’	E→E’
6	F		
7	G		

4.4 Case IV

Number of codes of a variable in source database is less than number of codes of the matched variable in SA. And each code of variable in source database can match code in SA exclusively. Even all codes in source database are matched and used, some codes in SA still be missed. It is because definitions of these codes are more specific than those in source database.

Table 4.4 Codes Match of Case IV

No.	Codes in Source Database	Codes in Safety Analyst	Matching
1	A	A’	B→A’
2	B	B’	D→B’
3	C	C’	F→C’
4	D	D’	C→D’
5	E	E’	E→E’
6		F’	
7		G’	

4.5 Case V

Number of codes of a variable in source database is more than number of codes of the matched variable in SA. And each code of SA variable can be matched from source database, even some codes in SA have more than one matched code. Take the following table as an example, code B' has two matched codes A and D, code D' has G and C. It is because definitions of these codes in source database are more specific than those in SA. There is no problem of this kind of matching, because codes A and D, or G and C cannot coexist in source database. And finally, only one code will be converted.

Table 4.5 Codes Match of Case V

No.	Codes in Source Database	Codes in Safety Analyst	Matching
1	A	A'	B→A'
2	B	B'	A & D→B'
3	C	C'	F→C'
4	D	D'	G & C→D'
5	E	E'	E→E'
6	F		
7	G		

4.6 Case VI

Number of codes of a variable in source database is less than number of codes of the matched variable in SA. And each code of SA variable can be matched from source database, but some codes in source database match more than one code in SA simultaneously. Take the following table as an example, code A has two matched codes C' and G', code E has E' and F'. It is because definitions of these codes in SA are more specific than those in source database. There is a logical problem of this kind of matching, because C' and G' can not coexist in SA by matching the same information from A, so does E' and F' from E. Thus, a correction must be done to choose only one matched code in SA, A to C' or A to G'. If it is really hard to select, just leave code C', G' in SA unmatched.

Table 4.6 Codes Match of Case VI

No.	Codes in Source Database	Codes in Safety Analyst	Matching	Correction
1	A	A'	B→A'	B→A'
2	B	B'	D→B'	D→B'
3	C	C'	A→C' & G'	A→C' or A→G'

4	D	D’	C→D’	C→D’
5	E	E’	E→E’ & F’	E→E’ or E→F’
6		F’		
7		G’		

Detailed information of variable and code comparison tables is shown in Appendix C, which includes all source databases and SA.

CHAPTER 5

SOFTWARE DEVELOPMENT

5.1 Introduction

One software package has been developed for data conversion, called Safety Analyst Data Converter (SADC), which is used to convert great amount of data from all available source databases to SA.

SADC mainly includes four parts, roadway segment data conversion, intersection data conversion, ramp conversion, and accident data conversion, which complies to the configuration of SA.

All files from available source databases are in the format of Comma Separated Values (CSV). All these files will be converted to the same format. In CSV file, different columns indicate different variables, different rows show different records. And the first row demonstrates name of each variable.

5.2 Data Needed

1. CAR.EXTRACT
2. CAR_50.csv
3. CAR_51.csv
4. LRS.csv
5. RCI.csv
6. RDWTBL25.csv
7. FDOT_AADT.csv

Detailed information of these sources databases are shown in chapter 3.

5.3 Software Installation

1. Find two zip files, SADC Setup.msi, and setup.exe.

2. Unzip these files to a local folder on user's computer.

3. Double Click the Setup.exe to start the setup program (the program may install MS .net framework 3.5 on your computer).

4. Follow each installation step and complete it.

5. After installation, a shortcut will be created on user's desktop and start menu.

Figure 5.1 Shortcut of Safety Analyst Data Conversion

5.4 Data Conversion

1) Open SADC.

Double click the shortcut to start Safety Analyst Data Converter.

Figure 5.2 Mainframe of Safety Analyst Data Conversion

2) Convert Segment Data

2-1 Click *Convert Segment Data*.

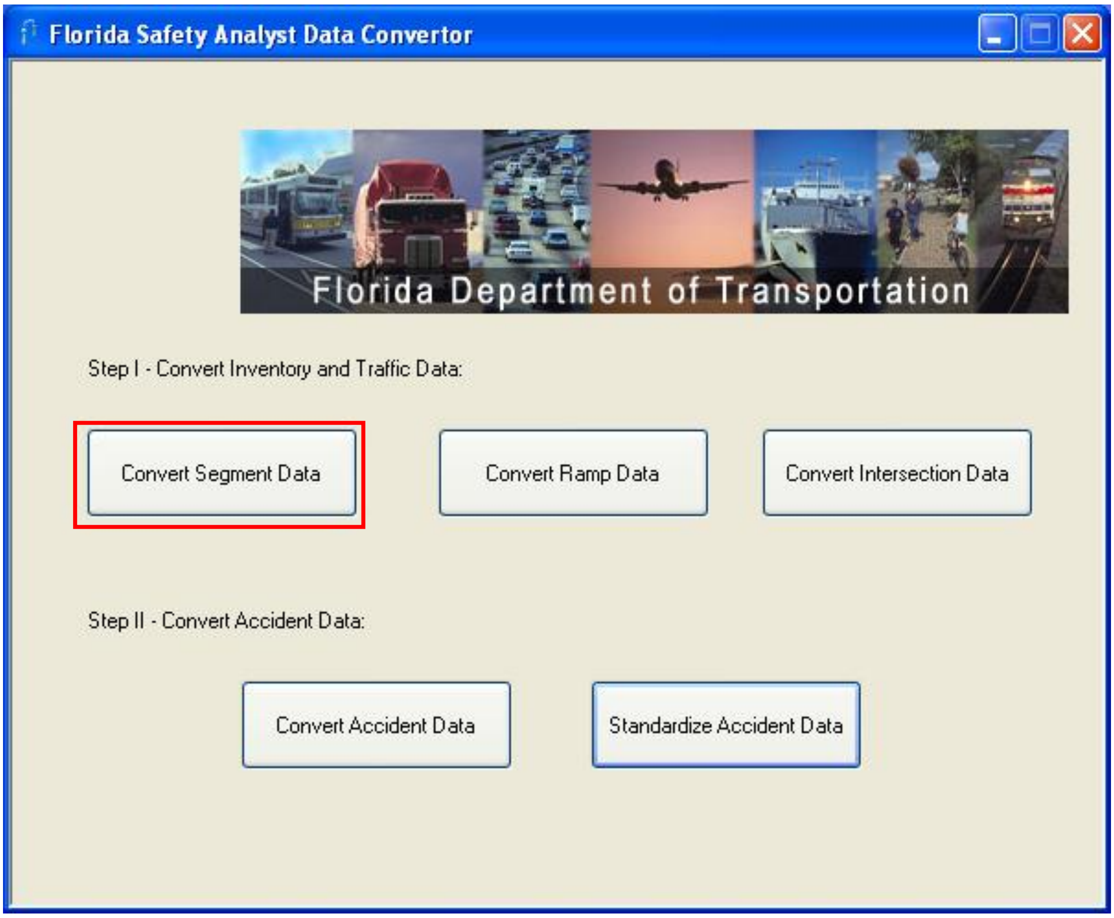


Figure 5.3 SADC-Convert Segment Data

2-2 Browse an export folder, create an export file name.

2-3 Add LRS.csv (RDWTBL31), RCI.csv, and FDOT_AADT.csv to the import data files. And click *Separated Traffic File*.

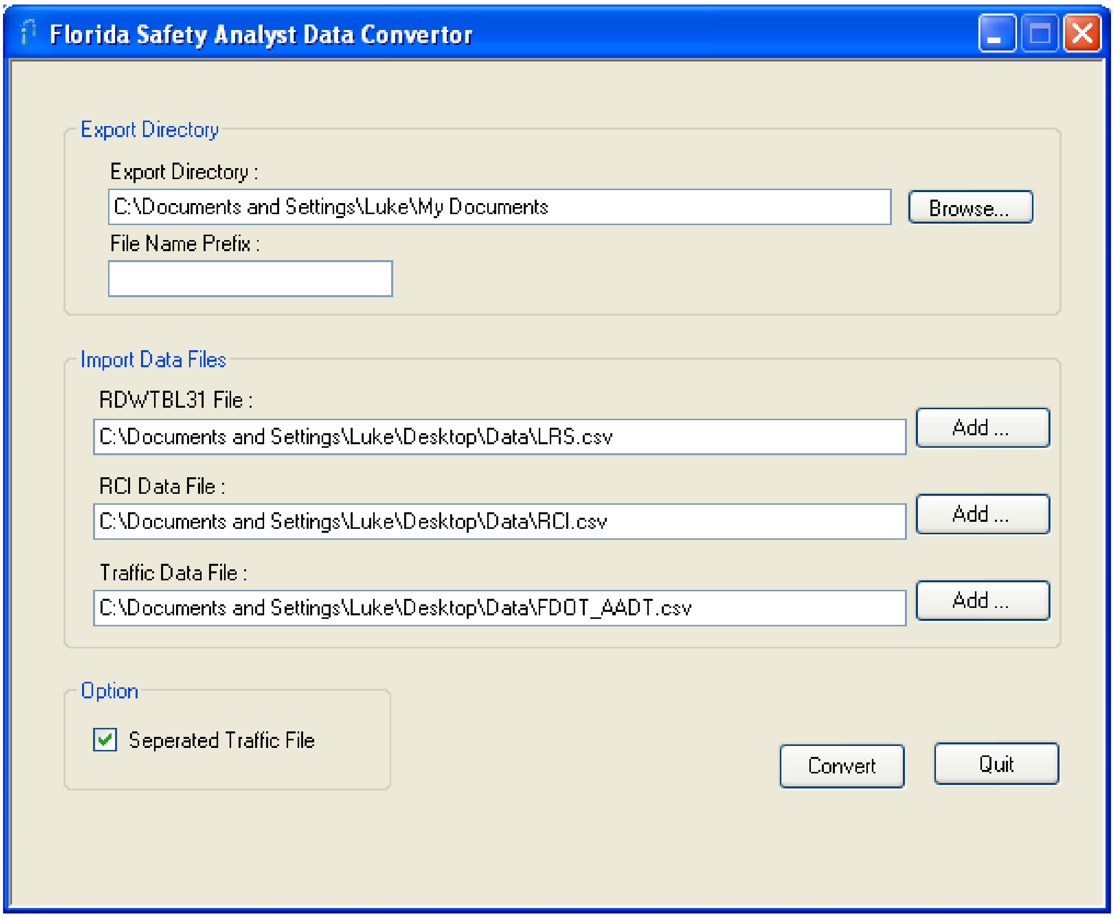


Figure 5.4 SADC-Convert Segment Data 2

2-4 Start *Conversion*.

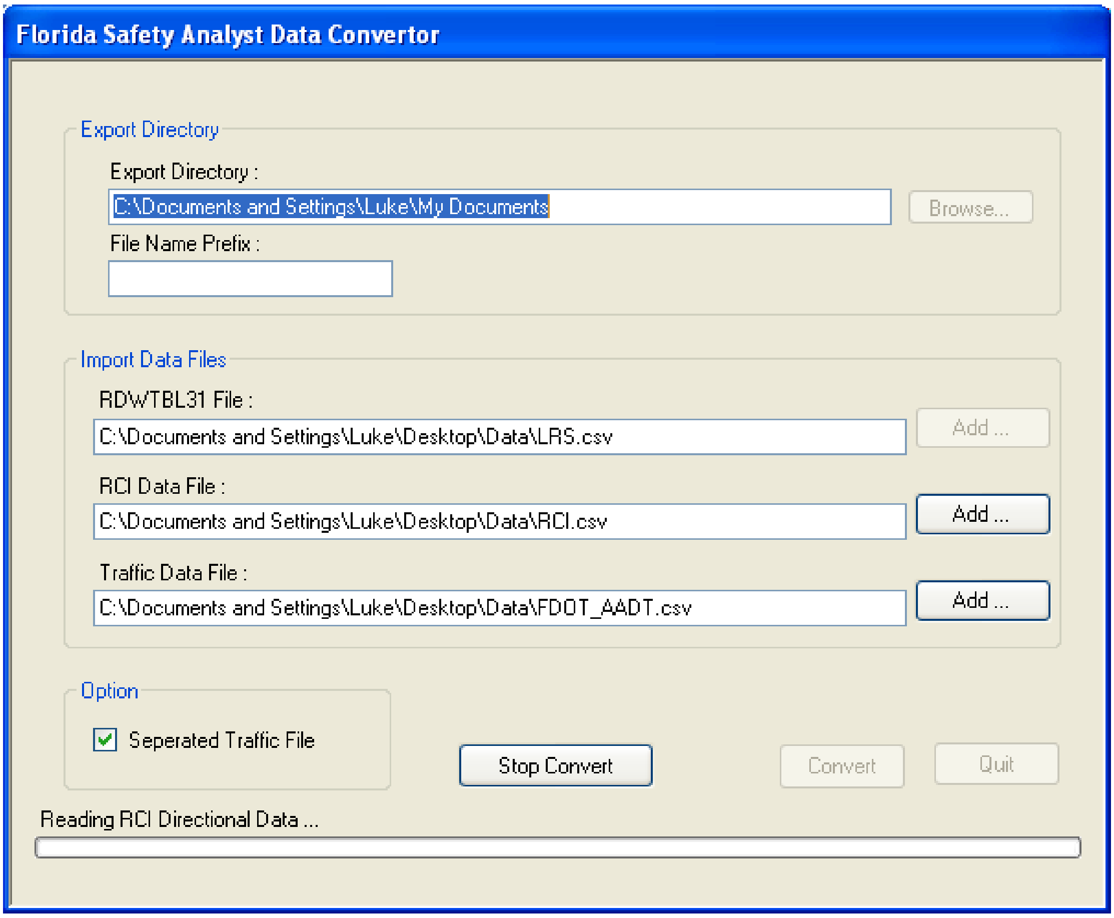


Figure 5.5 SADC-Convert Segment Data 3

2-5 Open the converted segment and segment traffic data.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	AltRoadwaySegment													
2	agencyID	locSysten	routeTyp	routeName	county	startSect	startOffs	endSectic	endOffset	gisID	altRouteN	majorRoac	segmentLe	dist
3	seg01010(	A	X	1010000	1		0.017		0.027				0.01	
4	seg01010(	A	X	1010000	1		0		0.008				0.008	
5	seg01010(	A	X	1010000	1		0.008		0.017				0.009	
6	seg01010(	A	X	1010000	1		0.027		0.05				0.023	
7	seg01010(	A	X	1010000	1		0.05		0.055				0.005	
8	seg01010(	A	X	1010000	1		0.083		0.108				0.025	
9	seg01010(	A	X	1010000	1		0.055		0.056				0.001	
10	seg01010(	A	X	1010000	1		0.108		0.127				0.019	
11	seg01010(	A	X	1010000	1		0.127		0.153				0.026	
12	seg01010(	A	X	1010000	1		0.056		0.063				0.007	
13	seg01010(	A	X	1010000	1		1.442		1.46				0.018	
14	seg01010(	A	X	1010000	1		0.063		0.083				0.02	
15	seg01010(	A	X	1010000	1		0.153		0.252				0.099	
16	seg01010(	A	X	1010000	1		0.252		0.429				0.177	
17	seg01010(	A	X	1010000	1		1.562		1.689				0.127	
18	seg01010(	A	X	1010000	1		1.754		1.764				0.01	
19	seg01010(	A	X	1010000	1		0.429		0.491				0.062	
20	seg01010(	A	X	1010000	1		1.764		1.766				0.002	
21	seg01010(	A	X	1010000	1		1.46		1.469				0.009	
22	seg01010(	A	X	1010000	1		1.766		1.804				0.038	
23	seg01010(	A	X	1010000	1		1.469		1.544				0.075	
24	seg01010(	A	X	1010000	1		1.689		1.704				0.015	
25	seg01010(	A	X	1010000	1		0.491		1.352				0.861	
26	seg01010(	A	X	1010000	1		1.804		1.819				0.015	
27	seg01010(	A	X	1010000	1		1.352		1.442				0.09	
28	seg01010(	A	X	1010000	1		1.819		1.872				0.053	
29	seg01010(	A	X	1010000	1		2.348		2.389				0.041	

Figure 5.6 Segment Data

	A	B	C	D	E	F
1	AltSegmentTraffic					
2	agencyID	calendarY	aadtVPD	percentH	peakHourl	comment
3	seg01010(	2007	16600	17.98	1698	
4	seg01010(	2007	16600	17.98	1698	
5	seg01010(	2007	16600	17.98	1698	
6	seg01010(	2007	16600	17.98	1698	
7	seg01010(	2007	16600	17.98	1698	
8	seg01010(	2007	16600	17.98	1698	
9	seg01010(	2007	16600	17.98	1698	
10	seg01010(	2007	16600	17.98	1698	
11	seg01010(	2007	16600	17.98	1698	
12	seg01010(	2007	16600	17.98	1698	
13	seg01010(	2007	16600	17.98	1698	
14	seg01010(	2007	16600	17.98	1698	
15	seg01010(	2007	16600	17.98	1698	
16	seg01010(	2007	16600	17.98	1698	
17	seg01010(	2007	16600	17.98	1698	
18	seg01010(	2007	16300	14.1	1594	
19	seg01010(	2007	16600	17.98	1698	
20	seg01010(	2007	16300	14.1	1594	
21	seg01010(	2007	16600	17.98	1698	
22	seg01010(	2007	16300	14.1	1594	
23	seg01010(	2007	16600	17.98	1698	
24	seg01010(	2007	16600	17.98	1698	
25	seg01010(	2007	16600	17.98	1698	
26	seg01010(	2007	16300	14.1	1594	
27	seg01010(	2007	16600	17.98	1698	
28	seg01010(	2007	16300	14.1	1594	
29	seg01010(	2007	15210	11.97	1574	

Figure 5.7 Segment Traffic Data

3) Convert Ramp Data

3-1 Click *Convert Ramp Data*.

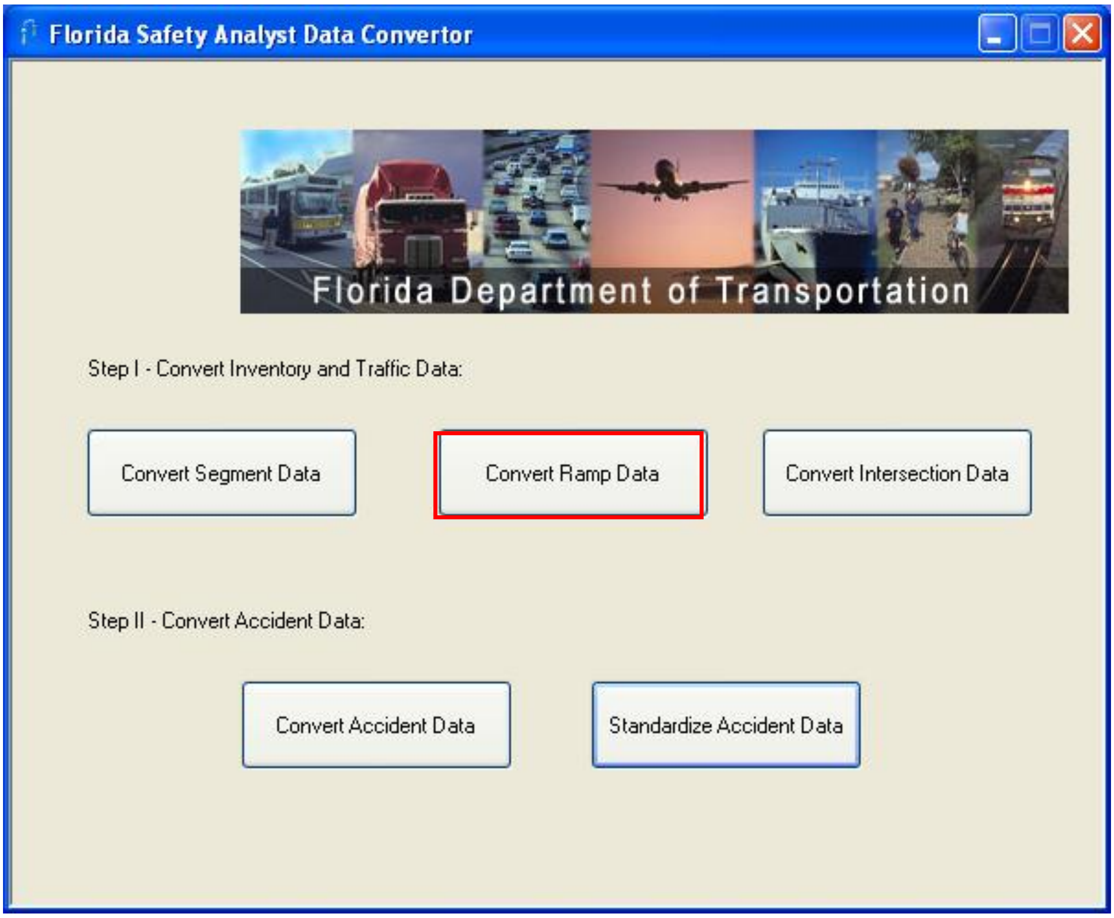


Figure 5.8 SADC-Convert Ramp Data

3-2 Browse an export folder, create an export file name.

3-3 Add LRS.csv (RDWTBL31) and FDOT_AADT.csv to the import data files. Click *Retrieve Traffic Data from Traffic File*.

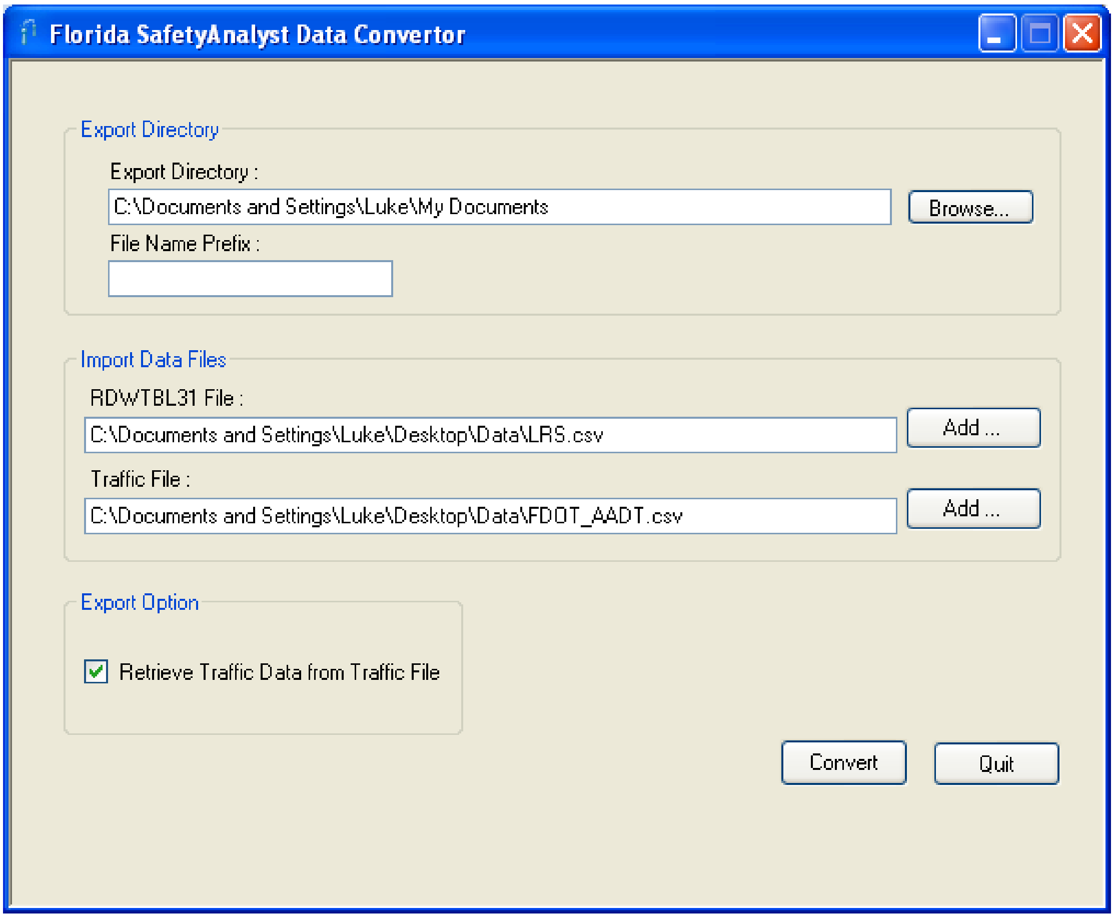


Figure 5.9 SADC-Convert Ramp Data 2

3-4 Start *Conversion*.

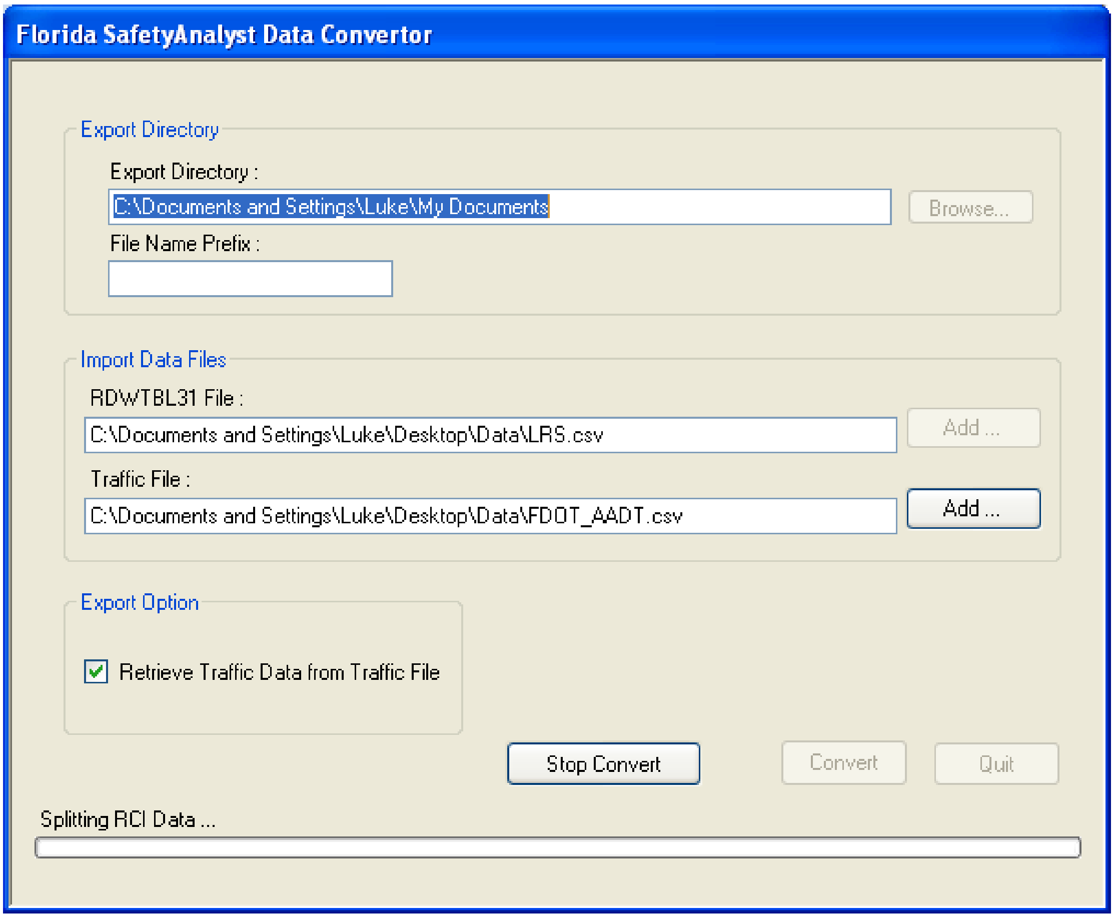
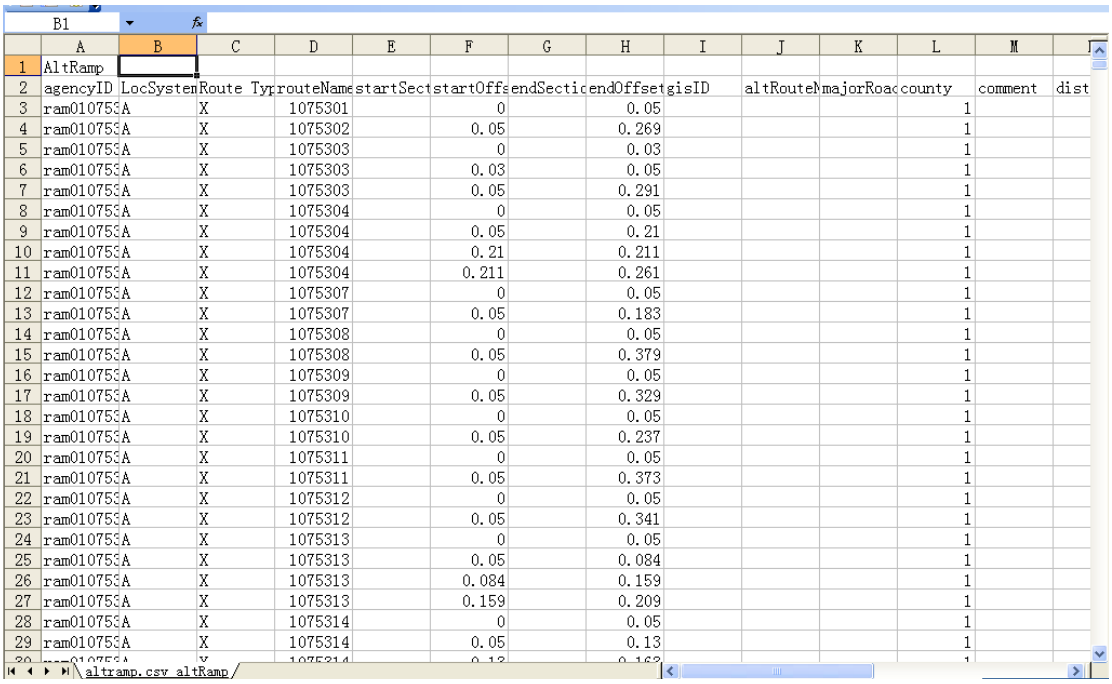


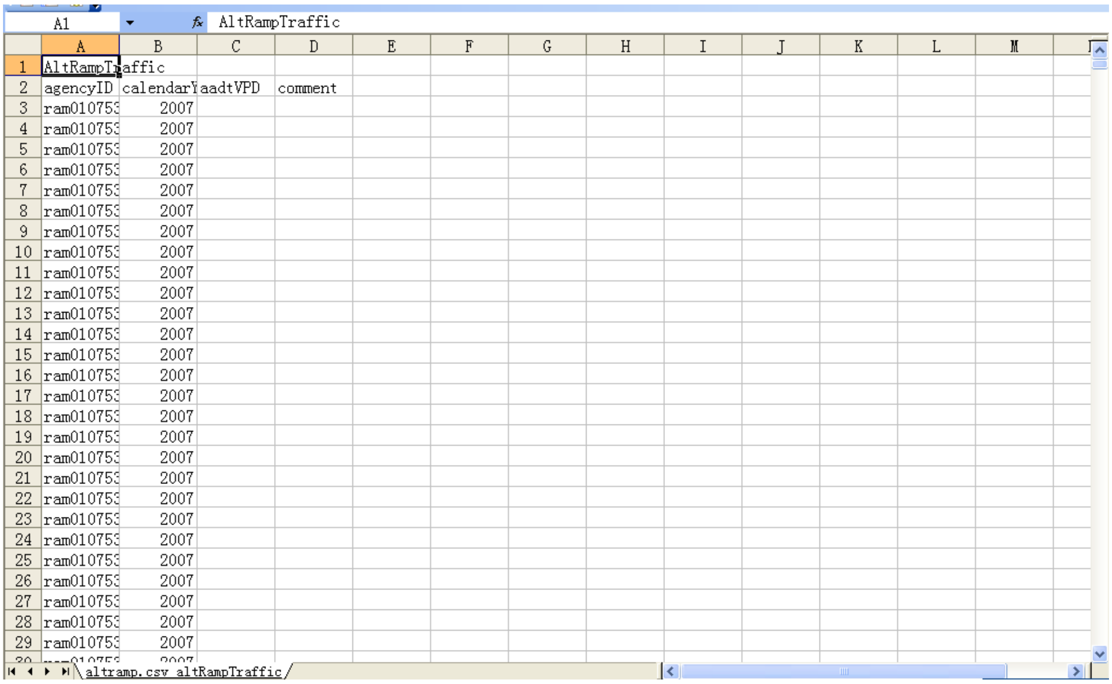
Figure 5.10 SADC-Convert Ramp Data 3

3-5 Open the converted ramp and ramp traffic data.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	AltRamp													
2	agencyID	LocSysten	Route Typ	routeName	startSect	startOffs	endSectic	endOffset	gisID	altRouteN	majorRoac	county	comment	dist
3	ram010753	A	X	1075301		0		0.05				1		
4	ram010753	A	X	1075302		0.05		0.269				1		
5	ram010753	A	X	1075303		0		0.03				1		
6	ram010753	A	X	1075303		0.03		0.05				1		
7	ram010753	A	X	1075303		0.05		0.291				1		
8	ram010753	A	X	1075304		0		0.05				1		
9	ram010753	A	X	1075304		0.05		0.21				1		
10	ram010753	A	X	1075304		0.21		0.211				1		
11	ram010753	A	X	1075304		0.211		0.261				1		
12	ram010753	A	X	1075307		0		0.05				1		
13	ram010753	A	X	1075307		0.05		0.183				1		
14	ram010753	A	X	1075308		0		0.05				1		
15	ram010753	A	X	1075308		0.05		0.379				1		
16	ram010753	A	X	1075309		0		0.05				1		
17	ram010753	A	X	1075309		0.05		0.329				1		
18	ram010753	A	X	1075310		0		0.05				1		
19	ram010753	A	X	1075310		0.05		0.237				1		
20	ram010753	A	X	1075311		0		0.05				1		
21	ram010753	A	X	1075311		0.05		0.373				1		
22	ram010753	A	X	1075312		0		0.05				1		
23	ram010753	A	X	1075312		0.05		0.341				1		
24	ram010753	A	X	1075313		0		0.05				1		
25	ram010753	A	X	1075313		0.05		0.084				1		
26	ram010753	A	X	1075313		0.084		0.159				1		
27	ram010753	A	X	1075313		0.159		0.209				1		
28	ram010753	A	X	1075314		0		0.05				1		
29	ram010753	A	X	1075314		0.05		0.13				1		

Figure 5.11 Ramp Data



	A	B	C	D
1	AltRampTraffic			
2	agencyID	calendarY	aadtVPD	comment
3	ram010753	2007		
4	ram010753	2007		
5	ram010753	2007		
6	ram010753	2007		
7	ram010753	2007		
8	ram010753	2007		
9	ram010753	2007		
10	ram010753	2007		
11	ram010753	2007		
12	ram010753	2007		
13	ram010753	2007		
14	ram010753	2007		
15	ram010753	2007		
16	ram010753	2007		
17	ram010753	2007		
18	ram010753	2007		
19	ram010753	2007		
20	ram010753	2007		
21	ram010753	2007		
22	ram010753	2007		
23	ram010753	2007		
24	ram010753	2007		
25	ram010753	2007		
26	ram010753	2007		
27	ram010753	2007		
28	ram010753	2007		
29	ram010753	2007		

Figure 5.12 Ramp Traffic Data

4) Convert Intersection Data

4-1 Click *Convert Intersection Data*.

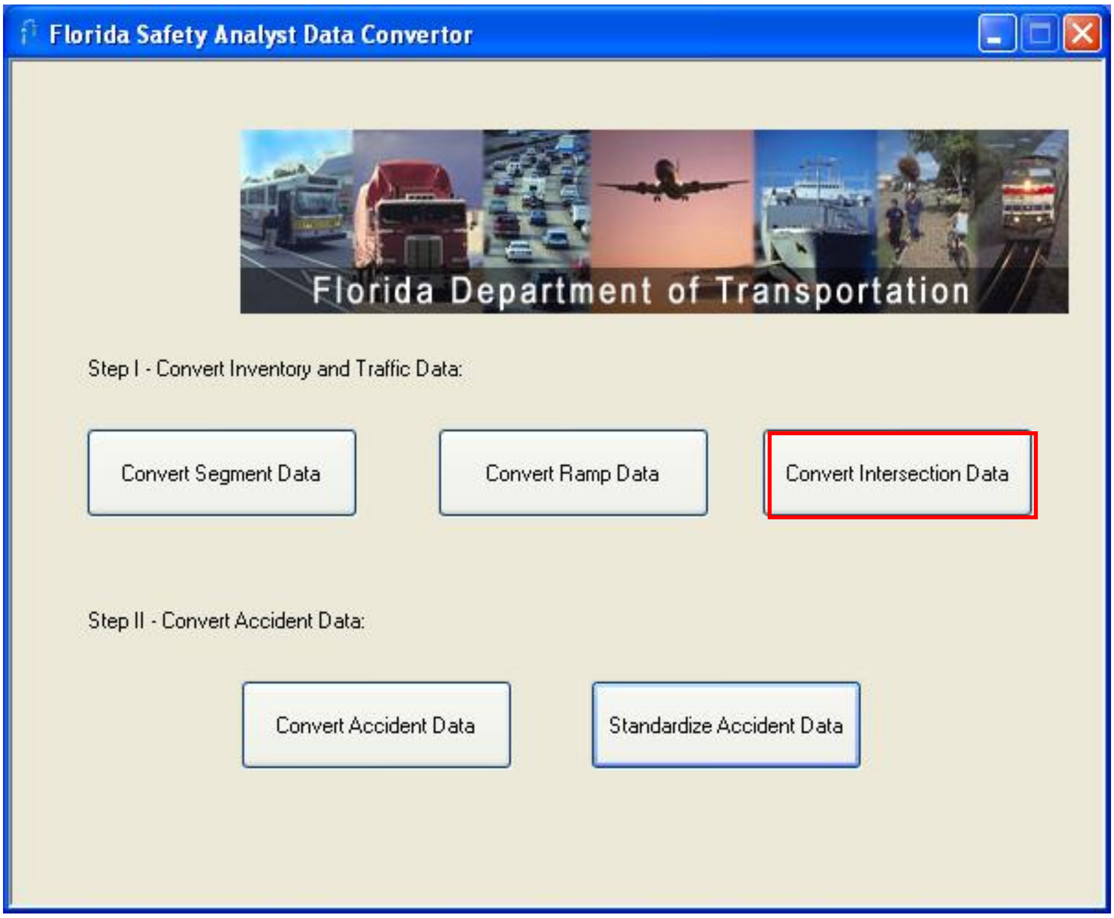


Figure 5.13 SADC-Convert Intersection Data

4-2 Browse an export folder, create an export file name.

4-3 Add RDWTBL25.csv, LRS.csv, RCI.csv and FDOT_AADT.csv to the import data files. Click *Retrieve Traffic Data from Traffic File*.

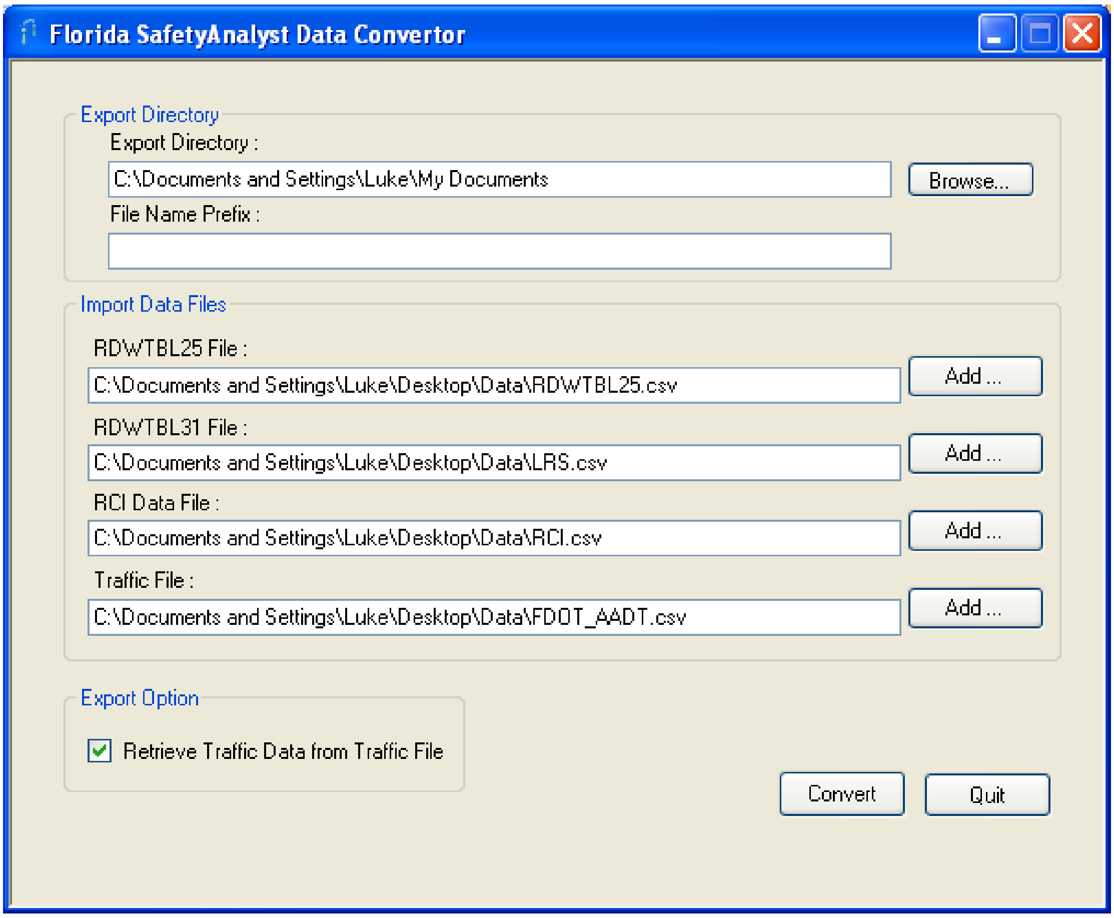


Figure 5.14 SADC-Convert Intersection Data 2

4-4 Start *Conversion*.

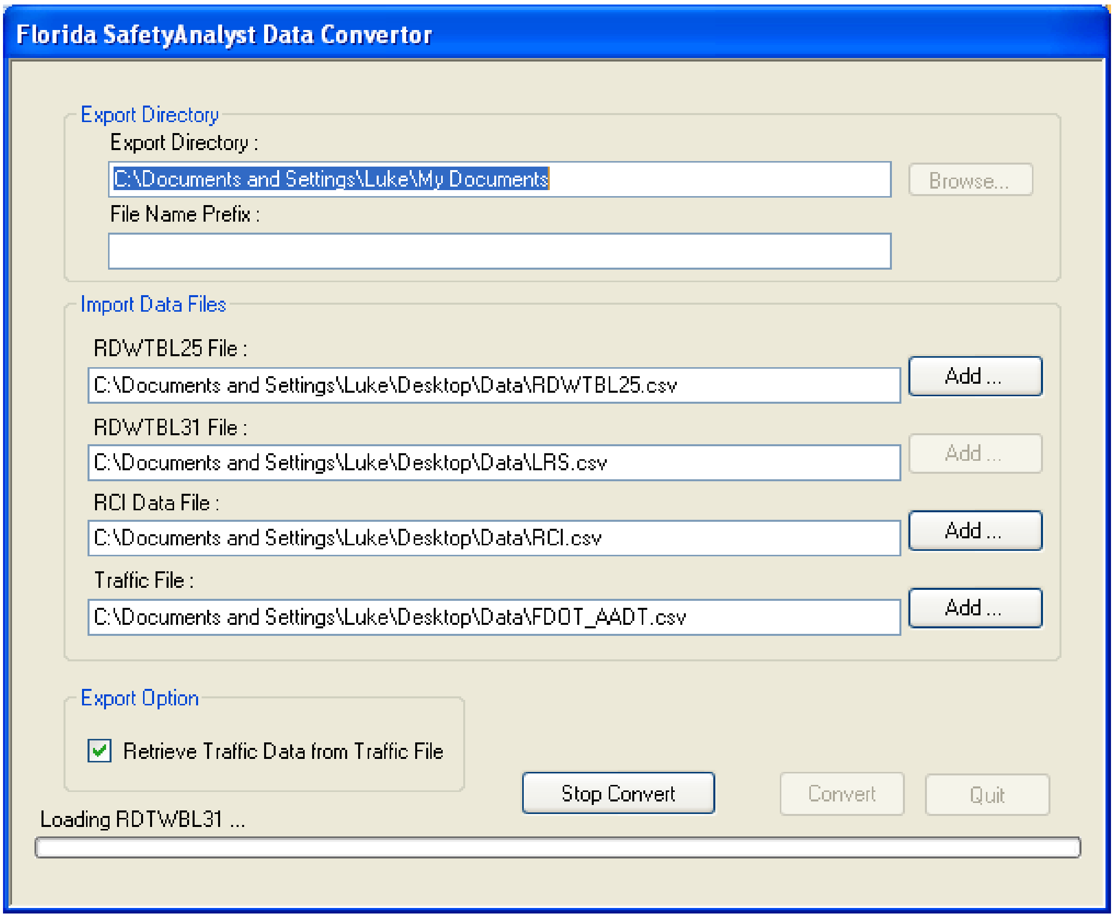


Figure 5.15 SADC-Convert Intersection Data 3

4-5 Open the converted intersection and intersection traffic data.

G1

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	AltRoadwaySegment												
2	agencyID	majorRoa	routeTyp	routeName	county	majorRoa	majorRoa	minorRoa	minorRoa	minorRoa	minorRoa	minorRoa	gisID
3	int010001	A	X	1010000	1		13.816		X	1040101		1.481	
4	int010019	A	X	1010000	1		13.242		X	1010101		2	
5	int010021	A	X	1010000	1		15.21		X	1010101		0	
6	int010049	A	X	1040000	1		1.507		X	1040101		0	
7	int010051	A	X	1010101	1		1.478		X	1040101		1.628	
8	int010057	A	X	1075000	1		8.259		X	1075302		0	
9	int010057	A	X	1075000	1		8.731		X	1075304		0	
10	int010057	A	X	1075000	1		10.662		X	1075306		0.501	
11	int010058	A	X	1075000	1		11.544		X	1075308		0	
12	int010058	A	X	1075000	1		12.026		X	1075310		0	
13	int010059	A	X	1075000	1		14.788		X	1075312		0.05	
14	int010060	A	X	1075000	1		18.118		X	1075318		0	
15	int010061	A	X	1075000	1		21.301		X	1075322		0	
16	int010063	A	X	1075000	1		15		X	1075313		0	
17	int010064	A	X	1075000	1		10.099		X	1075306		0	
18	int010069	A	X	1040000	1		2.009		X	1075312		0	
19	int010070	A	X	1040000	1		2.274		X	1075314		0	
20	int020004	A	X	2030000	2		14.634		X	2050000		0	
21	int020009	A	X	2010000	2		12.198		X	2050000		17.585	
22	int020010	A	X	2010001	2		0		X	2050000		16.651	
23	int020045	A	X	2040000	2		0.115		X	2040002		0	
24	int030010	A	X	3040000	3		6.626		X	3570000		0	
25	int030011	A	X	3030000	3		4.126		X	3510000		5.721	
26	int030023	A	X	3001000	3		0		X	3010000		12.846	
27	int030062	A	X	3175000	3		60.735		X	3175023		0.05	
28	int030069	A	X	3175000	3		50.076		X	3175003		0.05	
29	int030070	A	X	3175000	3		50.707		X	3175005		0	

intersection altIntersection

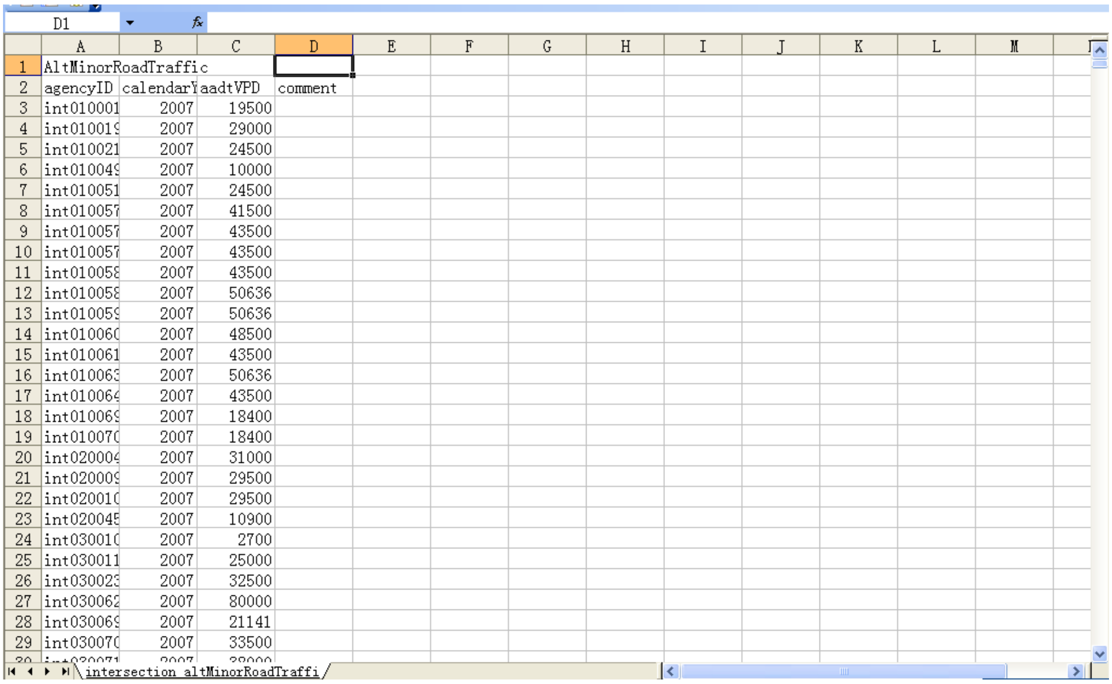
Figure 5.16 Intersection Data

D1

	A	B	C	D
1	AltMajorRoadTraffic			
2	agencyID	calendarY	aadtVPD	comment
3	int010001	2007	19500	
4	int010019	2007	29000	
5	int010021	2007	24500	
6	int010049	2007	10000	
7	int010051	2007	24500	
8	int010057	2007	41500	
9	int010057	2007	43500	
10	int010057	2007	43500	
11	int010058	2007	43500	
12	int010058	2007	50636	
13	int010059	2007	50636	
14	int010060	2007	48500	
15	int010061	2007	43500	
16	int010063	2007	50636	
17	int010064	2007	43500	
18	int010069	2007	18400	
19	int010070	2007	18400	
20	int020004	2007	31000	
21	int020009	2007	29500	
22	int020010	2007	29500	
23	int020045	2007	10900	
24	int030010	2007	2700	
25	int030011	2007	25000	
26	int030023	2007	32500	
27	int030062	2007	80000	
28	int030069	2007	21141	
29	int030070	2007	33500	

intersection altMajorRoadTraffi

Figure 5.17 Major Road Traffic



	A	B	C	D
1	AltMinorRoadTraffic			
2	agencyID	calendarY	aadtVPD	comment
3	int010001	2007	19500	
4	int010019	2007	29000	
5	int010021	2007	24500	
6	int010049	2007	10000	
7	int010051	2007	24500	
8	int010057	2007	41500	
9	int010057	2007	43500	
10	int010057	2007	43500	
11	int010058	2007	43500	
12	int010058	2007	50636	
13	int010059	2007	50636	
14	int010060	2007	48500	
15	int010061	2007	43500	
16	int010063	2007	50636	
17	int010064	2007	43500	
18	int010069	2007	18400	
19	int010070	2007	18400	
20	int020004	2007	31000	
21	int020009	2007	29500	
22	int020010	2007	29500	
23	int020045	2007	10900	
24	int030010	2007	2700	
25	int030011	2007	25000	
26	int030023	2007	32500	
27	int030062	2007	80000	
28	int030069	2007	21141	
29	int030070	2007	33500	

Figure 5.18 Minor Road Traffic

5) Standardize Accident Data

5-1 Click *Standardize Accident Data*,

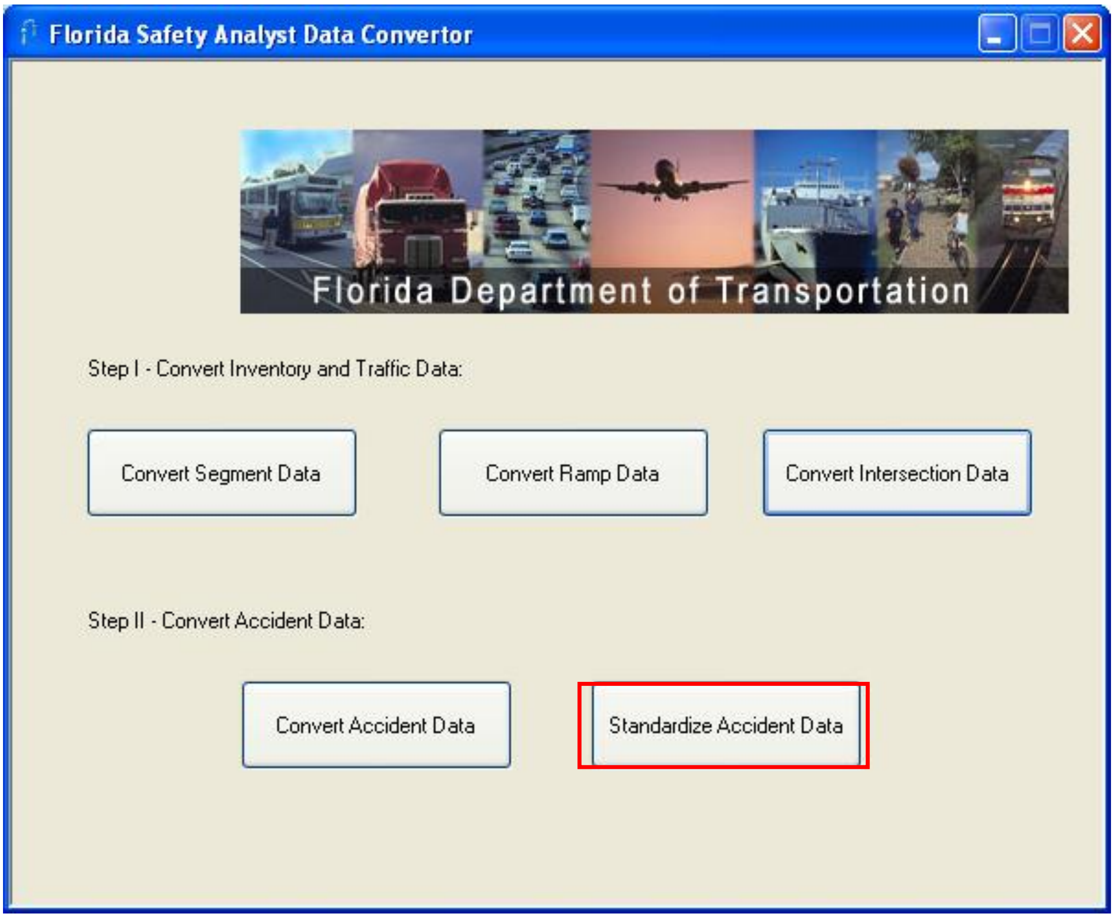


Figure 5.19 SADC-Standardize Accident Data

5-2 Add an original accident data file. The original accident file (CAR.EXTRACT) includes all data of RDWTBL 50, RDWTBL 51, RDWTBL 52, and RDWTBL 53. Only 50 and 51 will used for conversion.

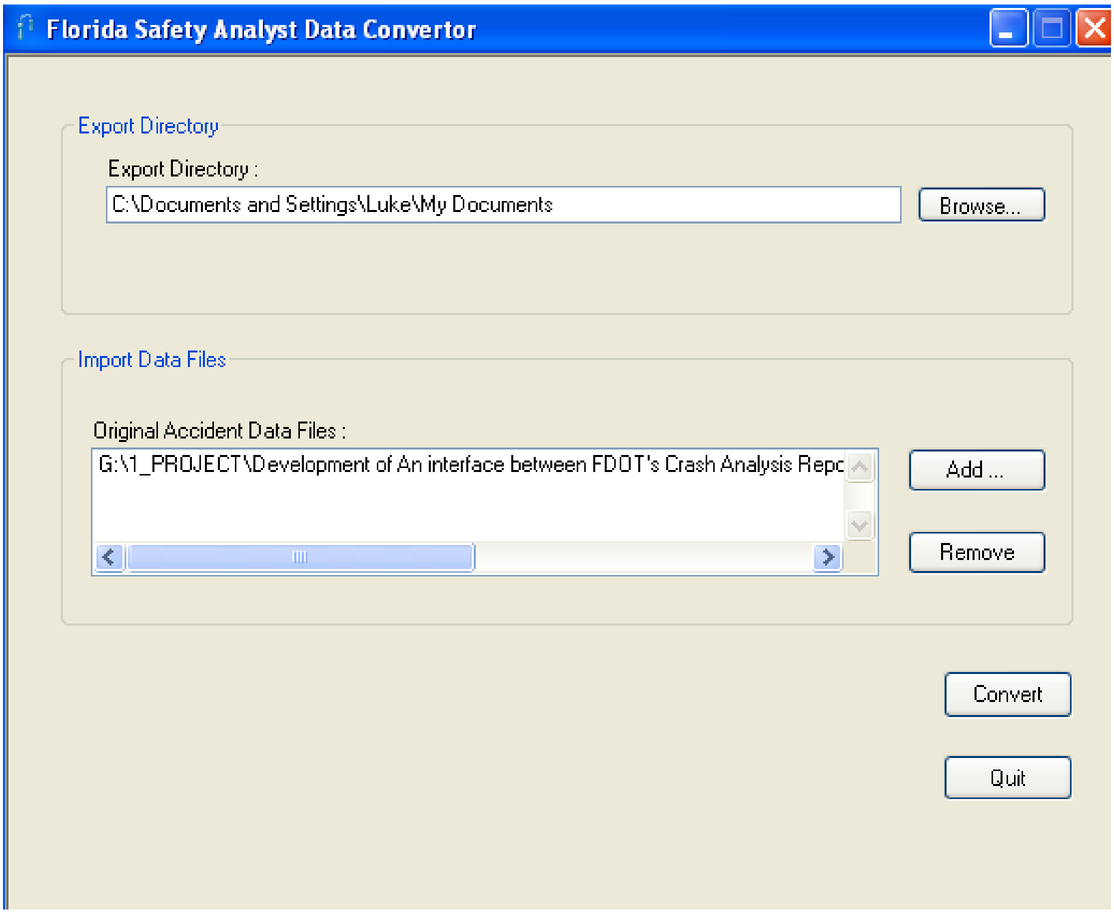


Figure 5.20 SADC-Standardize Accident Data 2

5-3 Click *Convert*. The original accident file is separated into four independent files, RDWTBL 50, 52, 52, and 53.

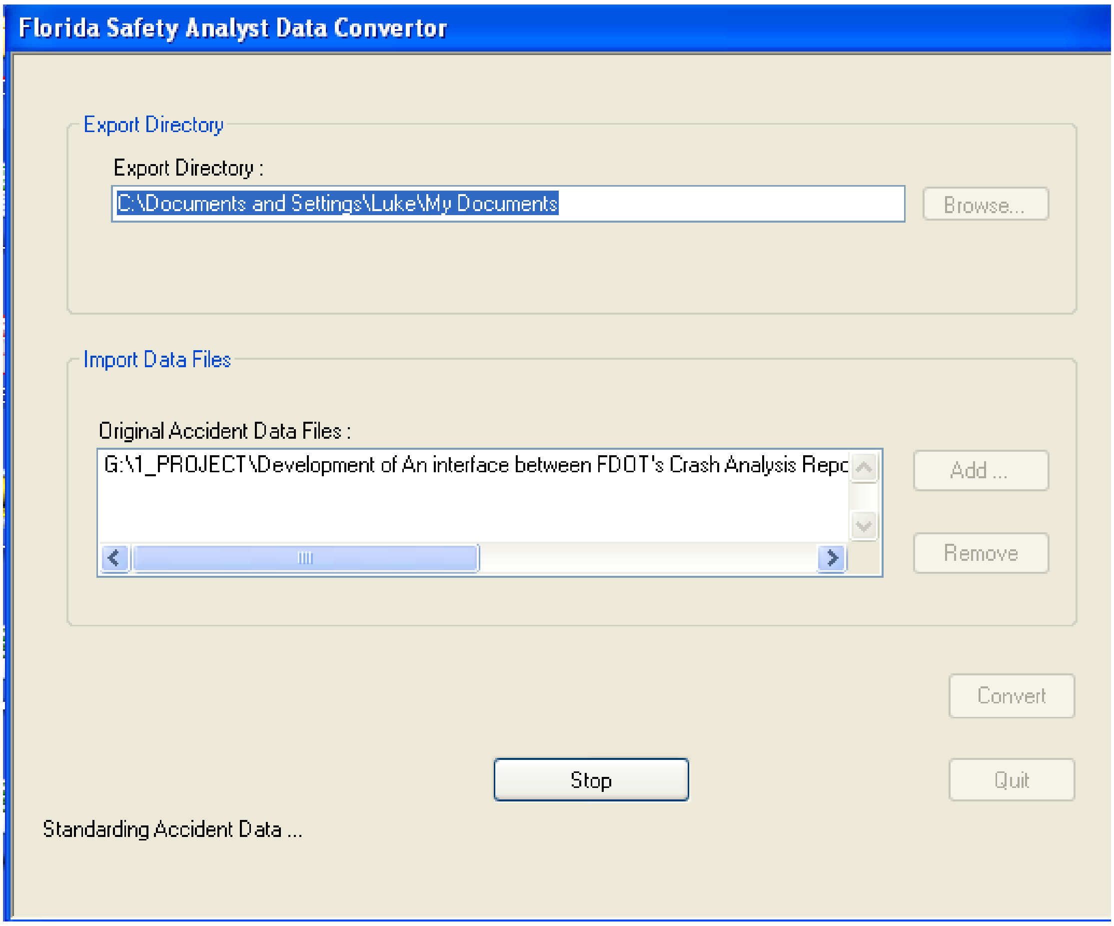


Figure 5.21 SADC-Standardize Accident Data 3

5-4 Open the separated CAR data.

A1 fx 1

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	1	2	3	4	5	6	7	8	9	10	11	12	13	
2	RDWTBL50	2007	194080	########	2	77	17	32			77	CASSELBEF	1	1
3	RDWTBL50	2007	1289490	########	1	46	23	51			3	PARKER	1	1
4	RDWTBL50	2007	2496130	########	5	10	3	52			3	TEMPLE TE	1	1
5	RDWTBL50	2007	2499130	2007-7-2	1	10	3	52			3	TEMPLE TE	1	1
6	RDWTBL50	2007	3694270	########	7	60	36	40			5	DEFUNIAK	1	
7	RDWTBL50	2007	5789910	########	4	16	5	32			3	UNINCORPC	1	1
8	RDWTBL50	2007	5789930	########	5	16	5	32			5	BARTOW	1	
9	RDWTBL50	2007	6636380	########	7	11	12	62			3	UMATILLA	1	1
10	RDWTBL50	2007	6636390	########	6	11	12	62			5	UMATILLA	1	2
11	RDWTBL50	2007	6636780	########	6	11	12	62			77	UMATILLA	1	
12	RDWTBL50	2007	7596150	########	1	17	16	50	US 301		3	SARASOTA	1	
13	RDWTBL50	2007	7596160	########	6	17	16	50			5	SARASOTA	1	1
14	RDWTBL50	2007	7749170	########	7	70	19	40			3	INDIAN HA	1	2
15	RDWTBL50	2007	7749930	########	4	70	19	40			5	INDIAN HA	1	1
16	RDWTBL50	2007	8195790	2007-8-2	4	90	38	45	US 1		2	MARATHON	1	
17	RDWTBL50	2007	8791030	########	4	16	5	30			8	AUBURNDAL	1	1
18	RDWTBL50	2007	10196660	########	7	86	10	75			8	SEMINOLE	1	
19	RDWTBL50	2007	10309060	########	2	16	5	0			4	LAKELAND		
20	RDWTBL50	2007	10739460	2007-7-4	3	93	6	52	US 1		3	JUNO BCH	1	1
21	RDWTBL50	2007	10960080	########	7	57	43	60			5	VALPARAIS	1	2
22	RDWTBL50	2007	10960170	########	5	57	43	60			3	VALPARAIS	1	1
23	RDWTBL50	2007	10973210	2007-7-6	5	57	43	60			3	VALPARAIS	1	1
24	RDWTBL50	2007	12151680	########	4	26	11	50			5	UNIV OF F	1	
25	RDWTBL50	2007	12158350	########	7	26	11	50			5	UNIV OF F	1	1
26	RDWTBL50	2007	12937300	########	2	34	39	60			5	WILLISTON	1	1
27	RDWTBL50	2007	12939210	2007-9-8	6	34	39	60			4	WILLISTON	1	1
28	RDWTBL50	2007	12939430	########	4	34	39	60			5	WILLISTON	1	1
29	RDWTBL50	2007	14462760	########	1	36	14	30	US 301		3	BELLVIEW	1	1

car_50

Figure 5.22 CAR_50 Data

A1 fx RDWTBL51

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	RDWTBL51	2007	192660	1	2002	DODG	1	FL	3.27E+08	FL		0	B
2	RDWTBL51	2007	192660	2	2007	TOYT	1	FL	3.28E+08	FL		0	B
3	RDWTBL51	2007	194080	1	0	FORD	3		0	FL		0	U
4	RDWTBL51	2007	1289490	1	1996	KENW	6	FL	3.25E+08	FL		2	B
5	RDWTBL51	2007	1289490	2	1987	MERC	1	FL	3.24E+08	AL		0	B
6	RDWTBL51	2007	2496130	1	1996	NISS	1	FL	3.29E+08	FL		0	B
7	RDWTBL51	2007	2496130	2	2003	MERC	1	FL	3.35E+08	FL		0	B
8	RDWTBL51	2007	2499130	1	2006	FORD	1	FL	3.36E+08	FL		0	B
9	RDWTBL51	2007	2499130	2	1998	FORD	1	FL	3.36E+08	FL		0	B
10	RDWTBL51	2007	3694270	1	1998	CHEV	3	FL	3.24E+08	FL		0	B
11	RDWTBL51	2007	3694270	2	1994	UNIT	14		0	UK		77	B
12	RDWTBL51	2007	5789910	1	1998	FORD	3	FL	3.36E+08	FL		0	B
13	RDWTBL51	2007	5789910	2	2005	FRHT	5	FL	3.38E+08	FL		0	B
14	RDWTBL51	2007	5789930	1	2001	DODG	8	FL	3.38E+08	FL		0	B
15	RDWTBL51	2007	5789930	2	2003	FORD	1	FL	3.38E+08	FL		0	B
16	RDWTBL51	2007	6636380	1	1997	FORD	3	FL	3.27E+08	FL		0	B
17	RDWTBL51	2007	6636390	1	1997	NISS	3	FL	3.28E+08	FL		0	B
18	RDWTBL51	2007	6636780	1	1985	CADI	1	FL	3.28E+08	FL		0	B
19	RDWTBL51	2007	6636780	2	2007	CADI	1	FL	3.28E+08	FL		0	B
20	RDWTBL51	2007	7596150	1	0		1		0			0	U
21	RDWTBL51	2007	7596150	2	0	BICY	10		0			0	U
22	RDWTBL51	2007	7596160	1	2008	CHRY	1	FL	3.36E+08	FL		0	B
23	RDWTBL51	2007	7596160	2	2002	UD	77	FL	3.42E+08	FL		77	B
24	RDWTBL51	2007	7749170	1	1994	CADI	1	FL	3.29E+08	FL		0	B
25	RDWTBL51	2007	7749170	2	1996	FORD	1	FL	3.29E+08	FL		0	B
26	RDWTBL51	2007	7749930	1	2000	SUZU	1	FL	3.29E+08	FL		0	B
27	RDWTBL51	2007	8195790	1	2007	STRN	1	FL	3.28E+08	FL		0	B
28	RDWTBL51	2007	8195790	2	2004	FORD	2	FL	3.3E+08	FL		0	B
29	RDWTBL51	2007	8195790	3	2003	FORD	3	FL	3.32E+08	FL		0	B

car_51

Figure 5.23 CAR_51 Data

A1 RDWTBL52

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	RDWTBL52	2007	192660	1	0	1	1	1	2	5	1	1	2
2	RDWTBL52	2007	192660	2	0	1	1	1	2	5	1	3	1
3	RDWTBL52	2007	192660	2	1	2	3	1	2	5	1		2
4	RDWTBL52	2007	194080	1	0	1	1	0	0	0	1	5	1
5	RDWTBL52	2007	1289490	1	0	1	1	1	2	0	1	2	1
6	RDWTBL52	2007	1289490	2	0	1	1	1	2	0	1	1	1
7	RDWTBL52	2007	2496130	1	0	1	1	1	2	0	1	2	1
8	RDWTBL52	2007	2496130	2	0	1	1	1	2	0	1	2	1
9	RDWTBL52	2007	2499130	1	0	1	1	1	2	0	1	1	2
10	RDWTBL52	2007	2499130	2	0	1	1	1	2	0	1	1	2
11	RDWTBL52	2007	3694270	1	0	1	1	1	1	0	1	1	1
12	RDWTBL52	2007	3694270	2	0	1	1	1	0	0	1	3	1
13	RDWTBL52	2007	3694270	2	1	2	1	1	1	0	1		1
14	RDWTBL52	2007	5789910	1	0	1	1	1	2	0	1	1	2
15	RDWTBL52	2007	5789910	2	0	1	1	1	2	0	1	1	2
16	RDWTBL52	2007	5789910	2	1	2	3	1	2	0	1		1
17	RDWTBL52	2007	5789930	1	0	1	1	1	2	0	1	1	1
18	RDWTBL52	2007	5789930	1	1	2	8	1	2	0	1		2
19	RDWTBL52	2007	5789930	2	0	1	1	2	2	0	1	1	2
20	RDWTBL52	2007	6636380	1	0	1	1	2	2	0	1	1	1
21	RDWTBL52	2007	6636390	1	0	1	1	2	2	0	1	1	1
22	RDWTBL52	2007	6636780	1	0	1	1	1	1	0	1	1	1
23	RDWTBL52	2007	6636780	2	0	1	1	0	0	0	0	5	0
24	RDWTBL52	2007	7596150	1	0	1	1	0	0	0	0	5	0
25	RDWTBL52	2007	7596150	2	0	1	1	1	1	0	1	2	2
26	RDWTBL52	2007	7596160	1	0	1	1	1	2	0	1	2	2
27	RDWTBL52	2007	7596160	1	1	2	3	1	2	0	1		1
28	RDWTBL52	2007	7596160	2	0	1	1	1	1	0	1	1	1
29	RDWTBL52	2007	7749170	1	0	1	1	1	2	0	1	1	1

car.extract 52

Figure 5.24 CAR_52 Data

A1 RDWTBL53

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	RDWTBL53	2007	192660	1	1	Y	1000RFC	3161925					
2	RDWTBL53	2007	192660	1	2	Y	3042XCA	316193					
3	RDWTBL53	2007	192660	2	1	N							
4	RDWTBL53	2007	194080	1	1	N							
5	RDWTBL53	2007	1289490	1	1	Y	3811EWT	316185					
6	RDWTBL53	2007	1289490	2	1	N							
7	RDWTBL53	2007	2496130	1	1	Y	9452EPM	316085					
8	RDWTBL53	2007	2496130	2	1	N							
9	RDWTBL53	2007	2499130	1	1	N							
10	RDWTBL53	2007	2499130	2	1	N							
11	RDWTBL53	2007	3694270	1	1	Y	3805DPF	316195					
12	RDWTBL53	2007	3694270	2	1	N							
13	RDWTBL53	2007	5789910	1	1	Y	0095DYB	32216					
14	RDWTBL53	2007	5789910	1	2	Y	0096DYB	3161925					
15	RDWTBL53	2007	5789910	1	3	Y	0097DYB	316061					
16	RDWTBL53	2007	5789910	1	4	Y	0098DYB	32219					
17	RDWTBL53	2007	5789910	2	1	N							
18	RDWTBL53	2007	5789930	1	1	N							
19	RDWTBL53	2007	5789930	2	1	N							
20	RDWTBL53	2007	6636380	1	1	N							
21	RDWTBL53	2007	6636390	1	1	Y	8508FCG	316061					
22	RDWTBL53	2007	6636780	1	1	Y	452817X	316193					
23	RDWTBL53	2007	6636780	1	2	Y	452818X	3161939					
24	RDWTBL53	2007	6636780	2	1	N							
25	RDWTBL53	2007	7596150	1	1	N							
26	RDWTBL53	2007	7596150	2	1	N							
27	RDWTBL53	2007	7596160	1	1	N							
28	RDWTBL53	2007	7596160	2	1	N							
29	RDWTBL53	2007	7749170	1	1	Y	0386EUZ	3161925					

car.extract 53

Figure 5.25 CAR_53 Data

6) Convert Accident Data

6-1 Click *Convert Accident Data*.

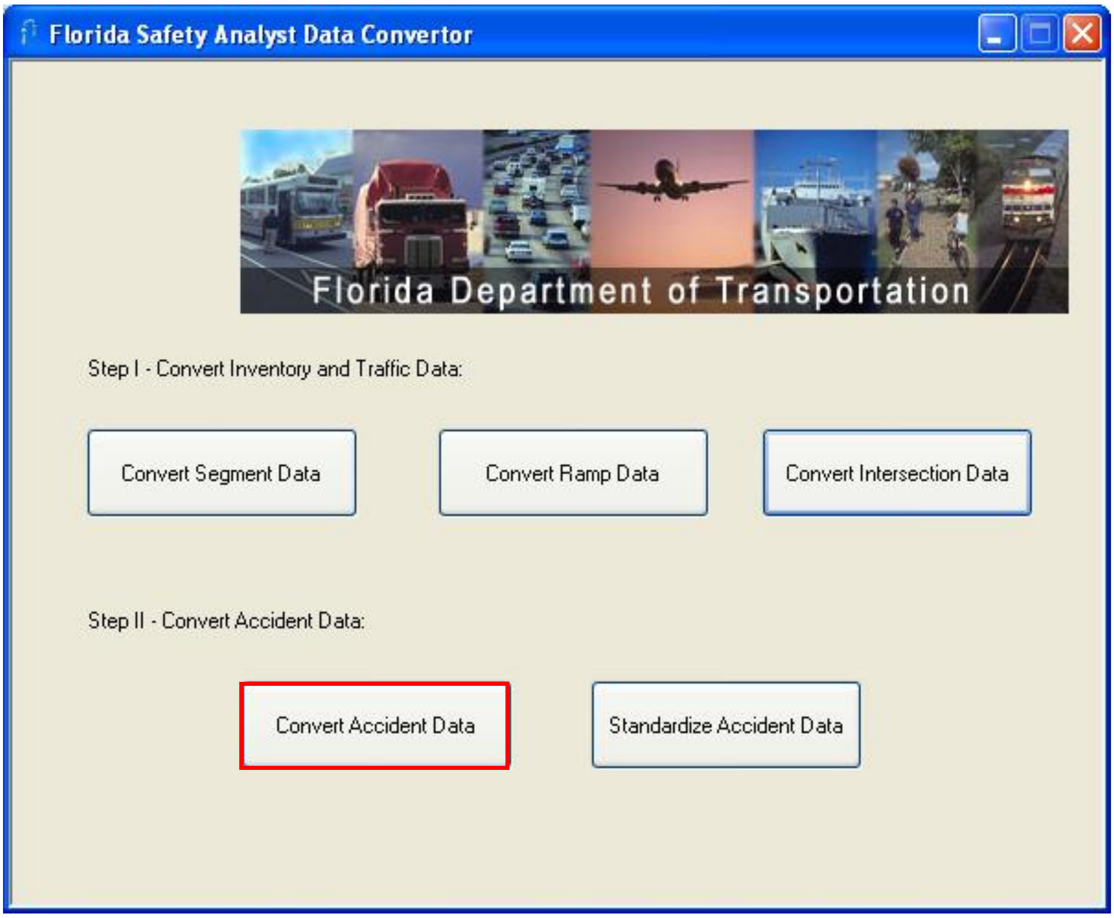


Figure 5.26 SADC-Convert Accident Data

6-2 Browse an export folder, create an export file name. Add car_50.csv and car_51.csv, altSegment.csv, altRamp.csv, and altIntersection.csv to the import data files. The last three files are generated by segment, ramp and intersection data conversion exclusively.

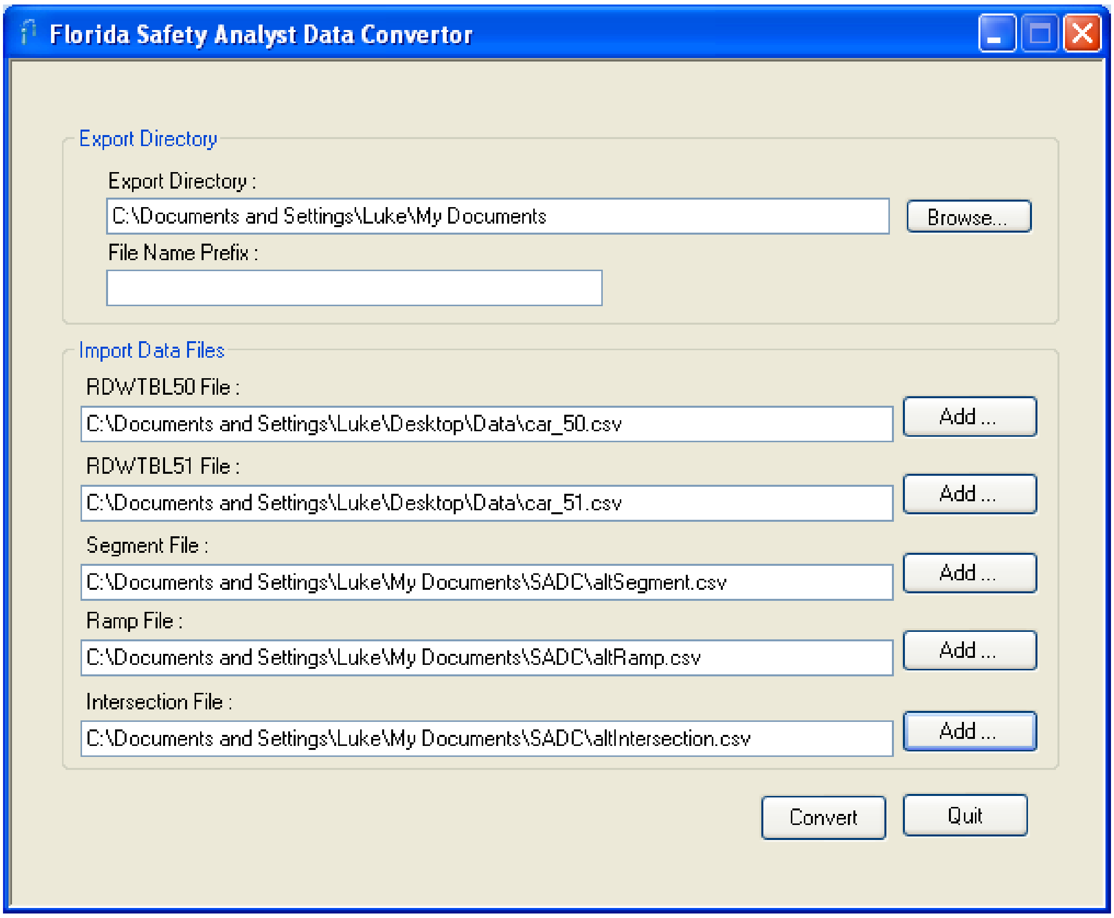


Figure 5.27 SADC-Convert Accident Data 2

6-3 Start *Conversion*.

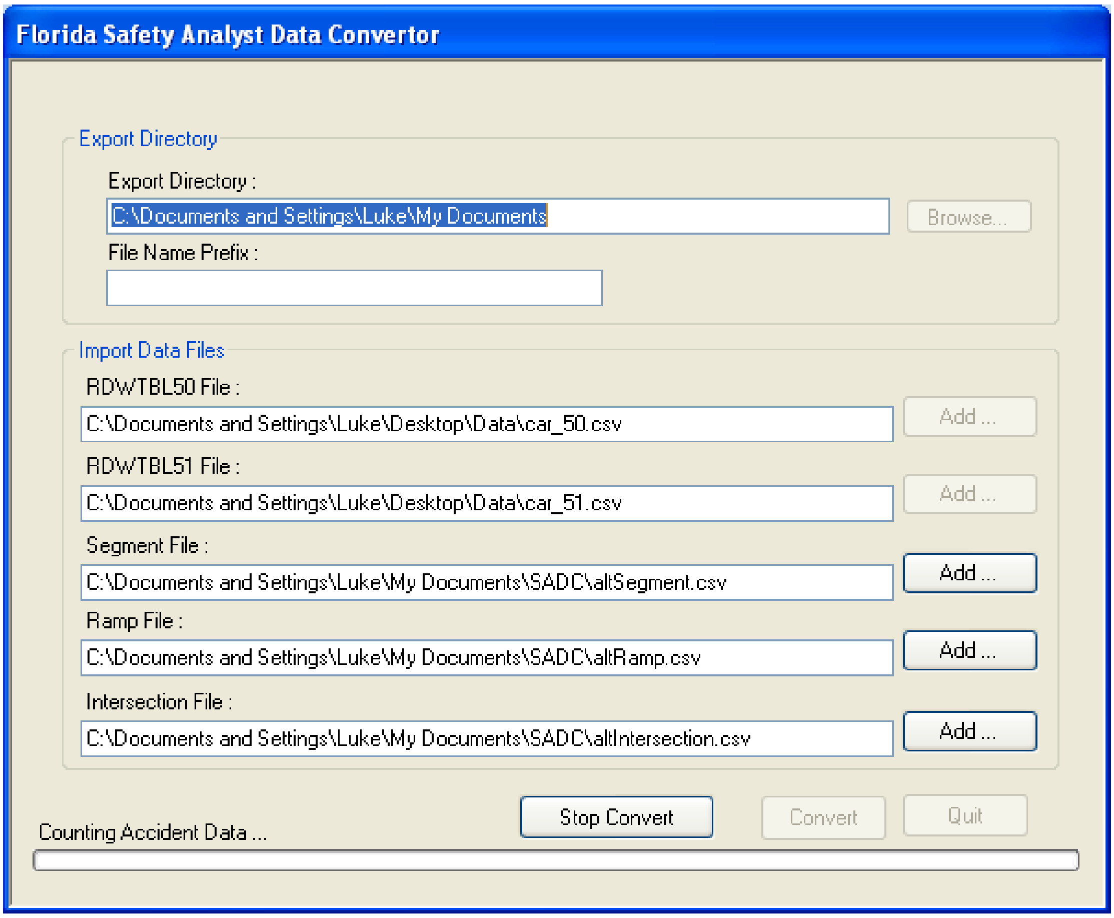
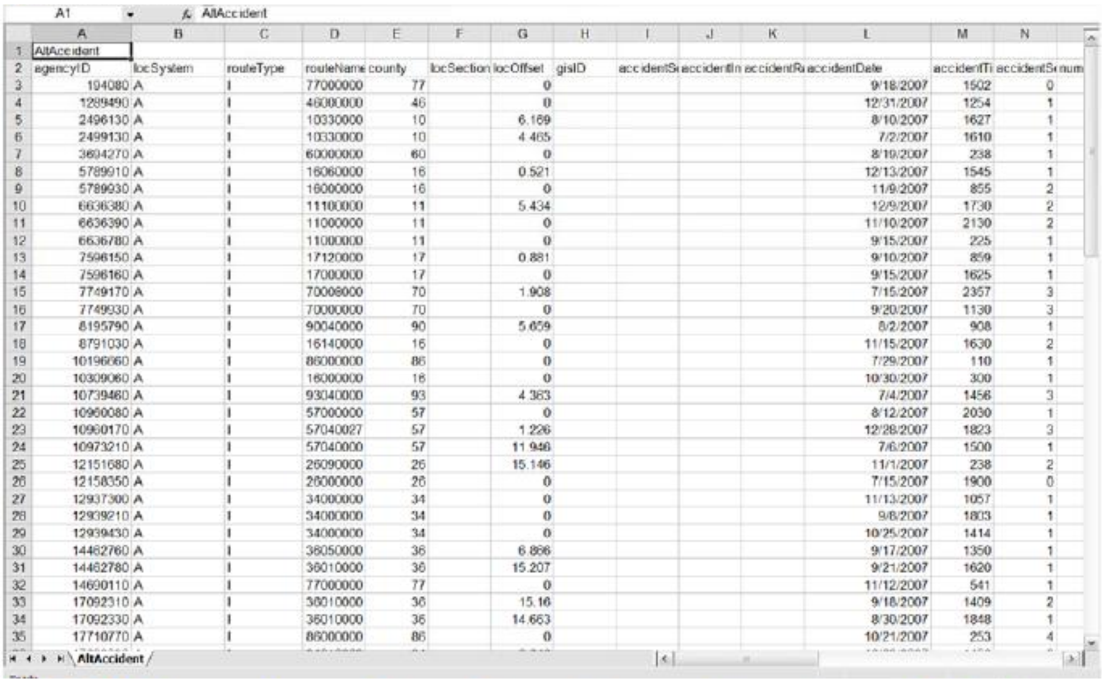


Figure 5.28 SADC-Convert Accident Data 3

6-4 Open the converted accident data.



A1 AltAccident

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	
1	AltAccident														
2	agencyID	locSystem	routeType	routeName	county	locSection	locOffset	gisID	accidentS	accidentIn	accidentR	accidentDate	accidentTi	accidentS	num
3	194080	A	I	77000000	77		0					9/18/2007	1502	0	
4	1289490	A	I	46000000	46		0					12/31/2007	1254	1	
5	2496130	A	I	10330000	10		6.169					8/10/2007	1627	1	
6	2499130	A	I	10330000	10		4.465					7/2/2007	1610	1	
7	3694270	A	I	60000000	60		0					8/19/2007	238	1	
8	5789910	A	I	16060000	16		0.521					12/13/2007	1545	1	
9	5789930	A	I	16000000	16		0					11/9/2007	855	2	
10	6636380	A	I	11100000	11		5.434					12/9/2007	1730	2	
11	6636390	A	I	11000000	11		0					11/10/2007	2130	2	
12	6636780	A	I	11000000	11		0					9/15/2007	225	1	
13	7596150	A	I	17120000	17		0.881					9/10/2007	859	1	
14	7596160	A	I	17000000	17		0					9/15/2007	1625	1	
15	7749170	A	I	70008000	70		1.908					7/15/2007	2357	3	
16	7749930	A	I	70000000	70		0					9/20/2007	1130	3	
17	8195790	A	I	90040000	90		5.659					8/2/2007	908	1	
18	8791030	A	I	16140000	16		0					11/15/2007	1630	2	
19	10196660	A	I	86000000	86		0					7/29/2007	110	1	
20	10309060	A	I	16000000	16		0					10/30/2007	300	1	
21	10739460	A	I	93040000	93		4.363					7/4/2007	1456	3	
22	10960080	A	I	57000000	57		0					8/12/2007	2030	1	
23	10960170	A	I	57040027	57		1.226					12/28/2007	1823	3	
24	10973210	A	I	57040000	57		11.946					7/6/2007	1500	1	
25	12151680	A	I	26090000	26		15.146					11/1/2007	238	2	
26	12158350	A	I	26000000	26		0					7/15/2007	1900	0	
27	12937300	A	I	34000000	34		0					11/13/2007	1057	1	
28	12939210	A	I	34000000	34		0					9/8/2007	1803	1	
29	12939430	A	I	34000000	34		0					10/25/2007	1414	1	
30	14462760	A	I	36050000	36		6.866					9/17/2007	1350	1	
31	14462780	A	I	36010000	36		15.207					9/21/2007	1620	1	
32	14690110	A	I	77000000	77		0					11/12/2007	541	1	
33	17092310	A	I	36010000	36		15.16					9/18/2007	1409	2	
34	17092330	A	I	36010000	36		14.663					8/30/2007	1848	1	
35	17710770	A	I	86000000	86		0					10/21/2007	253	4	

AltAccident

Figure 5.29 Accident Data

When finishing all data conversion by SADC, these converted data can be imported to SA (Data Management Tool). Then, these data can be used by SA Analytical tool for analyzing.

CHAPTER 6

SA CASE STUDY

This chapter mainly represents Safety Analyst applications by using converted data from SADC. Several examples are shown to demonstrate the whole procedures of SA analysis. This chapter displays three main steps of application example. First is the data import of SA. Second is SA analysis. The third is results output.

6.1 SA Data Import

All converted data shall be imported to SA by Data Management Tool. These data are shown as follows:

altSegment.csv

altSegmentTraffic.csv

altRamp.csv

altRampTraffic.csv

altIntersection.csv

altMajorRoadTraffic.csv

altMinorRoadTraffic.csv

altAccident.csv

Detailed procedures of how to use SA Data Management Tool to import these data are listed in one PDF file: SA Data Import Process, as Appendix D.

6.2 SA Analysis

SA Analytical Tool is used to conduct analysis of selected samples, which is the major part of SA software packages. Three samples are chosen, same roadway ID with different milepost, which indicates three segments along one roadway.

Detailed information of these three samples is:

Roadway ID 0304000

a. Route ISR 90-TAMIAMI TRAIL, Milepost 19.53 to 19.563 (Segment 8300)

b. Route ISR 90-TAMIAMI TRAIL, Milepost 6.409 to 6.626 (Segment 3600)

c. Route ISR 90-TAMIAMI TRAIL, Milepost 4.704 to 4.889 (Segment 2700)

All analytical procedures are shown in one PDF file: SA Analytical Process, as Appendix E.

6.3 Results Output

After each analytical step finished, all results can be selected to output as a PDF file. These single PDF files are combined as: Example of SA Analytical Results, as Appendix F.

REFERENCE

[1] ITT Corporation, “Safety Analyst Data Management Tool Manual”, FHWA Office of Safety Research and Development, pp. 7-9, 2008.

[2] ITT Corporation, “Safety Analyst Data Import Reference”, FHWA Office of Safety Research and Development, pp. 3-6, 2008.

[3] Highway Data Collection / Quality Control Section, Transportation Statistics Office, and Florida Department of Transportation, “Transportation Statistics RCI Office Handbook”, pp 35, 2007.

[4] Highway Data Collection / Quality Control Section, Transportation Statistics Office, and Florida Department of Transportation, “Transportation Statistics RCI Field Handbook”, 2007.

[5] ITT Corporation, “Safety Analyst Administration Tool Manual”, FHWA Office of Safety Research and Development, 2008.

[6] ITT Corporation, “Safety Analyst Implemented Countermeasure Management Tool Manual”, FHWA Office of Safety Research and Development, 2008.

[7] ITT Corporation, “Safety Analyst User’s Manual”, FHWA Office of Safety Research and Development, 2008.

[8] ITT Corporation, “Safety Analyst White Paper for Module 1—Network Screening”, FHWA Office of Safety Research and Development, 2008.

[9] ITT Corporation, “Safety Analyst White Paper for Module 2—Diagnosis and

Countermeasure Selection”, FHWA Office of Safety Research and Development, 2008.

[10] ITT Corporation, “Safety Analyst White Paper for Module 3—Economic Appraisal and Priority Ranking”, FHWA Office of Safety Research and Development, 2008.

[11] ITT Corporation, “Safety Analyst White Paper for Module 4—Evaluation”, FHWA Office of Safety Research and Development, 2008.

APPENDIX A

Safety Analyst Application Survey

The Florida Department of Transportation (FDOT) has developed a research project to develop an interface between the software of Safety Analyst and FDOT's Crash Analysis Reporting (CAR) System. The Safety Analyst program is currently being developed through a cooperative research team between FHWA and 24 state highway agencies Florida is one of the states participating in the Safety Analyst program.

Our research team, University of South Florida and the Center for Urban Transportation Research, was issued to conduct the project and needs information from cooperative organizations in order to help us with this project. We have designed a brief survey regarding the existing application of the software in your organization to get useful instructions for the project. We would greatly appreciate your feedback on the issues presented in this survey.

If you have any question about this survey, please feel free to contact the research team member, Hongyun Chen, at hchen@cutr.usf.edu, or 813-974-7882.

We have organized a list of seven questions. Please see them below.

(To be continued)

Questionnaire:

1. Since the Safety Analyst is a new-developed set of software, has or will your organization deployed it or used it with any projects?

   If "Yes" → Continue to the following question;

   If "No" → If your organization would not like to deploy the software, please briefly explain the reason?

   This concludes our questions for you. Thank you for your participation.

2. Since our state plans to develop an interface between the Safety Analyst and our own crash database, did your state have similar programs or problems while using the software?

3. Did your state have your own database, such as crash database, roadway database, or traffic volume database?

4. How did you connect the initial data into the Safety Analyst database? How many changes have you made on the initial data while inputting the data into the software?

5. What is the research purpose of using the Safety Analyst program in your project/testing? Do you have any results regarding its use with studies or projects? Will they help your organization enhance their safety performance?

6. Do you have any suggestions or recommendations that would be helpful while carrying out projects using this software?

7. Are there any critical issues in deploying the software in your department that you can share with us?

   This concludes our questions for you. Thank you for your participation.

APPENDIX B-I

Definitions of Variables in Safety Analyst

I.	Roadway Segment	Variable Meaning	Data Type
1	Agency ID	Segment ID	VARCHAR/CARCHAR2/nvachar/nvachar
2	LocSystem	Location System	VARCHAR/CARCHAR2/nvachar/nvachar
3	Route Type	Route Type	VARCHAR/CARCHAR2/nvachar/nvachar
4	routeName	Route Name	VARCHAR/CARCHAR2/nvachar/nvachar
5	county	County	VARCHAR/CARCHAR2/nvachar/nvachar
6	startSection	Start of Segment Section	VARCHAR/CARCHAR2/nvachar/nvachar
7	startOffset	Start of Segment Offset	DOUBLE/FLOAT/float/float
8	endSection	End of Segment Section	VARCHAR/CARCHAR2/nvachar/nvachar
9	endOffset	End of Segment Offset	DOUBLE/FLOAT/float/float
10	gisID	GIS Identifier - Starting Location	VARCHAR/CARCHAR2/nvachar/nvachar
11	altRouteNames	Alternate Route Names	VARCHAR/CARCHAR2/nvachar/nvachar
12	majorRoadName	Major Road Name	VARCHAR/CARCHAR2/nvachar/nvachar
13	segmentLength	Segment Length	DOUBLE/FLOAT/float/float
14	district	District	VARCHAR/CARCHAR2/nvachar/nvachar
15	city	City/Town	VARCHAR/CARCHAR2/nvachar/nvachar
16	jurisdiction	Jurisdiction	VARCHAR/CARCHAR2/nvachar/nvac

			har
17	areaType	Area Type	VARCHAR/CARCHAR2/nvachar/nvachar
18	terrain	Terrain	VARCHAR/CARCHAR2/nvachar/nvachar
19	roadwayClass1	Roadway Class Level 1	VARCHAR/CARCHAR2/nvachar/nvachar
20	d1numThruLane	Number of Through Lanes - Direction 1	BIGINT/NUMBER/bigint/bigint
21	d2numThruLane	Number of Through Lanes - Direction 2	BIGINT/NUMBER/bigint/bigint
22	d1auxLane1	Auxiliary Lane 1 - Direction 1	VARCHAR/CARCHAR2/nvachar/nvachar
23	d1auxLane2	Auxiliary Lane 2 - Direction 1	VARCHAR/CARCHAR2/nvachar/nvachar
24	d1auxLane3	Auxiliary Lane 3 - Direction 1	VARCHAR/CARCHAR2/nvachar/nvachar
25	d2auxLane1	Auxiliary Lane 1 - Direction 2	VARCHAR/CARCHAR2/nvachar/nvachar
26	d2auxLane2	Auxiliary Lane 2 - Direction 2	VARCHAR/CARCHAR2/nvachar/nvachar
27	d2auxLane3	Auxiliary Lane 3 - Direction 2	VARCHAR/CARCHAR2/nvachar/nvachar
28	d1avgLaneWidth	Lane Width - Direction 1	DOUBLE/FLOAT/float/float
29	d2avgLaneWidth	Lane Width - Direction 2	DOUBLE/FLOAT/float/float
30	medianType1	Median Type Level 1	VARCHAR/CARCHAR2/nvachar/nvachar
31	medianWidth	Median Width	DOUBLE/FLOAT/float/float
32	d1shoulderTypeOut	Shoulder Type - Outside - Direction 1	VARCHAR/CARCHAR2/nvachar/nvachar
33	d1shoulderTypeIn	Shoulder Type - Inside - Direction 1	VARCHAR/CARCHAR2/nvachar/nvachar
34	d2shoulderTypeOut	Shoulder Type - Outside - Direction 2	VARCHAR/CARCHAR2/nvachar/nvachar

35	d2shoulderTypeIn	Shoulder Type - Inside - Direction 2	VARCHAR/CARCHAR2/nvachar/nvachar
36	d1avgShoulderWidthOut	Shoulder Width - Outside - Direction 1	DOUBLE/FLOAT/float/float
37	d1avgShoulderWidthIn	Shoulder Width - Inside - Direction 1	DOUBLE/FLOAT/float/float
38	d2avgShoulderWidthOut	Shoulder Width - Outside - Direction 2	DOUBLE/FLOAT/float/float
39	d2avgShoulderWidthIn	Shoulder Width - Inside - Direction 2	DOUBLE/FLOAT/float/float
40	accessControl	Access Control	VARCHAR/CARCHAR2/nvachar/nvachar
41	drivewayDensity	Driveway Density	DOUBLE/FLOAT/float/float
42	growthFactor	Growth Factor	DOUBLE/FLOAT/float/float
43	postedSpeed	Speed Limit	DOUBLE/FLOAT/float/float
44	operationWay	Two-Way vs. One-Way Operation	VARCHAR/CARCHAR2/nvachar/nvachar
45	travelDirection	Direction of Travel	VARCHAR/CARCHAR2/nvachar/nvachar
46	increasingMilesposts	Direction of Increasing Mileposts/Distances	VARCHAR/CARCHAR2/nvachar/nvachar
47	d1bikeway	Bikeway - Direction 1	VARCHAR/CARCHAR2/nvachar/nvachar
48	d2bikeway	Bikeway - Direction 2	VARCHAR/CARCHAR2/nvachar/nvachar
49	interchangeInfluence	Interchange Influence Area on Freeway	VARCHAR/CARCHAR2/nvachar/nvachar
50	openedToTraffic	Date Opened to Traffic	BIGINT/NUMBER/bigint/bigint
51	discontinuity	Discontinuity	VARCHAR/CARCHAR2/nvachar/nvachar
52	corridor	Corridor	VARCHAR/CARCHAR2/nvachar/nvachar
53	comment	Comment	VARCHAR/CARCHAR2/nvachar/nvachar

II	Segment Traffic	Variable Meaning	
54	agencyID	Associated Agency Segment Identifier	VARCHAR/CARCHAR2/nvachar/nvachar
55	calendarYear	Year	BIGINT/NUMBER/bigint/bigint
56	aadtVPD	AADT	DOUBLE/FLOAT/float/float
57	percentHeavyVehicles	Heavy Vehicles	DOUBLE/FLOAT/float/float
58	peakHourlyVolume	Peak or Design Volume	DOUBLE/FLOAT/float/float
59	comment	Comment	VARCHAR/CARCHAR2/nvachar/nvachar
III	**Intersection**	**Variable Meaning**	
60	agencyID	Intersection ID	VARCHAR/CARCHAR2/nvachar/nvachar
61	majorRoadLocSystem	Location System	VARCHAR/CARCHAR2/nvachar/nvachar
62	routeType	Route Type	VARCHAR/CARCHAR2/nvachar/nvachar
63	routeName	Route Name	VARCHAR/CARCHAR2/nvachar/nvachar
64	county	County	VARCHAR/CARCHAR2/nvachar/nvachar
65	majorRoadSection	Major Road Section	VARCHAR/CARCHAR2/nvachar/nvachar
66	majorRoadOffset	Major Road Offset	DOUBLE/FLOAT/float/float
67	minorRoadLocSystem	Minor Road Location System	VARCHAR/CARCHAR2/nvachar/nvachar
68	minorRoadRouteType	Minor Road Route Type	VARCHAR/CARCHAR2/nvachar/nvachar
69	minorRoadRouteName	Minor Road Route Name	VARCHAR/CARCHAR2/nvachar/nvachar
70	minorRoadSection	Minor Road Section	VARCHAR/CARCHAR2/nvachar/nvachar

71	minorRoadOffset	Minor Road Offset	DOUBLE/FLOAT/float/float
72	gisID	GIS Identifier	VARCHAR/CARCHAR2/nvachar/nvachar
73	altRouteNames	Alternate Route Names	VARCHAR/CARCHAR2/nvachar/nvachar
74	majorRoadName	Major Road Name	VARCHAR/CARCHAR2/nvachar/nvachar
75	minorRoadName	Minor Road Name	VARCHAR/CARCHAR2/nvachar/nvachar
76	majorRoadDirection	Major Road Direction	VARCHAR/CARCHAR2/nvachar/nvachar
77	majBeginInfluenceZone	Beginning Influence Zone - Major Road	DOUBLE/FLOAT/float/float
78	minBeginInfluenceZone	Beginning Influence Zone - Minor Road	DOUBLE/FLOAT/float/float
79	majEndInfluenceZone	End Influence Zone - Major Road	DOUBLE/FLOAT/float/float
80	minEndInfluenceZone	End Influence Zone - Minor Road	DOUBLE/FLOAT/float/float
81	district	District	VARCHAR/CARCHAR2/nvachar/nvachar
82	city	City/Town	VARCHAR/CARCHAR2/nvachar/nvachar
83	jurisdiction	Jurisdiction	VARCHAR/CARCHAR2/nvachar/nvachar
84	areaType	Area Type	VARCHAR/CARCHAR2/nvachar/nvachar
85	intersectionType1	Intersection Type Level 1	VARCHAR/CARCHAR2/nvachar/nvachar
86	trafficControl1	Traffic Control Type at Intersection Level 1	VARCHAR/CARCHAR2/nvachar/nvachar
87	offsetIntersection	Offset Intersection	VARCHAR/CARCHAR2/nvachar/nvachar
88	offsetDistance	Offset Distance	DOUBLE/FLOAT/float/float
89	growthFactor	Growth Factor	DOUBLE/FLOAT/float/float

90	openedToTraffic	Date Opened to Traffic	BIGINT/NUMBER/bigint/bigint
91	corridor	Corridor	VARCHAR/CARCHAR2/nvachar/nvachar
92	comment	Comment	VARCHAR/CARCHAR2/nvachar/nvachar
IV	**Major Road Traffic**	**Variable Meaning**	
93	agencyID	Associated Agency Intersection Identifier	VARCHAR/CARCHAR2/nvachar/nvachar
94	calendarYear	Year	BIGINT/NUMBER/bigint/bigint
95	aadtVPD	AADT	DOUBLE/FLOAT/float/float
96	comment	Comment	VARCHAR/CARCHAR2/nvachar/nvachar
V	**Minor Road Traffic**	**Variable Meaning**	
97	agencyID	Associated Agency Intersection Identifier	VARCHAR/CARCHAR2/nvachar/nvachar
98	calendarYear	Year	BIGINT/NUMBER/bigint/bigint
99	aadtVPD	AADT	DOUBLE/FLOAT/float/float
100	comment	Comment	VARCHAR/CARCHAR2/nvachar/nvachar
VI	**Intersection Leg**	**Variable Meaning**	
101	agencyID	Associated Agency Intersection Identifier	VARCHAR/CARCHAR2/nvachar/nvachar
102	legID	Leg ID	VARCHAR/CARCHAR2/nvachar/nvachar
103	legType	Type	VARCHAR/CARCHAR2/nvachar/nvachar
104	legDirection	Direction	VARCHAR/CARCHAR2/nvachar/nvachar
105	legNumThruLane	Thru Lanes	BIGINT/NUMBER/bigint/bigint

106	legNumLeftTurnLane	Lt-Turn Lanes	BIGINT/NUMBER/bigint/bigint
107	legNumRightTurnLane	Rt-Turn Lanes	BIGINT/NUMBER/bigint/bigint
108	legMedianType	Median Type	VARCHAR/CARCHAR2/nvachar/nvachar
109	leftTurnPhasing	Left-Turn Phasing	VARCHAR/CARCHAR2/nvachar/nvachar
110	postedSpeed	Speed Limit	DOUBLE/FLOAT/float/float
111	turnProhibitions	Turn Prohibitions	VARCHAR/CARCHAR2/nvachar/nvachar
112	operationWay	Operation	VARCHAR/CARCHAR2/nvachar/nvachar
VII	**Leg Traffic**	**Variable Meaning**	
113	agencyID	Associated Agency Intersection Identifier	VARCHAR/CARCHAR2/nvachar/nvachar
114	legID	Associated Leg Identifier	VARCHAR/CARCHAR2/nvachar/nvachar
115	calendarYear	Year	BIGINT/NUMBER/bigint/bigint
116	aadtVPD	AADT	DOUBLE/FLOAT/float/float
117	throughVolume	Thru Volume	BIGINT/NUMBER/bigint/bigint
118	leftTurnVolume	Lt-Turn Volume	BIGINT/NUMBER/bigint/bigint
119	rightTurnVolume	Rt-Turn Volume	BIGINT/NUMBER/bigint/bigint
VIII	**Ramp**	**Variable Meaning**	
120	agencyID	Ramp ID	VARCHAR/CARCHAR2/nvachar/nvachar
121	locSystem	Location System	VARCHAR/CARCHAR2/nvachar/nvachar
122	routeType	Route Type	VARCHAR/CARCHAR2/nvachar/nvachar
123	routeName	Route Name	VARCHAR/CARCHAR2/nvachar/nvachar

124	startSection	Start of Ramp Section	VARCHAR/CARCHAR2/nvachar/nvachar
125	startOffset	Start of Ramp Offset	DOUBLE/FLOAT/float/float
126	endSection	End of Ramp Section	VARCHAR/CARCHAR2/nvachar/nvachar
127	endOffset	End of Ramp Offset	DOUBLE/FLOAT/float/float
128	gisID	GIS Identifier - Starting Location	VARCHAR/CARCHAR2/nvachar/nvachar
129	altRouteNames	Alternate Route Names	VARCHAR/CARCHAR2/nvachar/nvachar
130	majorRoadName	Major Road Name	VARCHAR/CARCHAR2/nvachar/nvachar
131	county	County	VARCHAR/CARCHAR2/nvachar/nvachar
132	comment	Comment	VARCHAR/CARCHAR2/nvachar/nvachar
133	district	District	VARCHAR/CARCHAR2/nvachar/nvachar
134	city	City/Town	VARCHAR/CARCHAR2/nvachar/nvachar
135	jurisdiction	Jurisdiction	VARCHAR/CARCHAR2/nvachar/nvachar
136	areaType	Area Type	VARCHAR/CARCHAR2/nvachar/nvachar
137	rampType	Ramp Type	VARCHAR/CARCHAR2/nvachar/nvachar
138	rampConfiguration	Ramp Configuration	VARCHAR/CARCHAR2/nvachar/nvachar
139	rampFreewayConnection	Type of Connection (At Freeway)	VARCHAR/CARCHAR2/nvachar/nvachar
140	rampCrossroadConnection	Type of Connection (At Crossroad)	VARCHAR/CARCHAR2/nvachar/nvachar

141	numOfLanes	Ramp Number of Lanes	BIGINT/NUMBER/bigint/bigint
142	rampLength	Ramp Length	DOUBLE/FLOAT/float/float
143	growthFactor	Growth Factor	DOUBLE/FLOAT/float/float
144	openedToTraffic	Date Opened to Traffic	BIGINT/NUMBER/bigint/bigint
145	corridor	Corridor	VARCHAR/CARCHAR2/nvachar/nvachar
XI	**Ramp Traffic**	**Variable Meaning**	
146	agencyID	Associated Agency Ramp Identifier	VARCHAR/CARCHAR2/nvachar/nvachar
147	calendarYear	Year	BIGINT/NUMBER/bigint/bigint
148	aadtVPD	AADT	DOUBLE/FLOAT/float/float
149	comment	Comment	VARCHAR/CARCHAR2/nvachar/nvachar
X	**Accident**	**Variable Meaning**	
150	agencyID	Accident ID	VARCHAR/CARCHAR2/nvachar/nvachar
151	locSystem	Location System	VARCHAR/CARCHAR2/nvachar/nvachar
152	routeType	Route Type	VARCHAR/CARCHAR2/nvachar/nvachar
153	routeName	Route Name	VARCHAR/CARCHAR2/nvachar/nvachar
154	county	County	VARCHAR/CARCHAR2/nvachar/nvachar
155	locSection	Accident Location Section	VARCHAR/CARCHAR2/nvachar/nvachar
156	locOffset	Accident Offset	DOUBLE/FLOAT/float/float
157	gisID	GIS Identifier	VARCHAR/CARCHAR2/nvachar/nvachar
158	accidentSegmentID	Agency Segment Identifier	VARCHAR/CARCHAR2/nvachar/nvac

			har
159	accidentIntersection ID	Agency Intersection Identifier	VARCHAR/CARCHAR2/nvachar/nvac har
160	accidentRampID	Agency Ramp Identifier	VARCHAR/CARCHAR2/nvachar/nvac har
161	accidentDate	Accident Date	VARCHAR/CARCHAR2/nvachar/nvac har
162	accidentTime	Accident Time	VARCHAR/CARCHAR2/nvachar/nvac har
163	accidentSeverity1	Accident Severity Level 1	VARCHAR/CARCHAR2/nvachar/nvac har
164	numberOfFatalities	Number of Fatalities	BIGINT/NUMBER/bigint/bigint
165	numberOfInjuries	Number of Non-Fatal Injuries	BIGINT/NUMBER/bigint/bigint
166	junctionRelationshi p	Relationship to Junction	VARCHAR/CARCHAR2/nvachar/nvac har
167	drivewayIndicator	Driveway Indicator	VARCHAR/CARCHAR2/nvachar/nvac har
168	light Condition	Light Condition	VARCHAR/CARCHAR2/nvachar/nvac har
169	weatherCondition	Weather Condition	VARCHAR/CARCHAR2/nvachar/nvac har
170	surfaceCondition	Roadway Surface Condition	VARCHAR/CARCHAR2/nvachar/nvac har
171	collisionType	Accident Type and Manner of Collision	VARCHAR/CARCHAR2/nvachar/nvac har
172	environmentConditi on	Contributing Circumstances, Environment	VARCHAR/CARCHAR2/nvachar/nvac har
173	roadCondition	Contributing Circumstances, Road	VARCHAR/CARCHAR2/nvachar/nvac har
174	schoolBus	School Bus Related	VARCHAR/CARCHAR2/nvachar/nvac har
175	workZone	Work Zone Related	VARCHAR/CARCHAR2/nvachar/nvac

			har
176	numVehicles	Number of Vehicles Involved	BIGINT/NUMBER/bigint/bigint
177	drugInvolved	Alcohol/Drug Involvement	VARCHAR/CARCHAR2/nvachar/nvachar
178	towIndicator	Tow-Away Indicator	VARCHAR/CARCHAR2/nvachar/nvachar
179	runoffIndicator	Run-Off Road Indicator	VARCHAR/CARCHAR2/nvachar/nvachar
180	pedestrianIndicator	Pedestrian Indicator	VARCHAR/CARCHAR2/nvachar/nvachar
181	bikeIndicator	Bicycle Indicator	VARCHAR/CARCHAR2/nvachar/nvachar
182	sideOfDividedHighway	Divided Highway Flag-Side of Road	VARCHAR/CARCHAR2/nvachar/nvachar
183	v1initialTravelDirection	Initial Direction of Travel - Vehicle 1	VARCHAR/CARCHAR2/nvachar/nvachar
184	v2initialTravelDirection	Initial Direction of Travel - Vehicle 2	VARCHAR/CARCHAR2/nvachar/nvachar
185	v1vehicleManeuver	Vehicle Maneuver/Action - Vehicle 1	VARCHAR/CARCHAR2/nvachar/nvachar
186	v2vehicleManeuver	Vehicle Maneuver/Action - Vehicle 2	VARCHAR/CARCHAR2/nvachar/nvachar
187	v1vehicleConfiguration	Vehicle Configuration - Vehicle 1	VARCHAR/CARCHAR2/nvachar/nvachar
188	v2vehicleConfiguration	Vehicle Configuration - Vehicle 2	VARCHAR/CARCHAR2/nvachar/nvachar
189	v1firstEvent	First Harmful Event - Vehicle 1	VARCHAR/CARCHAR2/nvachar/nvachar
190	v2firstEvent	First Harmful Event - Vehicle 2	VARCHAR/CARCHAR2/nvachar/nvachar
191	v1driverDOB	Driver Date of Birth - Vehicle 1	VARCHAR/CARCHAR2/nvachar/nvachar

192	v2driverDOB	Driver Date of Birth - Vehicle 2	VARCHAR/CARCHAR2/nvachar/nvachar

APPENDIX B-II

Definitions of Variables in CAR

Part 1_RDWTBL_50

No.	VARIABLE NAME	VARIABLE DESCRIPTION	TYPE	SIZE	EXAMPLE
1	TABLE_IDENTIFIER	TABLE ID ALWAYS "RDWTBL50"	CHAR	8	RDWTBL50
2	CALYEAR	CALENDAR YEAR	CHAR	4	CCYY
3	CARNUM	CRASH NUMBER	CHAR	9	123456789
4	CRASHDTE	DATE OF CRASH	DATE	10	CCYY-M-D
5	DAYOWEEK	DHSMV DAY OF WEEK	CODE	1	1
6	CONTYDOT	DEPT. OF TRANS. COUNTY	CODE	2	55
7	CONTYDMV	DEPT.MOTOR VEHICLES COUNTY NO.	CODE	2	13
8	DHSCTYNO	DHSMV CITY NUMBER	CHAR	2	1
9	USRTNO	US ROUTE NUMBER	CHAR	8	I-
10	DHSPOPCD	DHSMV POPULATION CODE	CODE	1	1
11	DHSRDSYS	DHSMV ROAD SYSTEM IDENTIFIER	CODE	2	1
12	TWNNAM	CITY/TOWN NAME	CHAR	25	TALLAHASSEE
13	TWNIND	CITY/TOWN INDICATOR	CHAR	1	1
14	TIMEOFAC	TIME OF ACCIDENT (MILITARY)	TIME	4	23:38
15	MANDIST	MANAGING DISTRICT	CODE	2	1
16	RDWYID	ROADWAY ID WITHIN COUNTY	CHAR	8	55020021
17	ONROAD	ON ROAD CRASH LOCATION	CHAR	36	I10
18	INTSROAD	CRSH LOC INTERSECTING HIGHWAY	CHAR	25	NORTH
19	ACCSIDRD	ACCIDENT SIDE OF ROAD	CODE	1	L
20	ACCLANE	LANE OF ACCIDENT CODE	CODE	1	P
21	LOCMETCD	METHOD USED TO LOCATE CRASH	CODE	1	A
22	LOCMP	CRSH LOC FINAL MP ON ROADWAY	CHAR	6	333.444
23	REF_DSTNC_NUM	REFERENCE DISTANCE NUMBER	CHAR	7	REFERENCE
24	REF_DIR_CD	REFERENCE DIRECTION CODE	CODE	1	A
25	REF_MEAS_CD	REFERENCE MEASURE CODE	CODE	2	1
26	TYPTRWAY	DIVIDED/NOT DIVIDED	CODE	1	2
27	TRWAYLN	TRAFFICWAY LANES	CHAR	2	3
28	TRAFCONT	TRAFFIC CONTROL	CODE	2	3
29	TRAFCON2	TRAFFIC CONTROL CODE-2ND OCC.	CODE	2	1
30	TRWAYCHR	TRAFFICWAY CHARACTER	CODE	2	3
31	ROUTEID	ROUTE/ROAD FULL ID NUMBER	CHAR	8	BR-A-
32	RDSURFCD	ROAD SURFACE CONDITION	CODE	2	3
33	WEATCOND	WEATHER CONDITION	CODE	2	3
34	LGHTCOND	LIGHTING CONDITION	CODE	2	3
35	FST_VSNOBST	FIRST VISION OBSTRUCTED CRASH	CODE	2	2

	CRSH_CD				
36	SCN_VSNOBST CRSH_CD	SECOND VISION OBSTRUCTED CRASH	CODE	2	4
37	FRST_RDCND_ CRSH_CD	FIRST ROAD CONDITION CRASH COD	CODE	2	4
38	SCND_RDCND_ CRSH_CD	SECOND ROAD CONDITION CRASH CO	CODE	2	4
39	TYPESUR	SURFACE TYPE	CODE	2	1
40	TYPESHLD	SHOULDER TYPE	CODE	2	1
41	SITELOCA	SITE LOCATION	CODE	2	2
42	TYPFACIL	TYPE OF ROADWAY FACILITY	CODE	1	1
43	ACCISEV	ACCIDENT SEVERITY CODE	CODE	1	1
44	CARSTACD	CRASH LOCATION STATUS CODE	CODE	2	1
45	DOTPROP	DOT PROPERTY INVOLVED IN CRSHD	CHAR	1	Y
46	ALCINVCD	ALCOHOL INVOLVED IN ACC. CODE	CODE	1	0
47	ACDNT_DMG_S EVRE_CD	ACCIDENT DAMAGE SEVERITY CODE	CODE	1	3
48	ACDNT_INSUR _CD	ACCIDENT INSURANCE CODE	CODE	1	B
49	ACDNT_FALT_ CD	ACCIDENT FAULT CODE	CODE	1	1
50	ACFMSECT_AT FALT_CD	ACCIDENT FORM SECTION AT FAULT	CHAR	2	2
51	TOT_VHCL_DM G_AMT	TOTAL VEHICLE DAMAGE AMOUNT	NUM	7	67896
52	TOT_VHCL_DM G_AMT	TOTAL VEHICLE DAMAGE AMOUNT	NUM	7	67896
53	TOT_PROP_DM G_AMT	TOTAL PROPERTY DAMAGE AMOUNT	NUM	7	4567
54	TOT_OF_PERS_ NUM	TOTAL NUMBER OF PERSON	NUM	2	3
55	TOT_OF_DR_N UM	TOTAL OF DRIVER NUMBER	NUM	2	3
56	TOT_OF_VHCL _NUM	TOTAL NUMBER OF VEHICLE	NUM	2	2
57	TOT_OF_FATL_ NUM	TOTAL NUMBER OF FATALITY	NUM	2	111
58	TOTNONTRAFF ATL_NUM	TOTAL NONTRAFFIC FATALITY NUMB	NUM	2	2
59	TOT_OF_INJR_ NUM	TOTAL OF INJURIES NUMBER	NUM	2	222
60	TOT_OF_PEDST _NUM	TOTAL NUMBER OF PEDESTRIAN	NUM	2	5
61	TOTOF_PEDLC YCL_NUM	TOTAL OF PEDAL CYCLIST NUMBER	NUM	2	12
62	TYP_DR_ACDN T_CD	TYPE DRIVER ACCIDENT CODE	CODE	1	1
63	TMENOT	TIME OFFICER NOTIFIED	TIME	4	1230

64	TMEARR	TIME OFFICER ARRIVED	TIME	4	1230
65	INVAGRPT	INVESTIGATING AGENCY REPORT ID	CHAR	15	C435731234 345
66	INVCOMCD	INVESTIGATION COMPLETE CODE	CODE	1	3
67	PHTCD	PHOTOS TAKEN CODE	CODE	1	A,F,C
68	INVESTAG	INVESTIGATING AGENCY	CODE	1	3
69	FHPTROOP	FHP TROOP	CODE	1	H
70	FHPDIST	FHP TROOP DISTRICT IDENTIFIER	CHAR	1	1
71	TMMSNT	TIME CRASH LOCATION REPORTED	TIME	4	1230
72	TMEMSARR	TIME EMS ARRIVED AT CRASH	TIME	4	1230
73	FAGBYCD	FIRST AID GIVEN CODE	CODE	2	10
74	INJTKCD	INJURY TAKEN TO CODE	CODE	1	1
75	SKTDATE	SKID TEST DATE YYYYMMDD	DATE	10	CCYY-M-D
76	SKTRESNM	SKID TEST RESULT NUMBER	NUM	0	1
77	DBTMTKRT	DOUBLE-BOTTOM TRUCK ROUTE	CODE	1	Y
78	DESDEFRT	DESIGNATED DEFENSE ROUTE	CODE	1	Y
79	DESTRKRT	DESIGNATED TRUCK ROUTE	CODE	1	Y
80	FAHWYSYS	FEDERAL HIGHWAY SYSTEM CODE	CODE	1	1
81	ACCESS	COMM./IND./REC. ACCESS POINTS	CHAR	2	COMM./IND ./REC.
82	RTESGNCD	TYPE OF ROUTE SIGNAGE CODE	CODE	1	1
83	TYPEROAD	TYPE OF ROADWAY (FM.OLD SYSTEM	CODE	1	3
84	FUNCLASS	HWY. FUNCTIONAL CLASS CODE	CODE	2	1
85	RDACCESS	ACCESS CONTROL TYPE	CODE	1	2
86	TOLLROAD	TOLL ROAD FLAG	CODE	1	0
87	HWYLOCAL	CURRENT HIGHWAY LOCATION CODE	CODE	1	4
88	PLACECD	CENSUS PLACE CODE	CODE	4	2791(ALPH ABET
89	URBAREA	URBAN AREA NUMBER	CODE	4	1600
90	URBSIZE	URBAN SIZE CODE	CODE	1	1
91	LANDUSE	PREVAILING TYPE OF LAND USE	CODE	1	1
92	NOLANES	NUMBER OF THRU ROADWAY LANES C	CHAR	2	2
93	SURWIDTH	THRU PAVEMENT SURFACE WIDTH	CHAR	3	45
94	SHLDTYPE	HIGHWAY SHOULDER TYPE	CODE	1	6
95	SHLDTYP2	HIGHWAY SHOULDER TYPE TWO	CODE	1	6
96	SHLDTYP3	HIGHWAY SHOULDER TYPE	CODE	1	6
97	SLDWIDTH	HIGHWAY SHOULDER WIDTH NUMBER	CHAR	3	10
98	SHLDWTH2	HIGHWAY SHOULDER WIDTH NUMBER	CHAR	3	5
99	SHLDWTH3	HIGHWAY SHOULDER WIDTH	CHAR	3	99.9
100	MEDWIDTH	HIGHWAY MEDIAN WIDTH	CHAR	3	40
101	RDMEDIAN	HIGHWAY MEDIAN TYPE	CODE	2	2
102	ISLDTYPE	INSIDE SHOULDER TYPE	CODE	1	1
103	ISLDTYP2	INSIDE SHOULDER TYPE TWO	CODE	1	1
104	ISLDTYP3	INSIDE SHOULDER TYPE THREE	CODE	1	1

105	ISLDWDTH	INSIDE SHOULDER WIDTH NUMBER	CHAR	3	4
106	ISLDWTH2	INSIDE SHOULDER WIDTH TWO NUMB	CHAR	3	10
107	ISLDWTH3	INSIDE SHOULDER WIDTH THREE NU	CHAR	3	10
108	BEARING	COMPASS BEARING	CHAR	11	N25D
109	HRZDGCRV	HORIZONTAL DEGREE OF CURVE	CHAR	6	2D
110	SUPERELE	SUPERELEVATION OF ROADWAY	CHAR	4	0.0208
111	PAVECOND	PAVEMENT CONDITION NUMBER	CHAR	3	10
112	SURFNUM	PAVEMENT SURFACE TYPE	CODE	2	1
113	FRICTCSE	FRICTION COURSE (1 IN. THICK)	CODE	1	2
114	SURLAYCD	CODE FOR HIGHEST SURF LAYER	CHAR	4	1
115	LIGHTCDE	IS THERE ADQUATE LIGHTING	CHAR	1	1
116	CRRATECD	CRASH RATES CALC CATEGORY CDE	CODE	2	11
117	INTSDRCD	CODE FOR INTERDECTN DIRECTION	CHAR	1	1
118	INTSFTYC	CODE FOR INTERDECTN SURF TYPE	CHAR	1	1
119	RDINTSEC	TYPE OF HWY. INTERSECTION	CODE	2	1
120	EXITNO	INTERCHANGE(EXIT) NUMBER	CHAR	4	32
121	INTERCHG	TYPE OF INTERCHANGE	CODE	2	1
122	CHKDIGIT	CHECK DIGIT	CHAR	1	Y
123	RRCROSNO	NATIONAL RR GRADE CROSSING NO.	CHAR	6	838242
124	BOXCULNO	TRANSPORTATION STRUCTURE NO.	CHAR	6	551099
125	FACCROSS	FACILITY CROSSED	CHAR	20	SUWANNEE
126	UNDPASNO	UNDERPASS NUMBER	CHAR	6	338
127	AVGDFACT	RDWY SECTION AVG. "D" FACTOR N	CHAR	4	4
128	AVGKFACT	RDWY SECTION AVG. "K" FACTOR N	CHAR	4	4
129	AVGTFACT	RDWY SECTION AVG. "T" FACTOR N	CHAR	4	4
130	SECTADT	SECTION AVG ANNUAL DAILY TRAFF	CHAR	6	4,150
131	ACMANCLS	ACCESS MANAGEMENT CLASSIF. CD.	CODE	2	1
132	AUXLNTYP	AUXILIARY LANE TYPE	CODE	1	1
133	AUXLNUM	NUMBER OF AUXILIARY LANES	CHAR	1	2
134	AUXLNWTH	AUXILIARY LANE WIDTH NUMBER	CHAR	4	12
135	SIDEWALK	SIDEWALK WIDTH NUMBER	CHAR	4	5
136	RDSIDTYP	TYPE OF ROADSIDE DITCH	CODE	2	1
137	LIGHTING	ADQUATE LIGHTING	CHAR	1	Y
138	SBSECTCD	SUBSECTION TYPE CODE	CODE	2	1
139	ATTLOCCD	ATTENUATOR LOCATION - CODE	CODE	2	RS
140	ATTYPECD	ATTENUATOR TYPE - CODE	CODE	2	1
141	VEHDIRCD	GENERAL VEHICULAR DIRECTION	CODE	2	NB
142	MAXSPEED	MAXIMUM POSTED SPEED LIMIT	CHAR	3	55
143	MINSPEED	MINIMUM POSTED SPEED LIMIT	CHAR	3	45
144	LMTRSTRC	LIMITED TURNING RESTRICTION	CHAR	1	X
145	TURNMOVE	TURNING MOVEMENT RESTRICTION	CODE	2	2
146	TYPEPARK	TYPE OF ROADWAY PARKING	CODE	1	1

147	SPDLIMIT	SPEED LIMIT	CHAR	2	55
148	SIGNALNC	NON-COUNTED SIGNAL	CODE	2	NON-COUN TED
149	SIGNALTP	SIGNAL TYPE	CODE	2	1
150	SIGNALTY	TRAFFIC SIGNAL TYPE	CODE	2	1
151	SCHLSPED	SCHOOL ZONE SPEED LIMIT	CHAR	2	15
152	PCGRADE	PERCENT OF GRADE	CHAR	5	3.20%
153	VRTCRVDR	VERTICAL CURVE DIRECTION	CODE	1	-
154	SPIRANGL	SPIRAL ANGLE	CHAR	6	1
155	SPIROFF	SPIRAL OFFSET	CHAR	4	2.15
156	BRIDGENO	TRANSPORTATION STRUCTURE NO.	CHAR	6	550251
157	BRDGNAME	BRIDGE LOCAL NAME	CHAR	25	SKYWAY
158	SUBRTNUM	BRIDGE SUB ROUTE NUMBER	CHAR	2	12
159	KMPOST	BRIDGE MILEPOINT	CHAR	10	1237.123456
160	BRDGLGTH	BRIDGE LENGTH	CHAR	5	0.149
161	BRDG_DS	BRIDGE DESCRIPTION	CHAR	46	FOUR
162	MVERTCLR	BRIDGE MIN VERT CLEARANCE	CHAR	5	12.456
163	MVERCRCD	MIN VERTICAL CLEAR REFERENCE	CHAR	1	2
164	MLATCLFT	MIN LATERAL CLEARANCE LEFT	CHAR	5	12.444
165	MLATCRGT	MIN LATERAL CLEARANCE RIGHT	CHAR	5	12.444
166	MLATCRCD	MIN LATERAL CLEARANCE REFER	CHAR	1	A
167	PLSTRNUM	PARALLEL STRUCTURE NUMBER	CHAR	15	XXXXXXX XXXXXX
168	APRTEDTE	APPRAISAL RATING DATE	DATE	4	APPRAISAL
169	CHNRATCD	CHANNEL RATING	CHAR	1	1
170	CULVRTCD	CULVERT RATING	CHAR	1	1
171	DKRATNCD	DECK RATING	CHAR	1	1
172	SUPRTNCD	SUPERSTRUCTURE RATING	CHAR	1	1
173	SUBSTRCD	SUBSTRUCTURE RATING	CHAR	1	1
174	STRRTNCD	STRUCTURAL RATING	CHAR	1	1
175	SUFRTING	SUFFICIENCY RATING	CHAR	4	123.9
176	ARDWIDTH	APPROACHING ROAD WIDTH	CHAR	6	123.456
177	RODWIDTH	ROADWAY WIDTH CURB TO CURB	CHAR	6	123.978
178	NUMLANES	NUMBER OF THRU ROADWAY LANES	CHAR	2	6
179	LCSWWDTH	LEFT CURB SIDEWALK WIDTH	CHAR	5	12.787
180	RCSWWDTH	RIGHT CURB SIDEWALK WIDTH	CHAR	5	12.787
181	DEKWIDTH	OUT TO OUT DECK WIDTH	CHAR	6	124.555
182	BRGRT1CD	BRIDGE RAIL TYPE ONE	CHAR	1	C
183	BRGRT2CD	BRIDGE RAIL TYPE TWO	CHAR	1	C
184	LOCNODE	FINAL REF NODE# CRASH LOC	CHAR	5	99999
185	LOCDIST	CRSH LOC FINAL DIST REL NODE#	CHAR	7	4444.666
186	LOCMEACD	FINAL MEAS CDE - CRSH LOC	CODE	2	1
187	LOCDIRCD	CRASH LOCATION - FINAL DIR	CODE	1	A
188	DHSINJCD	DHSMV INJURY SEVERITY CODE	CODE	1	1
189	TRAVLWAY	TRAVEL WAY ALONG ROADWAY	CODE	1	1
190	URBRURCL	URBAN/RURAL CLASSIFICATION	CODE	1	0
191	FATALINV	FATALITY INVOLVED	CODE	1	Y

192	FATALTOT	FARS TOT # FATALS	CHAR	2	3

Part 2_RDWTBL_51

No.	VARIABLE NAME	VARIABLE DESCRIPTION	TYPE	SIZE	EXAMPLE
1	TABLE_IDENTIFIER	TABLE ID ALWAYS "RDWTBL51"	CHAR	8	RDWTBL51
2	CALYEAR	CALENDAR YEAR	CHAR	4	CCYY
3	CARNUM	CRASH NUMBER	CHAR	9	123456789
4	ACFMSECT	DHSMV ACCIDENT FORM SECTION NO	CHAR	2	2
5	VEHYEAR	VEHICLE YEAR	CHAR	4	99
6	VEHMAKE	VEHICLE MAKE	CHAR	4	FORD
7	VEHTYPE	VEHICLE TYPE	CODE	2	XX
8	STATEID	STATE ABREVIATION CODE	CODE	2	FL
9	ZIPCODE9	NINE DIGIT ZIPCODE	CHAR	9	323030000
10	REGST	STATE OF VEHICLE REGIST	CODE	2	FL
11	VEHREGTY	VEHICLE REG TYPE	CODE	1	X
12	TOWVEHTP	TOWED TRAILER/VEHICLE TYPE	CODE	2	TOWED
13	ACCINSCD	ACCIDENT INSURANCE CODE	CODE	1	ACCIDENT
14	VEHUSE	VEHICLE USE	CODE	2	XX
15	TRAVDIR	DIRECTION OF TRAVEL	CODE	1	N
16	RDNAME	ROAD NAME	CHAR	25	U
17	ESTVEHDM	ESTIMATED VEH DAMAGE	CHAR	15	555
18	VEHDMTYP	VEHICLE DAMAGE TYPE	CODE	1	1
19	VEHRMDES	VEHICLE REMOVED BY DESCRIPTION	CHAR	40	VEHICLE
20	REMCD	REMOVED CODE	CODE	2	REMOVED
21	POINTIMP	POINT OF IMPACT	CODE	2	LS
22	HAZMATCD	HAZARDOUS MATERIALS TRANSPORTE	CODE	1	A
23	HAZMAPD	HAZARDOUS MATERIALS PLACARDED	CODE	1	3
24	VEHDEFEC	VEHICLE DEFECTS	CODE	2	A
25	VEHFEDEC	VEHICLE DEFECT #2	CODE	2	A
26	VEHMOVE	VEHICLE MOVEMENT	CODE	2	AB
27	VEHFUNC	VEHICLE FUBCTION	CODE	2	XX
28	VEHLOCCD	VEHICLE ROADWAY LOCATION CODE	CODE	2	XX
29	VEHFLTCD	VEHICLE FAULT CODE	CODE	1	1
30	VEHSPEED	VEHICLE SPEED	CHAR	3	1
31	SPDLIMIT	SPEED LIMIT	CHAR	2	55
32	COMVEH	COMMERCIAL VEHICLE	CHAR	1	55
33	TOT_VHCL_OCCP_NUM	TOTAL VEHICLE OCCUPANT NUMBER	NUM	3	10
34	SAF_EQUIP_USED_NUM	SAFETY EQUIPMENT USED NUMBER	NUM	3	100
35	MOVE_VIOL_CD	MOVING VIOLATION CODE	CODE	1	1

36	VHCL_OWN_BRTH_DT	VEHICLE OWNER DOB	DATE	4	VEHICLE
37	VHCL_OWN_SEX_CD	VEHICLE OWNER SEX CODE	CODE	1	1
38	VHCL_OWN_RACE_CD	VEHICLE OWNER RACE CODE	CODE	1	1
39	WRK_AREA_CD	WORK AREA CODE	CODE	2	NONE
40	HAZMAT_NM	HAZARDOUS MATERIAL NAME	CHAR	17	HAZARDOUS
41	CARRNAM	CARRIERS NAME	CHAR	40	CARRIERS
42	CARRST	CARRIER STATE	CHAR	2	GA
43	CARRZIP	CARRIER ZIP CODE	CHAR	10	32308-1564
44	HAZMADGT	HAZARDOUS MATERIALS DIGIT	CHAR	1	5
45	HAZREL	HAZARDOUS MAT. RELEASE	CODE	1	C
46	CARY_ID	CARRIER IDENTIFICATION	CHAR	8	CARRIER
47	FRST_EVNT_CAUS_CD	FIRST EVENT CAUSE CODE	CODE	2	400
48	SCND_EVNT_CAUS_CD	SECOND EVENT CAUSE CODE	CODE	2	400
49	THRD_EVNT_CAUS_CD	THIRD EVENT CAUSE CODE	CODE	2	400
50	FOUR_EVNT_CAUS_CD	FOURTH EVENT CAUSE CODE	CODE	2	400
51	FRST_CAUSDRPED_CD	FIRST CAUSE DRIVER PEDESTRIAN	CODE	2	100
52	SCND_CAUSDRPED_CD	SECOND CAUSE DRIVER PEDESTRIAN	CODE	2	100
53	THRD_CAUSDRPED_CD	THIRD CAUSE DRIVER PEDESTRIAN	CODE	2	100
54	TOWVEHDM	TOWED TRAILER/VEHICLE DAMAGE	NUM	0	TOWED
55	TOW_VHCL_YR	TOWED VEHICLE YEAR	CHAR	4	TOWED
56	TOW_VHCL_MAKE_ID	TOWED VEHICLE MAKE IDENTIFICAT	CHAR	4	FORD
57	TOW_VHCL_TAG_ST_ID	TOWED VEHICLE TAG STATE IDENTI	CHAR	2	FL

Part 3_RDWTBL_52

No.	**VARIABLE NAME**	**VARIABLE DESCRIPTION**	**TYPE**	**SIZE**	**EXAMPLE**
1	TABLE_IDENTIFIER	TABLE ID ALWAYS "RDWTBL52"	CHAR	8	RDWTBL52
2	CALYEAR	CALENDAR YEAR	CHAR	4	CCYY
3	CARNUM	CRASH NUMBER	CHAR	9	123456789
4	ACFMSECT	DHSMV ACCIDENT FORM SECTION NO	CHAR	2	2
5	PERSEQ	PERSON WITHIN SECTION OF FORM	CHAR	2	PERSON

6	PERTYPCD	PERSON TYPE CODE	CODE	2	1
7	PERLOCA	PERSONS LOCATION IN VEHICLE	CODE	1	PERSONS
8	INJSEVER	INJURY SEVERITY	CODE	1	3
9	SAFEQCD1	SAFETY EQUIPMENT CDE #1	CODE	1	SAFETY
10	SAFEQCD2	SAFETY EQUIPMENT CDE #2	CODE	1	SAFETY
11	ACEJECTC	ACCIDENT EJECT CODE	CODE	1	ACCIDENT
12	RESIDECD	RESIDENCE CODE	CODE	1	RESIDENCE
13	ACCSEXCD	ACCIDENT SEX CODES	CODE	1	ACCIDENT
14	DHSRACE	DHSMV RACE CODE	CODE	1	DHSMV
15	AGE3	AGE	CHAR	3	AGE
16	DRVACT	DRIVER ACTION CODE	CODE	2	22
17	PEDESACT	PEDESTRIAN ACTION	CODE	2	PEDESTRIAN
18	PHYDFECT	PHYSICAL DEFECTS CODE	CODE	1	PHYSICAL
19	BACTEST	ALCOHOL CONTENT DAC TEST TYPE	CODE	1	ALCOHOL
20	DRBACRSL	DRIVER BAC TEST RESULTS	CHAR	2	DRIVER
21	ALDGUSE	DHSMV ALCOHOL/DRUG CODE	CODE	1	DHSMV
22	WRK_AREA_CD	WORK AREA CODE	CODE	2	NONE
23	VEHOWNDR	VEHICLE OWNER/DRIVER SAME	CODE	1	VEHICLE
24	RECOEXD	RE-COMMENT / RE-EXAM	CODE	1	Y,
25	DRLICTYP	DRIVER LICNESE TYPE	CODE	1	DRIVER
26	TYPEDRIV	TYPE OF DRIVER	CODE	1	TYPE
27	LICST	LICENSE STATE OF ISSUE	CHAR	2	LICENSE
28	RQIR_ENDRS_CD	REQUIRED ENDORSEMENT CODE	CODE	1	A
29	ADRSTATE	COPES ADDRESS STATE	CHAR	2	FL
30	ADZIP9	ZIP CODE (9 DIGITS)	CHAR	9	19920621
31	DRIVABLC	DRIVING ABLTY QUESTIONABLE CDE	CODE	1	DRIVING

Part 4_RDWTBL_53

No.	VARIABLE NAME	VARIABLE DESCRIPTION	TYPE	SIZE	EXAMPLE
1	TABLE_IDENTIFIER	TABLE ID ALWAYS "RDWTBL53"	CHAR	8	RDWTBL53
2	CALYEAR	CALENDAR YEAR	CHAR	4	CCYY
3	CARNUM	CRASH NUMBER	CHAR	9	123456789
4	ACFMSECT	DHSMV ACCIDENT FORM SECTION NO	CHAR	2	2
5	STATSEQ	FL STATUTE IN SECTION OF FORM	CHAR	2	FL
6	ISSUE_CD	ISSUED CODE	CHAR	1	Y
7	CITNUM	CITATION CODE NUMBER	CHAR	8	CITATION
8	FLACHAPT	FLA STATUTES CHAPTER	CHAR	10	FLA

APPENDIX B-III

Definitions of Variables in RCI

No.	Feature No.	Variable Name	Abbreviation	Description of Variable Name	Code	Description of Code
1	111	State Road System	STROADNO	State Road Number	XXXXXXXX	1,2 will be SR (State Road Number) or OS (Old State Road Number) or CR (County Road Number)
						3 will always be blank
						4-8 will be the road number and letter digit designation
2	112	Federal System	FAHWYSYS	Type of Federal Aid: NHS, STP, or None	5	National Highway System (NHS)
					6	Surface Transportation Program (STP) – Major collector and above and not NHS
					9	Federal Aid None (FA None)
			OLDFASYS	Old Federal Aid Highway System Code	1	Federal Aid Interstate
					2	Federal Aid Primary
					3	Federal Aid Urban
					4	Federal Aid Secondary
					9	Federal Aid None
			SPECSYS	Special Systems	02	Airport
					03	Port Facility
					04	AMTRAK Station
					05	Rail/Truck Terminal
					07	Public Transit Terminal
			STGHWNWK	Strategic Highway Network	1	Yes

					2	No
			TRAVLWAY	Travel Way Along Roadway	1	NHS / Interstate
					2	NHS / STRAHNET Route
					3	NHS / STRAHNET Connector
					4	NHS / Unbuilt
					5	NHS / Other
					6	NHS / Intermodal Connector
3	113	AASHTO	USROUTE	Lowest Numerical Posted U.S. Route No.	XXXXXXXX	1, 2 will be I (Interstate Route Number) or US (US Route Number)
						3 will always be blank
						4-8 will be the Interstate or US Route Number or letter designation
4	114	Local Name	LOCALNAM	Posted or Known Local Street Name		Use all 20 characters as much as possible to avoid abbreviations.
						Use United States Postal standard street suffixes abbreviations.
						Use the following abbreviations for directions: N/S/W/E/NE/NW/SE/SW/NB/SB/WB/EB
						Use the following standard format to denote county line (Name Co Line)
						No punctuation or symbols
						List routes in the following order:
						No Roadway IDs
						No Milepoints/Mileposts

5	118	Highway Performance Monitoring System (HPMS)	ATGROTHR	Other / No Control At-Grade Intersections	XX	Number of intersections as defined (ex. 03)
			ATGRSIG	Number of At-Grade Intersections w/Signal	XX	Number of intersections as defined (ex. 03)
			ATGRSTOP	Number of At-Grade Intersections w/Stop Signs	XX	Number of intersections as defined (ex. 03)
			CURCLASx	Curves by Class (x=A-F)	01XXXXX	(ex. 0102745 is 2.745 miles)
			GRACLASx	Grade by Class (x=A-F)	01XXXXX	(ex. 0101235 is 1.235 miles)
			HORALADQ	Horizontal Alignment Adequacy	1	All curves standard
					2	Some curves < standard, but safe
					3	Some curves design speed < speed limit
					4	Many curves unsafe at speed limit
			HPMSIDNO	HPMS ID Number	12 Chars.	Record the 12-digit HPMS ID number
			LOADTDEV	HPMS Sample Type	1	Donut Samples
					2	Sample Totally on Structure
			PEAKLANE	Number of Lanes in Peak Direction in Peak Hour	1	One Lane
					2	Two Lanes
					3	Three Lanes
					4	Four Lanes
					5	Five Lanes

					6	Six Lanes
			SIGPREV	Prevailing Type of Signalizations	1	Uncoordinated Fixed Time (may include preprogrammed changes for peak or other time periods)
					2	Traffic Actuated (in inventory direction)
					3	Progressive (coordinated through several intersections)
			SIT1500	% of Passing Sight Distance >=1500 feet	XX	Record percentage 0% - 90% (ex. 30 for 30%)
			TERRAIN	Type of Land Terrain	1	Flat
					2	Rolling
			TURNLANL	Turn Lanes Left	1	Multiple turning lanes/bays exist
					2	Continuous left turn lane
					3	Single left turn lane/bay
					4	No left turn lanes/bays exist (intersections exist with left turns permitted)
					5	No left turn allowed during peak
			TURNLANR	Turn Lanes Right	1	Multiple turning lanes/bays exist
					2	Continuous right turn lane
					3	Single right turn lane/bay
					4	No right turn lanes/bays exist (intersections exist with right turns permitted)
					5	No right turn allowed during peak

			TYPEOP	Type of Operation	1	Parking Permitted One Side
					2	Parking Permitted Both Sides
					3	No Parking Allowed,or beyond shoulder or pavement edge where there is no shoulder
			VRTALADQ	Vertical Alignment Adequacy	1	No restrictions on passing due to grades
					2	Limited amount of passing restrictions due to grades on 05-25% of sample length
					3	Passing restrictions due to grades on 26-50% of sample length
					4	Passing restrictions due to grades on over 50% of sample length
			WIDEFEAS	Is Widening Feasible?	1	Not Feasible
					2	Yes, less than one lane could be added in both directions
					3	Yes, one lane could be added in both directions
					4	Yes, two lanes could be added in both directions
					5	Yes, more than two lanes could be added in both directions
			YRIMPT	Year of Last Surface Improvement	YYYY	Record four-digit year
6	119	HPMS Universe Inventory	CALLSERV	Publicly Sponsored Service Patrol	0	No (not required)
					1	Yes

			CELLPHON	Free Emergency Cell Phone Number Other Than 911	0	No
					1	Yes
			DETECALG	Incident Detection Technology Algorithms	0	No
					1	Yes
			ELECSURV	Electronic Surveillance of Traffic Flow	0	No
					1	Yes
			HADRADIO	Highway Advisory Radio	0	No
					1	Yes
			HOVLANES	High Occupancy Vehicle Lanes	0	Section does not have HOV lanes
					1	Section has exclusive HOV lanes
					2	Normal through lane(s) used for exclusive HOV in specified time periods
					3	Shoulder/parking lane(s) used for exclusive HOV in specified time periods
			METERAMP	Metered Entrance Ramp	0	No
					1	Yes
			SIGNINFO	Equipment to Provide In-Vehicle Signing	0	No
					1	Yes
			SURVCAMS	Surveillance Cameras in Use	0	No
					1	Yes
			VARISIGN	Variable Messaging Sign	0	No

					1	Yes
7	120	Type Road	ROTARY	Type of Rotary	1	Roundabout
					2	Traffic Circle
			RTESGNCD	Route Signing Qualifier	1	Alternate
					2	Business Route
					3	Bypass
					4	Spur
					5	Loop
					6	Proposed
					7	Temporary
					8	Truck Route
					9	None of the above
			TYPEROAD	Type of Road	0	Not divided
					2	Divided (painted or physical)
					4	One-way
8	121	Functional Classification	FUNCLASS	Federal Functional Classification, 2-Digit Code	01	RURAL – Principal Arterial–Interstate
					02	RURAL – Principal Arterial–Other
					06	RURAL – Minor Arterial
					07	RURAL – Major Collector
					08	RURAL – Minor Collector
					09	RURAL – Local
					11	URBAN – Principal Arterial–Interstate
					12	URBAN – Principal Arterial–Other Freeways and Expressways
					14	URBAN – Principal Arterial–Other
					16	URBAN – Minor Arterial

					17	URBAN – Collector
					18	URBAN – Local
9	122	Road Access	RDACCESS	Access Control Type	1	Full Control (interstate, turnpike or similar road with all access via grade-separated interchanges)
					2	Partial Control (some grade-separated interchanges and some direct access roads or driveways) – Rare
					3	No Access Control (not grade-separated interchanges)
			TOLLROAD	Toll Road Flag	0	Free
					1	Toll
			OWNAUTH	Owning Authority	MDX	Miami-Dade Expressway
					OOCEA	Orlando Orange County Expressway Authority
					THCEA	Tampa-Hillsborough Expressway Authority
10	124	Urban Classificatio n	HWYLOCAL	Location Code	1	Outside both city and urban limits (Rural)
					2	Inside the city limits, but not inside the urban limits (Rural)
					3	Inside the urban limits, but not inside the city limits (Urban)
					4	Inside both city and urban limits (Urban)
			PLACECD	Current Place Code	XXXX	Record the four-digit identification number
			URBAREA	Urban Area Number	XXXX	Record the four-digit Urban

						Area Number
			URBSIZE	Urban Size	1	Rural
					2	Small Urban (5,000 - 49,999 population
					3	Small Urbanized (50,000 - 199,999 population)
					4	Large Urbanized (200,000 - 499,999 population)
					5	Metropolitan (500,000 or more population)
11	125	Adjacent Land Classification	LANDUSE	Prevailing Type of Land Use	1	Central Business District (CBD)
					2	High Density Business/Commercial Center
					3	Low Density Commercial
					4	High Density Residential
					5	Low Density Residential
					6	Other
			ROUGHIND	Pavement Roughness Index	XXX	Entered by Transportation Statistics Office (Do not record.)
12	138	Roadway Realignment	NALIGNDT	Date of Realignment	MMDDYYYY	Date realignment officially opened (01311997 is Jan. 31,1997)
			NALIGNID	Section Identification of New Alignment	XXXXXXXX	County/Section/Sub-section
			NALNBGPT	Beginning Milepoint of New Alignment	XXX.XXX	Beginning Milepoint Number
			NALNENPT	Ending Milepoint of New Alignment	XXX.XXX	Ending Milepoint Number
13	139	New Alignment	OALIGNID	Section Identification of Old Alignment	XXXXXXXX	Automatically added

			OALNBGPT	Beginning Milepoint of Old Alignment	XXX.XXX	Automatically added
			OALNENPT	Ending Milepoint of Old Alignment	XXX.XXX	Automatically added
14	140	Section Status Exception	OSDATE	Date Section Taken Off or Added to State System	MMDDYYYY	Date section added/taken off (01311997 is January 31,1997)
			STATEXPT	Section Status Exception	01	Pending (May be added to the roadway network.)
					02	Active On the SHS (Route owned and maintained by FDOT.)
					04	Inactive (Route must be kept indefinitely, for historic purposes.)
					05	Deleted (Route has been physically removed. Roadway ID and data must remain for a minimum of five years.)
					07	Active Exclusive (Ramps, frontage roads, etc. owned and maintained by FDOT.)
					09	Active Off the SHS (NOT part of the State Highway System, NOT maintained by FDOT)
					10	GIS Route (Route used solely for the Basemap. It uses the 800 series subsection number, i.e. a roadway ID with the number 8 in the 6th position.)
					16	Local Roads with FM Projects (Used by the District Work

						Program Office to identify FM projects on local roads off the SHS and off the Federal Aid System. It uses the 900 series section number, i.e. a roadway ID with the number 9 in the 3rd position. Effective Date – November 2008.)
					17	Active Off Exclusive (Ramps, frontage roads, etc. NOT maintained by FDOT.)
15	141	Stationing Exceptions	BEGSECPT	Beginning Roadway Section Milepoint	XXX.XXX	Beginning (lowest) milepoint
			ENDSECPT	Ending Milepoint of Exception	XXX.XXX	Ending (highest) milepoint
			RDWYID	Roadway ID of Exception Within a County	XXXXXX XX	County/Section/Sub-section
16	143	Associated Stationing Exceptions	BEGSECPT	Beginning Roadway Section Milepoint		
			ENDSECPT	Ending Milepoint of Exception		
			RDWYID	Roadway ID of Exception Within a County		
17	144	Florida Intrastate Highway System	FIHSCHDT	Date of Last Change	MMDDY YYY	Record date
			FIHSCODE	On FIHS	0	No
					1	Yes
			FIHSLRAT	Long-Range Access Type	0	Not Applicable
					1	PC (Partial Control)

					2	FC (Full Control)
			FIHSMPRF	Map Reference Number for the Facility	100 ~ 199	Controlled Access
					400 ~ 499	Interstate
					500 ~ 599	Turnpike & Expressway
			FIHSSRAT	Proposed Short-Range Access Type	0	Not Applicable
					1	Partial Control
					2	Full Control
18	146	Access Managemen t Classificatio n	ACMANCLS	Access Management Classification	00	Where class would not be applicable
					01	Access Class 01
					02	Access Class 02
					03	Access Class 03
					04	Access Class 04
					05	Access Class 05
					06	Access Class 06
					07	Access Class 07
					99	Special Corridor Access Management Plan
19	147	Strategic Intermodal System	SISFACTP	SISFACTP	11	SIS
					12	Emerging SIS
					13	Constrained SIS Corridor
					14	Constrained Emerging SIS Corridor
					51	SIS Corridor to be Dropped
					52	Emerging SIS Corridor to be Dropped

					21	SIS Connector
					22	Emerging SIS Connector
					23	Constrained SIS Connector
					24	Constrained Emerging SIS Connector
					53	SIS Connector to be Dropped
					54	Emerging SIS Connector to be Dropped
					31	SIS Link
					32	Emerging SIS Link
					41	Planned SIS
					42	Planned Emerging SIS
					43	Planned SIS Connector
					44	Planned Emerging SIS Connector
			SISMAPID	Map ID for the SIS Facility	1XXX	Interstate (Mainline)
					2XXX	Turnpike (Mainline)
					3XXX	Expressway (Mainline)
					4XXX	Arterial (Mainline)
					5XXX	Intermodal Passenger Terminal (Bus)
					6XXX	Intermodal Freight Terminal (Future)
					8XXX	Connector
					9XXX	Planned (Already on SIS/ESIS)
					0XXX	Proposed (SIS/ESIS)
20	212	Through Lanes	NOLANES	Number of Through Roadway Lanes	XX	Number of through lanes (Ex. 02)
			SURWIDTH	Through Pavement Surface Width	XX	Surface width (in feet)
21	213	Auxiliary Lanes	AUXLNTYP	Auxiliary Lane Type	3	Turning (left)

					4	Turning (right)
					5	Bus Preference
					6	Merging (inside)
					7	Merging (outside)
					8	Turn Lane with Bike Slot
			AUXLNUM	Number of Auxiliary Lanes	X	Total number of auxiliary lanes adjacent to the roadway
			AUXLNWTH	Width of Auxiliary Lane	XX.XX	Average width of auxiliary lane(s)
22	214	Outside Shoulders	SHLDTYPE	Highway Shoulder Type (adjacent to outside travel lane)	0	Raised Curb (no shoulder or width exists)
					1	Paved with or without striping (including paved parking)
					2	Paved with Warning Device (raised or indented strips)
					3	Lawn (number of feet to support road bed)
					4	Gravel/Marl
					5	Valley Gutter (not a barrier)
					6	Curb & Gutter
					7	Other
					8	Curb with resurfaced gutter
			SLDWIDTH	Highway Shoulder Width	XX.X	Record number of feet. Enter to nearest 6 inches (0.5 feet)
23	215	Highway Median	MEDWIDTH	Highway Median Width	XXX	Highway Median Width (feet)
			RDMEDIAN	Type of Median	01-31	
24	216	Bike Lanes and Sidewalks	BIKELNCD	Bicycle Lane	0	Undesignated
					1	Designated
			BIKSLTCD	Bicycle Slot	0	Undesignated
					1	Designated

			SIDWLKWD	Sidewalk Width & Separation	XXX	Record actual width of the sidewalk to nearest foot
			SDWLKBCD	Sidewalk Barrier Code	0	No barrier
					1	On-street parking lane
					2	Row of trees, planters, utility poles, etc.
					3	Both 1 and 2
					4	Guardrail/traffic railing barrier/swale
			SHARDPTH	Shared Path Width & Separation	XXX	Record actual width of the Shared Path to nearest foot
25	219	Inside Shoulders	ISLDTYPE	Inside Shoulder Type	0	Raised Curb (no shoulder or width exists)
					1	Paved
					2	Paved with Warning Device (raised or indented strips)
					6	Curb & Gutter
					7	Other
					8	Curb with resurfaced gutter (asphalt paved over gutter)
			ISLDWDTH	Inside Shoulder Width	XX.X	Record 0.0 feet – 99.5 feet. Enter to nearest six inches (0.5 feet)
26	220	Non-Curve Intersection	NCPTINT	Non-Curve Point of Intersection	XXXDXX' XX.00"	Degrees/Minutes/Seconds
27	221	Horizontal Curve	BEARING	Compass Bearing Along Road at a Point	XXXDXX' 00"X	Record Curve Degrees/Minutes/Seconds
			HRZCANGL	Horizontal Curve Central Angle	XXXDXX' XX.00"	Record Angle Degrees/Minutes/Seconds/Hundredths of a second
			HRZDGCRV	Horizontal Degree of Curve	XXXDXX'	Record Degrees/Minutes

			HRZPTINT	Horizontal Point of Intersection	XXX.XXX	Record Milepoint of the PI
28	230	Surface Description	PAVECOND	Pavement Condition	0.0-1.0	Very Poor: Virtually impassable. 75% or more deteriorated.
					1.0-2.0	Poor: Large potholes and deep cracks exist. Discomfort at slow speeds.
					2.0-3.0	Fair: Rutting, map cracking and extensive patching.
					3.0-4.0	Good: First class ride with only slight surface deterioration.
					4.0-5.0	Very Good: Only new or nearly new pavement.
			PAVINDEX	Pavement Index	1	High Asphalt (typically high volume roadways)
					2	Medium Asphalt (typically local city/county side streets
					3	Low Asphalt (private roads, alleys – not usually HPMS samples)
					4	Unpaved (dirt, gravel – local functional classification)
					5	Concrete (typically high volume roadways, concrete joints visible)
			SURFNUM	Pavement Surface Type	08	Portland Cement Concrete
					25	Brick
					28	Asphaltic Concrete
					29	Other
29	232	Surface Layers	FRICTCSE	Type of Friction Layer Course	0	None

					1	Type 1
					2	Type 2
					3	Type 3
					4	Type 4
					5	Type 5
					6	Type 6
					7	Type 9.5
					8	Type 12.5
					9	Other
			SURFLAYx	Pavement Surface Layer (x=1-7)		
			SURFLxTH	Pavement Surface Thickness (x=1-7)	X.XX	Enter 1.00” to 9.00”, code to nearest inch.
30	233	Base	BASETHK	Base Course Thickness	XX	Record inches
			TYPEBASE	Type of Roadway Base Material		
31	251	Intersections	BEGSECNM	Beginning Roadway Section Milepoint Name	20 chars.	Record the intersecting roadway name (up to 20 characters)
			ENDSECNM	Ending Roadway Section Milepoint Name	20 chars.	Record the intersecting roadway name (up to 20 characters)
			INTSDIRx	Intersection Direction (x=1-9)	20 chars.	Record the intersecting roadway name (up to 20 characters)
			INTSRTPx	Intersection Surface Type (x=1-9)	A	Asphaltic Concrete
					B	Brick
					C	Portland Cement Concrete
					D	Other
32	252	Interchanges	EXITNO	Interchange (Exit) Number	###A	Record the exit number and

						letter if applicable, referring to the examples above.
			INTERCHG	Type of Interchange	01	Diamond
					02	Partial Diamond
					03	Trumpet
					04	Y Intersection
					05	2 Quadrant Cloverleaf or Partial Cloverleaf
					06	4 Quadrant Cloverleaf with Collector Road
					07	4 Quadrant Cloverleaf
					08	Direct Connection Design
					09	Other
33	253	Railroads	CHKDIGIT	Check Digit	X	Record Alpha Character
			RRCROSNO	National RR Grade Crossing Number	XXXXXX	Record six-digit Crossing Number (do not include Alpha character)
34	258	Structures	BOXCULNO	Box Culvert Structure Number	XXXXXX	Record Structure Number
			BRIDGENO	Bridge Structure ID Number	XXXXXX	Record Structure Number
			FACCROSS	Facility Crossing Name	20 chars.	Enter name of the river, railroad, stream, etc. (up to 20 characters)
			UNDPASNO	Underpass Number	XXXXXX	Record six-digit underpass number
35	311	Speed Zone	MAXSPEED	Maximum Speed Limit	XX	Record the two-digit number
36	320	Milemarker Signs	MILEMARK	Milemarker Sign	XXX	Record three-digit milemarker number
37	326	Traffic Monitoring Sites	TRFSTANO	Traffic Count Station Number	XXXXXX	Record the two-digit county and the four-digit site number
			TRSTATYP	Traffic Count	T	TTMS

				Station Type		
					P	PTMS
					R	Roadtube
					I	Inactive
38	330	Traffic Flow Break Station	FLWBRKID	Flow Break Count Station	XXXXXX	Record the two-digit county and the four-digit site number
			TRFBRKCD	Traffic Break Code	1	Located within Break
					2	Located on Rdwy/outside Break
					3	Located on Different Rdwy
39	331	Traffic Flow Breaks	AADTDATE	Date of AADT	MMDDYYYY	Use Month, Day, Year format (ex. 12312003)
			AADTTYPE	Source of AADT	1	Final Estimate from Survey
					2	Final Estimate from Growth Factor
					3	Interim Estimate from Survey
					4	Estimate from System Average
			AVGDFACT	Directional Distribution Factor	XX.XX	Record number 0.00 to 99.99
			AVGKFACT	30th Highest Hour Factor	XX.XX	Record number 0.00 to 99.99
			AVGTFACT	Truck Percentage	XX.XX	Record number 0.00 to 99.99
			SECTADT	Section AADT	XXXXXX	Record the six-digit count
40	360	Toll Plazas	TOLPLZMM	Toll Plaza Milemarker	XXX	Record three-digit milemarker number
			TOLPLZNM	Toll Plaza Name	20 Chars.	Record name of plaza (up to 20 characters)
			SVCPLZNM	Service Plaza Name	20 Chars.	Record name of plaza (up to 20 characters)
41	361	Service Plazas	SVPBEGMM	Service Plaza Beginning Milemarker	XXX.XX	Record milemarker

			SVPENDMM	Service Plaza Ending Milemarker	XXX.XX	Record milemarker

APPENDIX B-IV

Definitions of Variables in LRS - RDWTBL_31

No.	Variable Name Abbreviation	Variable Format
1	CALYEAR	CHAR(4) NOT NULL,
2	CONTYDOT	CHAR(2) NOT NULL,
3	RDWYID	CHAR(8) NOT NULL,
4	ONEUPSQ	INTEGER NOT NULL,
5	BEGSECPT	DECIMAL(6, 3) NOT NULL,
6	ENDSECPT	DECIMAL(6, 3) NOT NULL,
7	DBTMTKRT	CHAR(1) NOT NULL,
8	DESDEFRT	CHAR(1) NOT NULL,
9	DESTRKRT	CHAR(1) NOT NULL,
10	FAHWYSYS	CHAR(1) NOT NULL,
11	TRKROUTE	CHAR(20) NOT NULL,
12	LOCALNAM	CHAR(20) NOT NULL,
13	ACCESS	CHAR(2) NOT NULL,
14	RTESGNCD	CHAR(1) NOT NULL,
15	TYPEROAD	CHAR(1) NOT NULL,
16	FUNCLASS	CHAR(2) NOT NULL,
17	RDACCESS	CHAR(1) NOT NULL,
18	TOLLROAD	CHAR(1) NOT NULL,
19	HWYLOCAL	CHAR(1) NOT NULL,
20	PLACECD	CHAR(4) NOT NULL,
21	URBAREA	CHAR(4) NOT NULL,
22	URBSIZE	CHAR(1) NOT NULL,
23	LANDUSE	CHAR(1) NOT NULL,
24	NOLANES	CHAR(2) NOT NULL,
25	SURWIDTH	CHAR(3) NOT NULL,
26	SHLDTYPE	CHAR(1) NOT NULL,

27	SHLDTYP2	CHAR(1) NOT NULL,
28	SHLDTYP3	CHAR(1) NOT NULL,
29	SLDWIDTH	DECIMAL(3, 1) NOT NULL,
30	SHLDWTH2	DECIMAL(3, 1) NOT NULL,
31	SHLDWTH3	DECIMAL(3, 1) NOT NULL,
32	MEDWIDTH	CHAR(3) NOT NULL,
33	RDMEDIAN	CHAR(2) NOT NULL,
34	ISLDTYPE	CHAR(1) NOT NULL,
35	ISLDTYP2	CHAR(1) NOT NULL,
36	ISLDTYP3	CHAR(1) NOT NULL,
37	ISLDWDTH	DECIMAL(3, 1) NOT NULL,
38	ISLDWTH2	DECIMAL(3, 1) NOT NULL,
39	ISLDWTH3	DECIMAL(3, 1) NOT NULL,
40	BEARING	CHAR(11) NOT NULL,
41	HRZDGCRV	CHAR(6) NOT NULL,
42	SUPERELE	DECIMAL(4, 4) NOT NULL,
43	PAVECOND	DECIMAL(3, 2) NOT NULL,
44	SURFNUM	CHAR(2) NOT NULL,
45	FRICTCSE	CHAR(1) NOT NULL,
46	FRICTHK	DECIMAL(3, 2) NOT NULL,
47	SURLAYNO	CHAR(1) NOT NULL,
48	SURLAYCD	CHAR(4) NOT NULL,
49	SURTHKNO	CHAR(1) NOT NULL,
50	SURTHKCD	DECIMAL(3, 2) NOT NULL,
51	BEGSECNM	CHAR(20) NOT NULL,
52	ENDSECNM	CHAR(20) NOT NULL,
53	NOLGTHI	CHAR(3) NOT NULL,
54	NOLGTLO	CHAR(3) NOT NULL,
55	LIGHTCDE	CHAR(1) NOT NULL,
56	INTCMBCD	CHAR(2) NOT NULL,
57	INTDIRX	CHAR(9) NOT NULL,
58	DIVUNDIV	CHAR(1) NOT NULL,

59	CRRATECD	CHAR(2) NOT NULL,
60	URSUBRUR	CHAR(1) NOT NULL,
61	INTSDRCD	CHAR(1) NOT NULL,
62	INTSFTYC	CHAR(1) NOT NULL,
63	RDINTSEC	CHAR(2) NOT NULL,
64	CROSRDNM	CHAR(20) NOT NULL,
65	EXITNO	CHAR(4) NOT NULL,
66	INTERCHG	CHAR(2) NOT NULL,
67	CHKDIGIT	CHAR(1) NOT NULL,
68	RRCROSNO	CHAR(6) NOT NULL,
69	STAIDNO	CHAR(6) NOT NULL,
70	BOXCULNO	CHAR(6) NOT NULL,
71	BRIDGENO	CHAR(6) NOT NULL,
72	FACCROSS	CHAR(20) NOT NULL,
73	UNDPASNO	CHAR(6) NOT NULL,
74	AVGDFACT	DECIMAL(4, 2) NOT NULL,
75	AVGKFACT	DECIMAL(4, 2) NOT NULL,
76	AVGTFACT	DECIMAL(4, 2) NOT NULL,
77	SECTADT	CHAR(6) NOT NULL,
78	ACMANCLS	CHAR(2) NOT NULL,
79	AUXLNTYP	CHAR(1) NOT NULL,
80	AUXLNUM	CHAR(1) NOT NULL,
81	AUXLNWTH	DECIMAL(4, 2) NOT NULL,
82	SIDEWALK	DECIMAL(4, 2) NOT NULL,
83	RDSIDTYP	CHAR(2) NOT NULL,
84	LIGHTING	CHAR(1) NOT NULL,
85	MAINBEG	DECIMAL(6, 3) NOT NULL,
86	MAINEND	DECIMAL(6, 3) NOT NULL,
87	SBSECTCD	CHAR(2) NOT NULL,
88	ATTLOCCD	CHAR(2) NOT NULL,
89	ATTYPECD	CHAR(2) NOT NULL,
90	VEHDIRCD	CHAR(2) NOT NULL,

91	MAXSPEED	CHAR(3) NOT NULL,
92	MINSPEED	CHAR(3) NOT NULL,
93	LMTRSTRC	CHAR(1) NOT NULL,
94	TURNMOVE	CHAR(2) NOT NULL,
95	TYPEPARK	CHAR(1) NOT NULL,
96	SPDLIMIT	CHAR(2) NOT NULL,
97	SIGNALNC	CHAR(2) NOT NULL,
98	SIGNALTP	CHAR(2) NOT NULL,
99	SIGNALTY	CHAR(2) NOT NULL,
100	SCHLSPED	CHAR(2) NOT NULL,
101	STATEXPT	CHAR(2) NOT NULL,
102	NANLIGDT	DATE NOT NULL,
103	NALIGNID	CHAR(8) NOT NULL,
104	NALNBGPT	DECIMAL(6, 3) NOT NULL,
105	NALNENPT	DECIMAL(6, 3) NOT NULL,
106	OALIGNID	CHAR(8) NOT NULL,
107	OALNBGPT	DECIMAL(6, 3) NOT NULL,
108	OALNENPT	DECIMAL(6, 3) NOT NULL,
109	PCGRADE	DECIMAL(5, 4) NOT NULL,
110	VRTCRVDR	CHAR(1) NOT NULL,
11	SPIRANGL	CHAR(6) NOT NULL,

1		
112	SPIROFF	DECIMAL(4, 2) NOT NULL,
113	DTECRETE	DATE NOT NULL,
114	RDWY_ACTV_ID	CHAR(8) NOT NULL,
115	BEG_SECT_ACTV_NUM	DECIMAL(6, 3) NOT NULL,
116	END_SECT_ACTV_NUM	DECIMAL(6, 3) NOT NULL,
117	RDWY_INACTV_ID	CHAR(8) NOT NULL,
118	BEG_SECTINACTV_NUM	DECIMAL(6, 3) NOT NULL,
119	END_SECTINACTV_NUM	DECIMAL(6, 3) NOT NULL,
120	RDWY_SECT_SYS_DT	DATE NOT NULL,
121	US_RTE_NUM_ID	CHAR(8) NOT NULL,
122	ST_RD_NUM_ID	CHAR(8) NOT NULL,
123	RDWYSUBSECTTYP_TXT	CHAR(1) NOT NULL

APPENDIX B-V

Definitions of Variables in Node List

No.	Variable Abbreviation	Example
1	DOT_County	1
2	Node_Number	15
3	Roadway_Id	1040101
4	Subsection_Type	5

5	Node_Type	10
6	Fixture_Type	11
7	Critical_Node_Id	N
8	RCI_Roadway_Feature	251
9	RCI_Feature_Sequence	56
10	RCI_Roadway_Characteristic	INTSDIR2
11	Mile-Point	0.993

APPENDIX B-VI

Definitions of Variables in Traffic

No.	Variable Abbreviation	Example
1	CALYEAR	2003
2	CONTYDOT	10
3	RDWYID	10110000
4	ROWID	28
5	BEGSECPT	1.562
6	ENDSECPT	1.689
7	SECTADT	15400

Appendix C

1 Segment Variables with Codes

SAINDEX	SAVAR	SATYPE	SALENGTH	REQUIRED	SA CODE	RCIINDEX	RCIVAR	CODE	DEFAULT
3	Route Type	CODE	2	Y	I	17	FUNCLASS	01	
3	Route Type	CODE	2	Y	I	17	FUNCLASS	11	
3	Route Type	CODE	2	Y	US	113	USROUTE		
3	Route Type	CODE	2	Y	SR	111	STROADNO		
3	Route Type	CODE	2	Y	BR	15	RTESGNCD	2	
3	Route Type	CODE	2	Y	BL	15	RTESGNCD	5	
3	Route Type	CODE	2	Y	SP	15	RTESGNCD	4	
3	Route Type	CODE	2	Y	CR	111	STROADNO		
3	Route Type	CODE	2	Y	TR	17	FUNCLASS	08	
3	Route Type	CODE	2	Y	TR	17	FUNCLASS	17	

3	Route Type	CODE	2	Y	L	17	FUNCLASS	09	
3	Route Type	CODE	2	Y	L	17	FUNCLASS	18	
3	Route Type	CODE	2	Y	O				
3	Route Type	CODE	2	Y	X				
17	areaType	CODE	1	Y	U	23	URBSIZE	2	
17	areaType	CODE	1	Y	U	23	URBSIZE	3	
17	areaType	CODE	1	Y	U	23	URBSIZE	4	
17	areaType	CODE	1	Y	U	23	URBSIZE	5	
17	areaType	CODE	1	Y	R	23	URBSIZE	1	
17	areaType	CODE	1	Y	X				
18	terrain	CODE	1	N	L	118	TERRAIN	1	
18	terrain	CODE	1	N	R	118	TERRAIN	2	
18	terrain	CODE	1	N	M				
18	terrain	CODE	1	N	X				
19	roadwayClass1	CODE	2	N	1	17	FUNCLASS	01	
19	roadwayClass1	CODE	2	N	1	17	FUNCLASS	11	
19	roadwayClass1	CODE	2	N	2	17	FUNCLASS	12	

19	roadwayClass1	CODE	2	N	3	17	FUNCLASS	02	
19	roadwayClass1	CODE	2	N	3	17	FUNCLASS	14	
19	roadwayClass1	CODE	2	N	4	17	FUNCLASS	06	
19	roadwayClass1	CODE	2	N	4	17	FUNCLASS	16	
19	roadwayClass1	CODE	2	N	5	17	FUNCLASS	07	
19	roadwayClass1	CODE	2	N	6	17	FUNCLASS	8	
19	roadwayClass1	CODE	2	N	7	17	FUNCLASS	09	
19	roadwayClass1	CODE	2	N	7	17	FUNCLASS	18	
19	roadwayClass1	CODE	2	N	0	17	FUNCLASS	17	
19	roadwayClass1	CODE	2	N	99	17	FUNCLASS		
22	d1auxLane1	CODE	2	N	0				
22	d1auxLane1	CODE	2	N	1				
22	d1auxLane1	CODE	2	N	2	80	AUXLNTYP	6	
22	d1auxLane1	CODE	2	N	2	80	AUXLNTYP	7	

22	d1auxLane1	CODE	2	N	3	80	AUXLNTYP	3	
22	d1auxLane1	CODE	2	N	3	80	AUXLNTYP	4	
22	d1auxLane1	CODE	2	N	4				
22	d1auxLane1	CODE	2	N	5	80	AUXLNTYP	5	
22	d1auxLane1	CODE	2	N	6				
22	d1auxLane1	CODE	2	N	7	80	AUXLNTYP	8	
22	d1auxLane1	CODE	2	N	8				
22	d1auxLane1	CODE	2	N	99				
23	d1auxLane2	CODE	2	N	0				
23	d1auxLane2	CODE	2	N	1				
23	d1auxLane2	CODE	2	N	2	80	AUXLNTYP	6	
23	d1auxLane2	CODE	2	N	2	80	AUXLNTYP	7	
23	d1auxLane2	CODE	2	N	3	80	AUXLNTYP	3	
23	d1auxLane2	CODE	2	N	3	80	AUXLNTYP	4	

23	d1auxLane2	CODE	2	N	4				
23	d1auxLane2	CODE	2	N	5	80	AUXLNTYP	5	
23	d1auxLane2	CODE	2	N	6				
23	d1auxLane2	CODE	2	N	7	80	AUXLNTYP	8	
23	d1auxLane2	CODE	2	N	8				
23	d1auxLane2	CODE	2	N	99				
24	d1auxLane3	CODE	2	N	0				
24	d1auxLane3	CODE	2	N	1				
24	d1auxLane3	CODE	2	N	2	80	AUXLNTYP	6	
24	d1auxLane3	CODE	2	N	2	80	AUXLNTYP	7	
24	d1auxLane3	CODE	2	N	3	80	AUXLNTYP	3	
24	d1auxLane3	CODE	2	N	3	80	AUXLNTYP	4	
24	d1auxLane3	CODE	2	N	4				
24	d1auxLane3	CODE	2	N	5	80	AUXLNTYP	5	

24	d1auxLane3	CODE	2	N	6				
24	d1auxLane3	CODE	2	N	7	80	AUXLNTYP	8	
24	d1auxLane3	CODE	2	N	8				
24	d1auxLane3	CODE	2	N	99				
25	d2auxLane1	CODE	2	N	0				
25	d2auxLane1	CODE	2	N	1				
25	d2auxLane1	CODE	2	N	2	80	AUXLNTYP	6	
25	d2auxLane1	CODE	2	N	2	80	AUXLNTYP	7	
25	d2auxLane1	CODE	2	N	3	80	AUXLNTYP	3	
25	d2auxLane1	CODE	2	N	3	80	AUXLNTYP	4	
25	d2auxLane1	CODE	2	N	4				
25	d2auxLane1	CODE	2	N	5	80	AUXLNTYP	5	
25	d2auxLane1	CODE	2	N	6				
25	d2auxLane1	CODE	2	N	7	80	AUXLNTYP	8	

25	d2auxLane1	CODE	2	N	8				
25	d2auxLane1	CODE	2	N	99				
26	d2auxLane2	CODE	2	N	0				
26	d2auxLane2	CODE	2	N	1				
26	d2auxLane2	CODE	2	N	2	80	AUXLNTYP	6	
26	d2auxLane2	CODE	2	N	2	80	AUXLNTYP	7	
26	d2auxLane2	CODE	2	N	3	80	AUXLNTYP	3	
26	d2auxLane2	CODE	2	N	3	80	AUXLNTYP	4	
26	d2auxLane2	CODE	2	N	4				
26	d2auxLane2	CODE	2	N	5	80	AUXLNTYP	5	
26	d2auxLane2	CODE	2	N	6				
26	d2auxLane2	CODE	2	N	7	80	AUXLNTYP	8	
26	d2auxLane2	CODE	2	N	8				
26	d2auxLane2	CODE	2	N	99				

27	d2auxLane3	CODE	2	N	0				
27	d2auxLane3	CODE	2	N	1				
27	d2auxLane3	CODE	2	N	2	80	AUXLNTYP	6	
27	d2auxLane3	CODE	2	N	2	80	AUXLNTYP	7	
27	d2auxLane3	CODE	2	N	3	80	AUXLNTYP	3	
27	d2auxLane3	CODE	2	N	3	80	AUXLNTYP	4	
27	d2auxLane3	CODE	2	N	4				
27	d2auxLane3	CODE	2	N	5	80	AUXLNTYP	5	
27	d2auxLane3	CODE	2	N	6				
27	d2auxLane3	CODE	2	N	7	80	AUXLNTYP	8	
27	d2auxLane3	CODE	2	N	8				
27	d2auxLane3	CODE	2	N	99				
30	medianType1	CODE	2	Y	1	34	RDMEDIAN	06	
30	medianType1	CODE	2	Y	1	34	RDMEDIAN	13	

30	medianType1	CODE	2	Y	1	34	RDMEDIAN	16	
30	medianType1	CODE	2	Y	2	34	RDMEDIAN	12	
30	medianType1	CODE	2	Y	2	34	RDMEDIAN	23	
30	medianType1	CODE	2	Y	2	34	RDMEDIAN	31	
30	medianType1	CODE	2	Y	3	34	RDMEDIAN	04	
30	medianType1	CODE	2	Y	4	34	RDMEDIAN	02	
30	medianType1	CODE	2	Y	4	34	RDMEDIAN	03	
30	medianType1	CODE	2	Y	4	34	RDMEDIAN	17	
30	medianType1	CODE	2	Y	5	34	RDMEDIAN	08	
30	medianType1	CODE	2	Y	6	34	RDMEDIAN	10	
30	medianType1	CODE	2	Y	6	34	RDMEDIAN	09	
30	medianType1	CODE	2	Y	7	34			
30	medianType1	CODE	2	Y	8	34			
30	medianType1	CODE	2	Y	9	34	RDMEDIAN	01	

30	medianType1	CODE	2	Y	0	34			
30	medianType1	CODE	2	Y	99	34			
32	d1shoulderTypeOut	CODE	2	N	1	27	SHLDTYPE	1	
32	d1shoulderTypeOut	CODE	2	N	2	27	SHLDTYPE	2	
32	d1shoulderTypeOut	CODE	2	N	2	27	SHLDTYPE	7	
32	d1shoulderTypeOut	CODE	2	N	3	27	SHLDTYPE	4	
32	d1shoulderTypeOut	CODE	2	N	4	27	SHLDTYPE	3	
32	d1shoulderTypeOut	CODE	2	N	5	27	SHLDTYPE	0	
32	d1shoulderTypeOut	CODE	2	N	5	27	SHLDTYPE	6	
32	d1shoulderTypeOut	CODE	2	N	5	27	SHLDTYPE	8	
32	d1shoulderTypeOut	CODE	2	N	6				
32	d1shoulderTypeOut	CODE	2	N	98				
32	d1shoulderTypeOut	CODE	2	N	99				
33	d1shoulderTypeIn	CODE	2	N	1	35	ISLDTYPE	1	
33	d1shoulderTypeIn	CODE	2	N	1	35	ISLDTYPE	2	

33	d1shoulderTypeIn	CODE	2	N	2				
33	d1shoulderTypeIn	CODE	2	N	3				
33	d1shoulderTypeIn	CODE	2	N	4				
33	d1shoulderTypeIn	CODE	2	N	5	35	ISLDTYPE	0	
33	d1shoulderTypeIn	CODE	2	N	5	35	ISLDTYPE	6	
33	d1shoulderTypeIn	CODE	2	N	5	35	ISLDTYPE	8	
33	d1shoulderTypeIn	CODE	2	N	6				
33	d1shoulderTypeIn	CODE	2	N	98				
33	d1shoulderTypeIn	CODE	2	N	99				
34	d2shoulderTypeOut	CODE	2	N	1	27	SHLDTYPE	1	
34	d2shoulderTypeOut	CODE	2	N	1	27	SHLDTYPE	2	
34	d2shoulderTypeOut	CODE	2	N	2	27	SHLDTYPE	7	
34	d2shoulderTypeOut	CODE	2	N	3	27	SHLDTYPE	4	
34	d2shoulderTypeOut	CODE	2	N	4	27	SHLDTYPE	3	

34	d2shoulderTypeOut	CODE	2	N	5	27	SHLDTYPE	0	
34	d2shoulderTypeOut	CODE	2	N	5	27	SHLDTYPE	6	
34	d2shoulderTypeOut	CODE	2	N	5	27	SHLDTYPE	8	
34	d2shoulderTypeOut	CODE	2	N	6				
34	d2shoulderTypeOut	CODE	2	N	98				
34	d2shoulderTypeOut	CODE	2	N	99				
35	d2shoulderTypeIn	CODE	2	N	1	35	ISLDTYPE	1	
35	d2shoulderTypeIn	CODE	2	N	1	35	ISLDTYPE	2	
35	d2shoulderTypeIn	CODE	2	N	2				
35	d2shoulderTypeIn	CODE	2	N	3				
35	d2shoulderTypeIn	CODE	2	N	4				
35	d2shoulderTypeIn	CODE	2	N	5	35	ISLDTYPE	0	
35	d2shoulderTypeIn	CODE	2	N	5	35	ISLDTYPE	6	
35	d2shoulderTypeIn	CODE	2	N	5	35	ISLDTYPE	8	

35	d2shoulderTypeIn	CODE	2	N	6				
35	d2shoulderTypeIn	CODE	2	N	98				
35	d2shoulderTypeIn	CODE	2	N	99				
40	accessControl	CODE	2	N	1	18	RDACCESS	1	
40	accessControl	CODE	2	N	2	18	RDACCESS	2	
40	accessControl	CODE	2	N	3	18	RDACCESS	3	
40	accessControl	CODE	2	N	99				
41	drivewayDensity	NUM	128	N		79	ACMANCLS	02	660-1320 ft
41	drivewayDensity	NUM	128	N		79	ACMANCLS	03	440-660 ft
41	drivewayDensity	NUM	128	N		79	ACMANCLS	04	440-660 ft
41	drivewayDensity	NUM	128	N		79	ACMANCLS	05	245-440 ft
41	drivewayDensity	NUM	128	N		79	ACMANCLS	06	245-440 ft
41	drivewayDensity	NUM	128	N		79	ACMANCLS	07	125 ft
44	operationWay	CODE	2	Y	1	16	TYPEROAD	4	

44	operationWay	CODE	2	Y	2	16	TYPEROAD	2	
44	operationWay	CODE	2	Y	3				
44	operationWay	CODE	2	Y	99	16	TYPEROAD	0	
45	travelDirection	CODE	2	N	NB				
45	travelDirection	CODE	2	N	SB				
45	travelDirection	CODE	2	N	EB				
45	travelDirection	CODE	2	N	WB				
45	travelDirection	CODE	2	N	NA				
45	travelDirection	CODE	2	N	X				
46	increasingMilesposts	CODE	2	N	NB				
46	increasingMilesposts	CODE	2	N	SB				
46	increasingMilesposts	CODE	2	N	EB				
46	increasingMilesposts	CODE	2	N	WB				
46	increasingMilesposts	CODE	2	N	NA				

46	increasingMilesposts	CODE	2	N	X				
47	d1bikeway	CODE	2	N	1	216	BIKELNCD-0	0	
47	d1bikeway	CODE	2	N	2				
47	d1bikeway	CODE	2	N	3	216	BIKELNCD-1	1	
47	d1bikeway	CODE	2	N	4				
47	d1bikeway	CODE	2	N	99				
48	d2bikeway	CODE	2	N	1	216	BIKELNCD-0	0	
48	d2bikeway	CODE	2	N	2				
48	d2bikeway	CODE	2	N	3	216	BIKELNCD-1	1	
48	d2bikeway	CODE	2	N	4				
48	d2bikeway	CODE	2	N	99				
49	interchangeInfluence	CODE	1	Y	Y	4	RDWYID		SUBSECTION NUMBER IS NOT ZERO
49	interchangeInfluence	CODE	1	Y	N	4	RDWYID		SUBSECTION NUMBER IS ZERO

49	interchangeInfluence	CODE	1	Y	X				
51	discontinuity	CODE	1	N	Y				
51	discontinuity	CODE	1	N	N				
51	discontinuity	CODE	1	N	X				

2 Segment Variables without Codes

SAINDEX	SAVAR	SATYPE	SALENGTH	REQUIRED	RCIINDEX	RCIVAR	DEFAULT
1	Agency ID	CHAR	128	Y	4	RDWYID	
2	LocSystem	CODE	1	Y	4	RDWYID	
2	LocSystem	CODE	1	Y	6	BEGSECPT	
2	LocSystem	CODE	1	Y	7	ENDSECPT	
4	routeName	CHAR	128	Y	13	LOCALNAM	
5	county	CODE	2	Y	4	RDWYID	FIRST PART
6	startSection	CHAR	128	N			
7	startOffset	NUM	6.3	Y	6	BEGSECPT	

8	endSection	CHAR	128	N			
9	endOffset	NUM	6.3	Y	7	ENDSECPT	
10	gisID	CHAR	128	N	102	STATEXPT	
11	altRouteNames	CHAR	128	N			
12	majorRoadName	CHAR	128	N			
13	segmentLength	NUM	6.3	Y			(7 ENDSECPT)- (6 BEGSECPT)
14	district	CODE	1	N			
15	city	CHAR	128	N			
16	jurisdiction	CODE	2	N			
20	d1numThruLane	NUM	2	Y	25	NOLANES	
21	d2numThruLane	NUM	1	Y	25	NOLANES	
28	d1avgLaneWidth	NUM	2	N	26	SURWIDTH	
29	d2avgLaneWidth	NUM	2	N	26	SURWIDTH	
31	medianWidth	NUM	3	N	33	MEDWIDTH	

36	d1avgShoulderWidthOut	NUM	2.1	N	30	SLDWIDTH	
37	d1avgShoulderWidthIn	NUM	2.1	N	38	ISLDWDTH	
38	d2avgShoulderWidthOut	NUM	2.1	N	30	SLDWIDTH	
39	d2avgShoulderWidthIn	NUM	2.1	N	38	ISLDWDTH	
42	growthFactor	NUM		N			
43	postedSpeed	NUM		N			
50	openedToTraffic	CHAR	128	N			
52	corridor	CHAR	128	N			
53	comment	CHAR	128	N			

3 Segment Traffic Variables

SAINDEX	SAVAR	SATYPE	SALENGTH	REQUIRED	RCIINDEX	RCIVAR	DEFAULT
54	agencyID	CHAR	8	Y	4	RDWYID	
55	calendarYear	CHAR	8	Y			2007
56	aadtVPD	NUM	6	Y	78	SECTADT	

57	percentHeavyVehicles	NUM	2.2	N	77	AVGTFACT	
58	peakHourlyVolume	NUM	8	N			(78 SECTADT)*(76 AVGKFACT)*(75 AVGDFACT)
59	comment	CHAR	128	N			

4 Ramp Variables without Codes

SAINDEX	SAVAR	SATYPE	SALENGTH	REQUIRED	RCIINDEX	RCIVAR	DEFAULT
120	agencyID	CHAR	128	Y	4	RDWYID	
121	LocSystem	CODE	1	Y	4	RDWYID	
121	LocSystem	CODE	1	Y	6	BEGSECPT	
121	LocSystem	CODE	1	Y	7	ENDSECPT	
123	routeName	CHAR	128	Y	13	LOCALNAM	
124	startSection	CHAR	128	N			
125	startOffset	NUM	6.3	Y	6	BEGSECPT	

126	endSection	CHAR	128	N			
127	endOffset	NUM	6.3	Y	7	ENDSECPT	
128	gisID	CHAR	128	N	102	STATEXPT	
129	altRouteNames	CHAR	128	N			
130	majorRoadName	CHAR	128	N			
131	county	CODE	2	Y	4	RDWYID	FIRST PART
132	comment	CHAR	128	N			
133	district	CODE	1	N			
134	city	CHAR	128	N			
135	jurisdiction	CODE	2	N			
139	rampFreewayConnection	CODE	2	N			
140	rampCrossroadConnection	CODE	2	N			
141	numOfLanes	NUM	2	Y	25	NOLANES	
142	rampLength	NUM	6.3	N			(7 ENDSECPT) - (6 EGSECPT)

143	growthFactor	NUM		N			
144	openedToTraffic	CHAR	128	N			
145	corridor	CHAR	128	N			

5 Ramp Variables with Codes

SAIN DEX	SAVAR	SATY PE	SALEN GTH	REQU IRED	SA CODE	RCIIN DEX	RCIVAR	CODE	DEFAULT
122	Route Type	CODE	2	Y	I	17	FUNCLASS	01	
122	Route Type	CODE	2	Y	I	17	FUNCLASS	11	
122	Route Type	CODE	2	Y	US	113	USROUTE		
122	Route Type	CODE	2	Y	SR	111	STROADNO		
122	Route Type	CODE	2	Y	BR	15	RTESGNCD	2	
122	Route Type	CODE	2	Y	BL	15	RTESGNCD	5	
122	Route Type	CODE	2	Y	SP	15	RTESGNCD	4	
122	Route Type	CODE	2	Y	CR	111	STROADNO		
122	Route Type	CODE	2	Y	TR	17	FUNCLASS	08	
122	Route Type	CODE	2	Y	TR	17	FUNCLASS	17	
122	Route Type	CODE	2	Y	L	17	FUNCLASS	09	
122	Route Type	CODE	2	Y	L	17	FUNCLASS	18	
122	Route Type	CODE	2	Y	O				
122	Route Type	CODE	2	Y	X				
136	areaType	CODE	1	Y	U	23	URBSIZE	2	
136	areaType	CODE	1	Y	U	23	URBSIZE	3	
136	areaType	CODE	1	Y	U	23	URBSIZE	4	
136	areaType	CODE	1	Y	U	23	URBSIZE	5	

136	areaType	CODE	1	Y	R	23	URBSIZE	1	
136	areaType	CODE	1	Y	X				
137	rampType	CODE	2	Y	1	13	LOCALNAM	"OFF-RAMP" or "OFF RAMP"	Capture this word in the record
137	rampType	CODE	2	Y	2	13	LOCALNAM	"ON-RAMP" or "ON RAMP"	Capture this word in the record
137	rampType	CODE	2	Y	3	13	LOCALNAM	"RAMP:"	Capture this word in the record
137	rampType	CODE	2	Y	0	13	LOCALNAM	other	
137	rampType	CODE	2	Y	99	13	LOCALNAM	unknown	
138	rampConfiguration	CODE	2	Y	1	67	INTERCHG	01	
138	rampConfiguration	CODE	2	Y	1	67	INTERCHG	02	
138	rampConfiguration	CODE	2	Y	2	67	INTERCHG	05	
138	rampConfiguration	CODE	2	Y	3	67	INTERCHG		
138	rampConfiguration	CODE	2	Y	4	67	INTERCHG		
138	rampConfiguration	CODE	2	Y	5	67	INTERCHG	03	
138	rampConfiguration	CODE	2	Y	6	67	INTERCHG		

138	rampConfiguration	CODE	2	Y	0	67	INTERCHG	09	
138	rampConfiguration	CODE	2	Y	99	67	INTERCHG		

6 Ramp Traffic Variables

SAIN DEX	SAVAR	SATYPE	SALENGTH	REQUIRED	RCIINDEX	RCIVAR	DEFAULT
146	agencyID	CHAR	8	Y	4	RDWYID	
147	calendarYear	CHAR	8	Y			2007
148	aadtVPD	NUM	6	Y	78	SECTADT	
149	comment	CHAR	128	N			

7 Intersection Variables without Codes

SAINDEX	SAVAR	SATYPE	SALENGTH	REQUIRED	RCIINDEX	RCIVAR	DEFAULT
60	agencyID	CHAR	5	Y	2	Node Number	RDWTBL 25
63	routeName	CHAR	128	Y	13	LOCALNAM	
65	majorRoadSection	CHAR	128	Conditionally Y			

66	majorRoadOffset	NUM	6.3	Y	6	BEGSECPT	
69	minorRoadRouteName	CHAR	128	Y	13	LOCALNAM	
70	minorRoadSection	CHAR	128	Conditionally Y			
71	minorRoadOffset	NUM	6.3	Y	6	BEGSECPT	
72	gisID	CHAR	128	N	102	STATEXPT	
73	altRouteNames	CHAR	128	N			
74	majorRoadName	CHAR	128	N	13	LOCALNAM	
75	minorRoadName	CHAR	128	N	13	LOCALNAM	
77	majBeginInfluenceZone	NUM		N			100
78	minBeginInfluenceZone	NUM		N			50
79	majEndInfluenceZone	NUM		N			100
80	minEndInfluenceZone	NUM		N			50
82	city	CHAR	128	N			
88	offsetDistance	NUM	128	N			
89	growthFactor	NUM	128	N			
90	openedToTraffic	CHAR	128	N			
91	corridor	CHAR	128	N			
92	comment	CHAR	128	N			

8 Intersection Variables with Codes

SAINDEX	SAVAR	SATYPE	SALENGTH	REQUIRED	SA CODE	RCIINDEX	RCIVAR	CODE	DEFAULT
61	majorRoadLocSystem	CODE	1	Y		4	RDWYID		
61	majorRoadLocSystem	CODE	1	Y		6	BEGSECPT		
61	majorRoadLocSystem	CODE	1	Y		7	ENDSECPT		
62	routeType	CODE	2	Y	I	17	FUNCLASS	01	
62	routeType	CODE	2	Y	I	17	FUNCLASS	11	
62	routeType	CODE	2	Y	US	113	USROUTE		
62	routeType	CODE	2	Y	SR	111	STROADNO		
62	routeType	CODE	2	Y	BR	15	RTESGNCD	2	
62	routeType	CODE	2	Y	BL	15	RTESGNCD	5	
62	routeType	CODE	2	Y	SP	15	RTESGNCD	4	
62	routeType	CODE	2	Y	CR	111	STROADNO		
62	routeType	CODE	2	Y	TR	17	FUNCLASS	08	

62	routeType	CODE	2	Y	TR	17	FUNCLASS	17	
62	routeType	CODE	2	Y	L	17	FUNCLASS	09	
62	routeType	CODE	2	Y	L	17	FUNCLASS	18	
62	routeType	CODE	2	Y	O				
62	routeType	CODE	2	Y	X				
64	county	CODE	2	Y		4	RDWYID		FIRST Part
67	minorRoadLocSystem	CODE	1	Y		4	RDWYID		
67	minorRoadLocSystem	CODE	1	Y		6	BEGSECPT		
67	minorRoadLocSystem	CODE	1	Y		7	ENDSECPT		
68	minorRoadRouteType	CODE	2	Y	I	17	FUNCLASS	01	
68	minorRoadRouteType	CODE	2	Y	I	17	FUNCLASS	11	
68	minorRoadRouteType	CODE	2	Y	US	113	USROUTE		
68	minorRoadRouteType	CODE	2	Y	SR	111	STROADNO		
68	minorRoadRouteType	CODE	2	Y	BR	15	RTESGNCD	2	

68	minorRoadRouteType	CODE	2	Y	BL	15	RTESGNCD	5	
68	minorRoadRouteType	CODE	2	Y	SP	15	RTESGNCD	4	
68	minorRoadRouteType	CODE	2	Y	CR	111	STROADNO		
68	minorRoadRouteType	CODE	2	Y	TR	17	FUNCLASS	08	
68	minorRoadRouteType	CODE	2	Y	TR	17	FUNCLASS	17	
68	minorRoadRouteType	CODE	2	Y	L	17	FUNCLASS	09	
68	minorRoadRouteType	CODE	2	Y	L	17	FUNCLASS	18	
68	minorRoadRouteType	CODE	2	Y	O				
68	minorRoadRouteType	CODE	2	Y	X				
76	majorRoadDirection	CODE	2	N	NS	13	RCI Section Direction	1	RDWTBL 22
76	majorRoadDirection	CODE	2	N	NS	13	RCI Section Direction	5	RDWTBL 22
76	majorRoadDirection	CODE	2	N	EW	13	RCI Section Direction	3	RDWTBL

									22
76	majorRoadDirection	CODE	2	N	EW	13	RCI Section Direction	7	RDWTBL 22
76	majorRoadDirection	CODE	2	N	X	13	RCI Section Direction	2	RDWTBL 22
76	majorRoadDirection	CODE	2	N	X	13	RCI Section Direction	6	RDWTBL 22
76	majorRoadDirection	CODE	2	N	X	13	RCI Section Direction	4	RDWTBL 22
76	majorRoadDirection	CODE	2	N	X	13	RCI Section Direction	8	RDWTBL 22
81	district	CODE	2	N	1	4	RDWYID	1,3,4,5,6,7,9, 12,13,91,16, 17	county num

81	district	CODE	2	N	2	4	RDWYID	26,27,28,71,29,30,72,31,32,33,34,35,74,76	county num
81	district	CODE	2	N	3	4	RDWYID	46,47,48,49, 50,51,52,53, 54,55,56,57, 58,59,60,61	county num
81	district	CODE	2	N	4	4	RDWYID	86,88,89,93, 94	county num
81	district	CODE	2	N	5	4	RDWYID	70,73,11,36, 75,92,77,18, 79	county num
81	district	CODE	2	N	6	4	RDWYID	87,90	county num
81	district	CODE	2	N	7	4	RDWYID	2,8,10,14,15	county

									num
83	jurisdiction	CODE	2	N					
84	areaType	CODE	1	Y	U	23	URBSIZE	2	
84	areaType	CODE	1	Y	U	23	URBSIZE	3	
84	areaType	CODE	1	Y	U	23	URBSIZE	4	
84	areaType	CODE	1	Y	U	23	URBSIZE	5	
84	areaType	CODE	1	Y	R	23	URBSIZE	1	
84	areaType	CODE	1	Y	X				
85	intersectionType1	CODE	2	Y					
86	trafficControl1	CODE	2	Y					
87	offsetIntersection	CODE	1	N					

9 Major Road Traffic Variables

SAINDEX	SAVAR	SATYPE	SALENGTH	REQUIRED	RCIINDEX	RCIVAR	DEFAULT
93	agencyID	CHAR	8	Y	4	RDWYID	
94	calendarYear	CHAR	8	Y			2007
95	aadtVPD	NUM	6	Y	78	SECTADT	
96	comment	CHAR	128	N			

10 Minor Road Traffic Variables

SAINDEX	SAVAR	SATYPE	SALENGTH	REQUIRED	RCIINDEX	RCIVAR	DEFAULT
97	agencyID	CHAR	8	Y	4	RDWYID	
98	calendarYear	CHAR	8	Y			2007
99	aadtVPD	NUM	6	Y	78	SECTADT	
100	comment	CHAR	128	N			

11 Crash Variables

X	SA Variable	SA Variable Description	Requirement	SA Co	CAR Variable	CAR	Table

				de		Cod e	No.
150	agencyID	Accident ID	Required				
151	locSystem	Location System	Required	A			
151	locSystem	Location System	Required	B			
151	locSystem	Location System	Required	C			
151	locSystem	Location System	Required	D			
152	routeType	Route Type	Required	I	US ROUTE NUMBER	I	50
152	routeType	Route Type	Required	I	FUNCLASS	01	50
152	routeType	Route Type	Required	I	FUNCLASS	11	50
152	routeType	Route Type	Required	US	FUNCLASS	02	50
152	routeType	Route Type	Required	US	FUNCLASS	12	50
152	routeType	Route Type	Required	US	FUNCLASS	14	50
152	routeType	Route Type	Required	SR	FUNCLASS	06	50
152	routeType	Route Type	Required	SR	FUNCLASS	16	50
152	routeType	Route Type	Required	BR			
152	routeType	Route Type	Required	BL			
152	routeType	Route Type	Required	SP			
152	routeType	Route Type	Required	CR	FUNCLASS	07	50
152	routeType	Route Type	Required	CR	FUNCLASS	17	50
152	routeType	Route Type	Required	TR	FUNCLASS	08	50
152	routeType	Route Type	Required	L	FUNCLASS	09	50
152	routeType	Route Type	Required	L	FUNCLASS	19	50
152	routeType	Route Type	Required	O			
152	routeType	Route Type	Required	X	FUNCLASS	00	50
152	routeType	Route Type	Required	X	FUNCLASS	10	50
153	routeName	Route Name	Required		RDWYID		50
154	county	County	Other		CONTYDOT	26	50

154	county	County	Other		CONTYDOT	27	50
154	county	County	Other		CONTYDOT	46	50
154	county	County	Other		CONTYDOT	28	50
154	county	County	Other		CONTYDOT	70	50
154	county	County	Other		CONTYDOT	86	50
154	county	County	Other		CONTYDOT	86	50
154	county	County	Other		CONTYDOT	47	50
154	county	County	Other		CONTYDOT	01	50
154	county	County	Other		CONTYDOT	02	50
154	county	County	Other		CONTYDOT	71	50
154	county	County	Other		CONTYDOT	03	50
154	county	County	Other		CONTYDOT	29	50
154	county	County	Other		CONTYDOT	04	50
154	county	County	Other		CONTYDOT	30	50
154	county	County	Other		CONTYDOT	72	50
154	county	County	Other		CONTYDOT	48	50
154	county	County	Other		CONTYDOT	73	50
154	county	County	Other		CONTYDOT	49	50
154	county	County	Other		CONTYDOT	50	50
154	county	County	Other		CONTYDOT	31	50
154	county	County	Other		CONTYDOT	05	50
154	county	County	Other		CONTYDOT	51	50
154	county	County	Other		CONTYDOT	32	50
154	county	County	Other		CONTYDOT	06	50
154	county	County	Other		CONTYDOT	07	50
154	county	County	Other		CONTYDOT	08	50
154	county	County	Other		CONTYDOT	09	50
154	county	County	Other		CONTYDOT	10	50

154	county	County	Other		CONTYDOT	52	50
154	county	County	Other		CONTYDOT	88	50
154	county	County	Other		CONTYDOT	88	50
154	county	County	Other		CONTYDOT	53	50
154	county	County	Other		CONTYDOT	54	50
154	county	County	Other		CONTYDOT	33	50
154	county	County	Other		CONTYDOT	11	50
154	county	County	Other		CONTYDOT	12	50
154	county	County	Other		CONTYDOT	55	50
154	county	County	Other		CONTYDOT	34	50
154	county	County	Other		CONTYDOT	56	50
154	county	County	Other		CONTYDOT	35	50
154	county	County	Other		CONTYDOT	13	50
154	county	County	Other		CONTYDOT	36	50
154	county	County	Other		CONTYDOT	89	50
154	county	County	Other		CONTYDOT	89	50
154	county	County	Other		CONTYDOT	87	50
154	county	County	Other		CONTYDOT	87	50
154	county	County	Other		CONTYDOT	90	50
154	county	County	Other		CONTYDOT	90	50
154	county	County	Other		CONTYDOT	74	50
154	county	County	Other		CONTYDOT	57	50
154	county	County	Other		CONTYDOT	91	50
154	county	County	Other		CONTYDOT	91	50
154	county	County	Other		CONTYDOT	75	50
154	county	County	Other		CONTYDOT	92	50
154	county	County	Other		CONTYDOT	92	50
154	county	County	Other		CONTYDOT	93	50

154	county	County	Other		CONTYDOT	93	50
154	county	County	Other		CONTYDOT	14	50
154	county	County	Other		CONTYDOT	15	50
154	county	County	Other		CONTYDOT	16	50
154	county	County	Other		CONTYDOT	76	50
154	county	County	Other		CONTYDOT	58	50
154	county	County	Other		CONTYDOT	17	50
154	county	County	Other		CONTYDOT	77	50
154	county	County	Other		CONTYDOT	78	50
154	county	County	Other		CONTYDOT	78	50
154	county	County	Other		CONTYDOT	94	50
154	county	County	Other		CONTYDOT	94	50
154	county	County	Other		CONTYDOT	18	50
154	county	County	Other		CONTYDOT	37	50
154	county	County	Other		CONTYDOT	38	50
154	county	County	Other		CONTYDOT	39	50
154	county	County	Other		CONTYDOT	79	50
154	county	County	Other		CONTYDOT	79	50
154	county	County	Other		CONTYDOT	59	50
154	county	County	Other		CONTYDOT	60	50
154	county	County	Other		CONTYDOT	61	50
155	locSection	Accident Location Section	Other				50
156	locOffset	Accident Offset	Required		LOCMP		50
157	gisID	GIS Identifier	Other				
158	accidentSegmentID	Agency Segment Identifier	Other				
159	accidentIntersectionID	Agency Intersection Identifier	Other				
159	accidentIntersectionID	Agency Intersection Identifier	Other				

159	accidentIntersectionID	Agency Intersection Identifier	Other				
160	accidentRampID	Agency Ramp Identifier	Other				
160	accidentRampID	Agency Ramp Identifier	Other				
160	accidentRampID	Agency Ramp Identifier	Other				
161	accidentDate	Accident Date	Required		CRASHDTE		50
162	accidentTime	Accident Time	Other		TIMEOFAC		50
163	accidentSeverity1	Accident Severity Level 1	Required	K	ACCISEV	5	50
163	accidentSeverity1	Accident Severity Level 1	Required	A	ACCISEV	4	50
163	accidentSeverity1	Accident Severity Level 1	Required	B	ACCISEV	3	50
163	accidentSeverity1	Accident Severity Level 1	Required	C	ACCISEV	2	50
163	accidentSeverity1	Accident Severity Level 1	Required	P	ACCISEV	1	50
163	accidentSeverity1	Accident Severity Level 1	Required	X			
164	numberOfFatalities	Number of Fatalities	Required		TOT_OF_FATL_NUM		50
165	numberOfInjuries	Number of Non-Fatal Injuries	Required		TOT_OF_INJR_NUM		50
166	junctionRelationship	Relationship to Junction	Required	1	SITELOCA	01	50
166	junctionRelationship	Relationship to Junction	Required	2	SITELOCA	02	50
166	junctionRelationship	Relationship to Junction	Required	3	SITELOCA	03	50
166	junctionRelationship	Relationship to Junction	Required	4	SITELOCA	04	50
166	junctionRelationship	Relationship to Junction	Required	5	SITELOCA	07	50
166	junctionRelationship	Relationship to Junction	Required	5	SITELOCA	08	50
166	junctionRelationship	Relationship to Junction	Required	6			
166	junctionRelationship	Relationship to Junction	Required	7	SITELOCA	05	50
166	junctionRelationship	Relationship to Junction	Required	8	SITELOCA	06	50
166	junctionRelationship	Relationship to Junction	Required	9	SITELOCA	09	50
166	junctionRelationship	Relationship to Junction	Required	9	SITELOCA	10	50
166	junctionRelationship	Relationship to Junction	Required	9	SITELOCA	11	50
166	junctionRelationship	Relationship to Junction	Required	9	SITELOCA	12	50
166	junctionRelationship	Relationship to Junction	Required	9	SITELOCA	13	50

166	junctionRelationship	Relationship to Junction	Required	9	SITELOCA	77	50
166	junctionRelationship	Relationship to Junction	Required	99			
167	drivewayIndicator	Driveway Indicator	Other	1	SITELOCA	01	50
167	drivewayIndicator	Driveway Indicator	Other	1	SITELOCA	02	50
167	drivewayIndicator	Driveway Indicator	Other	1	SITELOCA	03	50
167	drivewayIndicator	Driveway Indicator	Other	1	SITELOCA	05	50
167	drivewayIndicator	Driveway Indicator	Other	1	SITELOCA	06	50
167	drivewayIndicator	Driveway Indicator	Other	1	SITELOCA	07	50
167	drivewayIndicator	Driveway Indicator	Other	1	SITELOCA	08	50
167	drivewayIndicator	Driveway Indicator	Other	1	SITELOCA	09	50
167	drivewayIndicator	Driveway Indicator	Other	1	SITELOCA	10	50
167	drivewayIndicator	Driveway Indicator	Other	1	SITELOCA	11	50
167	drivewayIndicator	Driveway Indicator	Other	1	SITELOCA	12	50
167	drivewayIndicator	Driveway Indicator	Other	1	SITELOCA	13	50
167	drivewayIndicator	Driveway Indicator	Other	2	SITELOCA	04	50
167	drivewayIndicator	Driveway Indicator	Other	3			
167	drivewayIndicator	Driveway Indicator	Other	99	SITELOCA	77	50
168	light Condition	Light Condition	Other	1	LGHTCOND	01	50
168	light Condition	Light Condition	Other	2	LGHTCOND	02	50
168	light Condition	Light Condition	Other	3	LGHTCOND	03	50
168	light Condition	Light Condition	Other	4	LGHTCOND	04	50
168	light Condition	Light Condition	Other	5	LGHTCOND	05	50
168	light Condition	Light Condition	Other	6			
168	light Condition	Light Condition	Other	7			
168	light Condition	Light Condition	Other	99	LIGHTING CONDITION	88	50
169	weatherCondition	Weather Condition	Other	1	WEATCOND	01	50
169	weatherCondition	Weather Condition	Other	2	WEATCOND	02	50
169	weatherCondition	Weather Condition	Other	3	WEATCOND	04	50

169	weatherCondition	Weather Condition	Other	4	WEATCOND	03	50
169	weatherCondition	Weather Condition	Other	5			
169	weatherCondition	Weather Condition	Other	6			
169	weatherCondition	Weather Condition	Other	7			
169	weatherCondition	Weather Condition	Other	8			
169	weatherCondition	Weather Condition	Other	9			
169	weatherCondition	Weather Condition	Other	10			
169	weatherCondition	Weather Condition	Other	99	WEATCOND	88	50
170	surfaceCondition	Roadway Surface Condition	Other	1	RDSURFCD	01	50
170	surfaceCondition	Roadway Surface Condition	Other	2	RDSURFCD	02	50
170	surfaceCondition	Roadway Surface Condition	Other	3			
170	surfaceCondition	Roadway Surface Condition	Other	4			
170	surfaceCondition	Roadway Surface Condition	Other	5	RDSURFCD	04	50
170	surfaceCondition	Roadway Surface Condition	Other	6	RDSURFCD	03	50
170	surfaceCondition	Roadway Surface Condition	Other	7			
170	surfaceCondition	Roadway Surface Condition	Other	8			
170	surfaceCondition	Roadway Surface Condition	Other	9			
170	surfaceCondition	Roadway Surface Condition	Other	10			
170	surfaceCondition	Roadway Surface Condition	Other	99	RDSURFCD	88	50
171	collisionType	Accident Type and Manner of Collision	Required	1	FRST_EVNT_CAUS_CD	08	51
171	collisionType	Accident Type and Manner of Collision	Required	2	FRST_EVNT_CAUS_CD	14	51
171	collisionType	Accident Type and Manner of Collision	Required	3	FRST_EVNT_CAUS_CD	11	51
171	collisionType	Accident Type and Manner of Collision	Required	3	FRST_EVNT_CAUS_CD	12	51
171	collisionType	Accident Type and Manner of Collision	Required	3	FRST_EVNT_CAUS_CD	13	51
171	collisionType	Accident Type and Manner of Collision	Required	4	FRST_EVNT_CAUS_CD	10	51
171	collisionType	Accident Type and Manner of Collision	Required	5	FRST_EVNT_CAUS_CD	15	51
171	collisionType	Accident Type and Manner of Collision	Required	6	FRST_EVNT_CAUS_CD	27	51
171	collisionType	Accident Type and Manner of Collision	Required	7	FRST_EVNT_CAUS_CD	16	51

171	collisionType	Accident Type and Manner of Collision	Required	7	FRST_EVNT_CAUS_CD	17	51
171	collisionType	Accident Type and Manner of Collision	Required	7	FRST_EVNT_CAUS_CD	18	51
171	collisionType	Accident Type and Manner of Collision	Required	7	FRST_EVNT_CAUS_CD	19	51
171	collisionType	Accident Type and Manner of Collision	Required	7	FRST_EVNT_CAUS_CD	20	51
171	collisionType	Accident Type and Manner of Collision	Required	7	FRST_EVNT_CAUS_CD	22	51
171	collisionType	Accident Type and Manner of Collision	Required	7	FRST_EVNT_CAUS_CD	23	51
171	collisionType	Accident Type and Manner of Collision	Required	7	FRST_EVNT_CAUS_CD	24	51
171	collisionType	Accident Type and Manner of Collision	Required	7	FRST_EVNT_CAUS_CD	25	51
171	collisionType	Accident Type and Manner of Collision	Required	8	FRST_EVNT_CAUS_CD	21	51
171	collisionType	Accident Type and Manner of Collision	Required	8	FRST_EVNT_CAUS_CD	26	51
171	collisionType	Accident Type and Manner of Collision	Required	8	FRST_EVNT_CAUS_CD	28	51
171	collisionType	Accident Type and Manner of Collision	Required	8	FRST_EVNT_CAUS_CD	29	51
171	collisionType	Accident Type and Manner of Collision	Required	8	FRST_EVNT_CAUS_CD	30	51
171	collisionType	Accident Type and Manner of Collision	Required	8	FRST_EVNT_CAUS_CD	39	51
171	collisionType	Accident Type and Manner of Collision	Required	9	FRST_EVNT_CAUS_CD	31	51
171	collisionType	Accident Type and Manner of Collision	Required	10	FRST_EVNT_CAUS_CD	34	51
171	collisionType	Accident Type and Manner of Collision	Required	10	FRST_EVNT_CAUS_CD	35	51
171	collisionType	Accident Type and Manner of Collision	Required	11	FRST_EVNT_CAUS_CD	32	51
171	collisionType	Accident Type and Manner of Collision	Required	11	FRST_EVNT_CAUS_CD	33	51
171	collisionType	Accident Type and Manner of Collision	Required	11	FRST_EVNT_CAUS_CD	36	51
171	collisionType	Accident Type and Manner of Collision	Required	11	FRST_EVNT_CAUS_CD	37	51
171	collisionType	Accident Type and Manner of Collision	Required	11	FRST_EVNT_CAUS_CD	38	51
171	collisionType	Accident Type and Manner of Collision	Required	21	FRST_EVNT_CAUS_CD	01	51
171	collisionType	Accident Type and Manner of Collision	Required	22	FRST_EVNT_CAUS_CD	02	51
171	collisionType	Accident Type and Manner of Collision	Required	23			
171	collisionType	Accident Type and Manner of Collision	Required	24	FRST_EVNT_CAUS_CD	03	51
171	collisionType	Accident Type and Manner of Collision	Required	25	FRST_EVNT_CAUS_CD	06	51
171	collisionType	Accident Type and Manner of Collision	Required	26			

171	collisionType	Accident Type and Manner of Collision	Required	27	FRST_EVNT_CAUS_CD	04	51
171	collisionType	Accident Type and Manner of Collision	Required	27	FRST_EVNT_CAUS_CD	05	51
171	collisionType	Accident Type and Manner of Collision	Required	27	FRST_EVNT_CAUS_CD	07	51
171	collisionType	Accident Type and Manner of Collision	Required	27	FRST_EVNT_CAUS_CD	09	51
171	collisionType	Accident Type and Manner of Collision	Required	99	FRST_EVNT_CAUS_CD	00	51
172	environmentCondition	Contributing Circumstances, Environment	Other	1			
172	environmentCondition	Contributing Circumstances, Environment	Other	2			
172	environmentCondition	Contributing Circumstances, Environment	Other	3			
172	environmentCondition	Contributing Circumstances, Environment	Other	4			
172	environmentCondition	Contributing Circumstances, Environment	Other	5			
172	environmentCondition	Contributing Circumstances, Environment	Other	6			
172	environmentCondition	Contributing Circumstances, Environment	Other	99			
173	roadCondition	Contributing Circumstances, Road	Other	1	FRST_RDCND_CRSH_CD	01	50
173	roadCondition	Contributing Circumstances, Road	Other	2			
173	roadCondition	Contributing Circumstances, Road	Other	3			
173	roadCondition	Contributing Circumstances, Road	Other	4	FRST_RDCND_CRSH_CD	05	50
173	roadCondition	Contributing Circumstances, Road	Other	5			
173	roadCondition	Contributing Circumstances, Road	Other	6	FRST_RDCND_CRSH_CD	09	50
173	roadCondition	Contributing Circumstances, Road	Other	7	FRST_RDCND_CRSH_CD	02	50
173	roadCondition	Contributing Circumstances, Road	Other	8			
173	roadCondition	Contributing Circumstances, Road	Other	9	FRST_RDCND_CRSH_CD	06	50
173	roadCondition	Contributing Circumstances, Road	Other	10			
173	roadCondition	Contributing Circumstances, Road	Other	11			
173	roadCondition	Contributing Circumstances, Road	Other	99	FRST_RDCND_CRSH_CD	77	50
174	schoolBus	School Bus Related	Other	1	VEHUSE	77	51
174	schoolBus	School Bus Related	Other	2	VEHUSE	05	51
174	schoolBus	School Bus Related	Other	2	VEHUSE	06	51
174	schoolBus	School Bus Related	Other	3			

174	schoolBus	School Bus Related	Other	99	VEHUSE	00	51
175	workZone	Work Zone Related	Other	Y	FRST_RDCND_CRSH_CD	02	50
175	workZone	Work Zone Related	Other	Y	FRST_RDCND_CRSH_CD	04	50
175	workZone	Work Zone Related	Other	N	FRST_RDCND_CRSH_CD	01	50
175	workZone	Work Zone Related	Other	N	FRST_RDCND_CRSH_CD	03	50
175	workZone	Work Zone Related	Other	N	FRST_RDCND_CRSH_CD	05	50
175	workZone	Work Zone Related	Other	N	FRST_RDCND_CRSH_CD	06	50
175	workZone	Work Zone Related	Other	N	FRST_RDCND_CRSH_CD	07	50
175	workZone	Work Zone Related	Other	N	FRST_RDCND_CRSH_CD	08	50
175	workZone	Work Zone Related	Other	N	FRST_RDCND_CRSH_CD	09	50
175	workZone	Work Zone Related	Other	X	FRST_RDCND_CRSH_CD	77	50
176	numVehicles	Number of Vehicles Involved	Required		TOT_OF_VHCL_NUM		50
177	drugInvolved	Alcohol/Drug Involvement	Other	1	ALCINVCD	0	50
177	drugInvolved	Alcohol/Drug Involvement	Other	2	ALCINVCD	1	50
177	drugInvolved	Alcohol/Drug Involvement	Other	3	ALCINVCD	2	50
177	drugInvolved	Alcohol/Drug Involvement	Other	4	ALCINVCD	3	50
177	drugInvolved	Alcohol/Drug Involvement	Other	99	ALCINVCD	4	50
178	towIndicator	Tow-Away Indicator	Other	Y			
178	towIndicator	Tow-Away Indicator	Other	N			
178	towIndicator	Tow-Away Indicator	Other	X			
179	runoffIndicator	Run-Off Road Indicator	Other	Y	FRST_EVNT_CAUS_CD	30	51
179	runoffIndicator	Run-Off Road Indicator	Other	Y	SCND_EVNT_CAUS_CD	30	51
179	runoffIndicator	Run-Off Road Indicator	Other	N			
179	runoffIndicator	Run-Off Road Indicator	Other	X	FRST_EVNT_CAUS_CD	0	51
179	runoffIndicator	Run-Off Road Indicator	Other	X	SCND_EVNT_CAUS_CD	0	51
180	pedestrianIndicator	Pedestrian Indicator	Other	Y	FRST_EVNT_CAUS_CD	10	51
180	pedestrianIndicator	Pedestrian Indicator	Other	Y	SCND_EVNT_CAUS_CD	10	51
180	pedestrianIndicator	Pedestrian Indicator	Other	N			

180	pedestrianIndicator	Pedestrian Indicator	Other	X	FRST_EVNT_CAUS_CD	0	51
180	pedestrianIndicator	Pedestrian Indicator	Other	X	SCND_EVNT_CAUS_CD	0	51
181	bikeIndicator	Bicycle Indicator	Other	Y	FRST_EVNT_CAUS_CD	11	51
181	bikeIndicator	Bicycle Indicator	Other	Y	SCND_EVNT_CAUS_CD	11	51
181	bikeIndicator	Bicycle Indicator	Other	Y	FRST_EVNT_CAUS_CD	12	51
181	bikeIndicator	Bicycle Indicator	Other	Y	SCND_EVNT_CAUS_CD	12	51
181	bikeIndicator	Bicycle Indicator	Other	N			
181	bikeIndicator	Bicycle Indicator	Other	X	FRST_EVNT_CAUS_CD	0	51
181	bikeIndicator	Bicycle Indicator	Other	X	SCND_EVNT_CAUS_CD	0	51
182	sideOfDividedHighway	Divided Highway Flag-Side of Road	Other	NB	LOCDIRCD	N	50
182	sideOfDividedHighway	Divided Highway Flag-Side of Road	Other	SB	LOCDIRCD	S	50
182	sideOfDividedHighway	Divided Highway Flag-Side of Road	Other	EB	LOCDIRCD	E	50
182	sideOfDividedHighway	Divided Highway Flag-Side of Road	Other	WB	LOCDIRCD	W	50
182	sideOfDividedHighway	Divided Highway Flag-Side of Road	Other	NA			
182	sideOfDividedHighway	Divided Highway Flag-Side of Road	Other	X	LOCDIRCD	U	50
183	v1initialTravelDirection	Initial Direction of Travel - Vehicle 1	Required	NB	TRAVDIR	N	51
183	v1initialTravelDirection	Initial Direction of Travel - Vehicle 1	Required	SB	TRAVDIR	S	51
183	v1initialTravelDirection	Initial Direction of Travel - Vehicle 1	Required	EB	TRAVDIR	E	51
183	v1initialTravelDirection	Initial Direction of Travel - Vehicle 1	Required	WB	TRAVDIR	W	51
183	v1initialTravelDirection	Initial Direction of Travel - Vehicle 1	Required	NO			
183	v1initialTravelDirection	Initial Direction of Travel - Vehicle 1	Required	XX	TRAVDIR	U	51

184	v2initialTravelDirection	Initial Direction of Travel - Vehicle 2	Required	NB	TRAVDIR	N	51
184	v2initialTravelDirection	Initial Direction of Travel - Vehicle 2	Required	SB	TRAVDIR	S	51
184	v2initialTravelDirection	Initial Direction of Travel - Vehicle 2	Required	EB	TRAVDIR	E	51
184	v2initialTravelDirection	Initial Direction of Travel - Vehicle 2	Required	WB	TRAVDIR	W	51
184	v2initialTravelDirection	Initial Direction of Travel - Vehicle 2	Required	NO			
184	v2initialTravelDirection	Initial Direction of Travel - Vehicle 2	Required	XX	TRAVDIR	U	51
185	v1vehicleManeuver	Vehicle Maneuver/Action - Vehicle 1	Required	1	VEHMOVE	01	51
185	v1vehicleManeuver	Vehicle Maneuver/Action - Vehicle 1	Required	2	VEHMOVE	04	51
185	v1vehicleManeuver	Vehicle Maneuver/Action - Vehicle 1	Required	3	VEHMOVE	06	51
185	v1vehicleManeuver	Vehicle Maneuver/Action - Vehicle 1	Required	4	VEHMOVE	11	51
185	v1vehicleManeuver	Vehicle Maneuver/Action - Vehicle 1	Required	5	VEHMOVE	05	51
185	v1vehicleManeuver	Vehicle Maneuver/Action - Vehicle 1	Required	6	VEHMOVE	03	51
185	v1vehicleManeuver	Vehicle Maneuver/Action - Vehicle 1	Required	7	VEHMOVE	10	51
185	v1vehicleManeuver	Vehicle Maneuver/Action - Vehicle 1	Required	8			
185	v1vehicleManeuver	Vehicle Maneuver/Action - Vehicle 1	Required	9			
185	v1vehicleManeuver	Vehicle Maneuver/Action - Vehicle 1	Required	10	VEHMOVE	08	51
185	v1vehicleManeuver	Vehicle Maneuver/Action - Vehicle 1	Required	10	VEHMOVE	09	51
185	v1vehicleManeuver	Vehicle Maneuver/Action - Vehicle 1	Required	11			
185	v1vehicleManeuver	Vehicle Maneuver/Action - Vehicle 1	Required	12	VEHMOVE	02	51
185	v1vehicleManeuver	Vehicle Maneuver/Action - Vehicle 1	Required	13			
185	v1vehicleManeuver	Vehicle Maneuver/Action - Vehicle 1	Required	14			
185	v1vehicleManeuver	Vehicle Maneuver/Action - Vehicle 1	Required	99	VEHMOVE	88	51
186	v2vehicleManeuver	Vehicle Maneuver/Action - Vehicle 2	Required	1	VEHMOVE	01	51
186	v2vehicleManeuver	Vehicle Maneuver/Action - Vehicle 2	Required	2	VEHMOVE	04	51

186	v2vehicleManeuver	Vehicle Maneuver/Action - Vehicle 2	Required	3	VEHMOVE	06	51
186	v2vehicleManeuver	Vehicle Maneuver/Action - Vehicle 2	Required	4	VEHMOVE	11	51
186	v2vehicleManeuver	Vehicle Maneuver/Action - Vehicle 2	Required	5	VEHMOVE	05	51
186	v2vehicleManeuver	Vehicle Maneuver/Action - Vehicle 2	Required	6	VEHMOVE	03	51
186	v2vehicleManeuver	Vehicle Maneuver/Action - Vehicle 2	Required	7	VEHMOVE	10	51
186	v2vehicleManeuver	Vehicle Maneuver/Action - Vehicle 2	Required	8			
186	v2vehicleManeuver	Vehicle Maneuver/Action - Vehicle 2	Required	9			
186	v2vehicleManeuver	Vehicle Maneuver/Action - Vehicle 2	Required	10	VEHMOVE	08	51
186	v2vehicleManeuver	Vehicle Maneuver/Action - Vehicle 2	Required	10	VEHMOVE	09	51
186	v2vehicleManeuver	Vehicle Maneuver/Action - Vehicle 2	Required	11			
186	v2vehicleManeuver	Vehicle Maneuver/Action - Vehicle 2	Required	12	VEHMOVE	02	51
186	v2vehicleManeuver	Vehicle Maneuver/Action - Vehicle 2	Required	13			
186	v2vehicleManeuver	Vehicle Maneuver/Action - Vehicle 2	Required	14			
186	v2vehicleManeuver	Vehicle Maneuver/Action - Vehicle 2	Required	99	VEHMOVE	88	51
187	v1vehicleConfiguration	Vehicle Configuration - Vehicle 1	Other	1	VEHTYPE	01	51
187	v1vehicleConfiguration	Vehicle Configuration - Vehicle 1	Other	1	VEHTYPE	02	51
187	v1vehicleConfiguration	Vehicle Configuration - Vehicle 1	Other	2	VEHTYPE	03	51
187	v1vehicleConfiguration	Vehicle Configuration - Vehicle 1	Other	3			
187	v1vehicleConfiguration	Vehicle Configuration - Vehicle 1	Other	4	VEHTYPE	11	51
187	v1vehicleConfiguration	Vehicle Configuration - Vehicle 1	Other	4	VEHTYPE	12	51
187	v1vehicleConfiguration	Vehicle Configuration - Vehicle 1	Other	5	VEHTYPE	07	51
187	v1vehicleConfiguration	Vehicle Configuration - Vehicle 1	Other	6			
187	v1vehicleConfiguration	Vehicle Configuration - Vehicle 1	Other	7	VEHTYPE	04	51
187	v1vehicleConfiguration	Vehicle Configuration - Vehicle 1	Other	8			
187	v1vehicleConfiguration	Vehicle Configuration - Vehicle 1	Other	9	VEHTYPE	06	51
187	v1vehicleConfiguration	Vehicle Configuration - Vehicle 1	Other	10			
187	v1vehicleConfiguration	Vehicle Configuration - Vehicle 1	Other	11			
187	v1vehicleConfiguration	Vehicle Configuration - Vehicle 1	Other	12			

187	v1vehicleConfiguration	Vehicle Configuration - Vehicle 1	Other	13			
187	v1vehicleConfiguration	Vehicle Configuration - Vehicle 1	Other	14	VEHTYPE	09	51
187	v1vehicleConfiguration	Vehicle Configuration - Vehicle 1	Other	15	VEHTYPE	08	51
187	v1vehicleConfiguration	Vehicle Configuration - Vehicle 1	Other	16			
187	v1vehicleConfiguration	Vehicle Configuration - Vehicle 1	Other	17			
187	v1vehicleConfiguration	Vehicle Configuration - Vehicle 1	Other	99	VEHTYPE	00	51
188	v2vehicleConfiguration	Vehicle Configuration - Vehicle 2	Other	1	VEHTYPE	01	51
188	v2vehicleConfiguration	Vehicle Configuration - Vehicle 2	Other	1	VEHTYPE	02	51
188	v2vehicleConfiguration	Vehicle Configuration - Vehicle 2	Other	2	VEHTYPE	03	51
188	v2vehicleConfiguration	Vehicle Configuration - Vehicle 2	Other	3			
188	v2vehicleConfiguration	Vehicle Configuration - Vehicle 2	Other	4	VEHTYPE	11	51
188	v2vehicleConfiguration	Vehicle Configuration - Vehicle 2	Other	4	VEHTYPE	12	51
188	v2vehicleConfiguration	Vehicle Configuration - Vehicle 2	Other	5	VEHTYPE	07	51
188	v2vehicleConfiguration	Vehicle Configuration - Vehicle 2	Other	6			
188	v2vehicleConfiguration	Vehicle Configuration - Vehicle 2	Other	7	VEHTYPE	04	51
188	v2vehicleConfiguration	Vehicle Configuration - Vehicle 2	Other	8			
188	v2vehicleConfiguration	Vehicle Configuration - Vehicle 2	Other	9	VEHTYPE	06	51
188	v2vehicleConfiguration	Vehicle Configuration - Vehicle 2	Other	10			
188	v2vehicleConfiguration	Vehicle Configuration - Vehicle 2	Other	11			
188	v2vehicleConfiguration	Vehicle Configuration - Vehicle 2	Other	12			
188	v2vehicleConfiguration	Vehicle Configuration - Vehicle 2	Other	13			
188	v2vehicleConfiguration	Vehicle Configuration - Vehicle 2	Other	14	VEHTYPE	09	51
188	v2vehicleConfiguration	Vehicle Configuration - Vehicle 2	Other	15	VEHTYPE	08	51
188	v2vehicleConfiguration	Vehicle Configuration - Vehicle 2	Other	16			
188	v2vehicleConfiguration	Vehicle Configuration - Vehicle 2	Other	17			
188	v2vehicleConfiguration	Vehicle Configuration - Vehicle 2	Other	99	VEHTYPE	00	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	1	FRST_EVNT_CAUS_CD	31	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	2	FRST_EVNT_CAUS_CD	34	51

189	v1firstEvent	First Harmful Event - Vehicle 1	Other	2	FRST_EVNT_CAUS_CD	35	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	3			
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	4	FRST_EVNT_CAUS_CD	33	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	5	FRST_EVNT_CAUS_CD	37	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	6	FRST_EVNT_CAUS_CD	32	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	7			
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	8	FRST_EVNT_CAUS_CD	30	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	8	FRST_EVNT_CAUS_CD	36	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	8	FRST_EVNT_CAUS_CD	38	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	8	FRST_EVNT_CAUS_CD	39	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	9			
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	10	FRST_EVNT_CAUS_CD	10	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	11	FRST_EVNT_CAUS_CD	11	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	11	FRST_EVNT_CAUS_CD	12	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	12	FRST_EVNT_CAUS_CD	14	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	13	FRST_EVNT_CAUS_CD	15	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	14	FRST_EVNT_CAUS_CD	13	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	15	FRST_EVNT_CAUS_CD	08	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	16	FRST_EVNT_CAUS_CD	23	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	17	FRST_EVNT_CAUS_CD	01	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	17	FRST_EVNT_CAUS_CD	02	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	17	FRST_EVNT_CAUS_CD	03	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	17	FRST_EVNT_CAUS_CD	04	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	17	FRST_EVNT_CAUS_CD	05	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	17	FRST_EVNT_CAUS_CD	06	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	17	FRST_EVNT_CAUS_CD	07	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	17	FRST_EVNT_CAUS_CD	09	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	18	FRST_EVNT_CAUS_CD	28	51

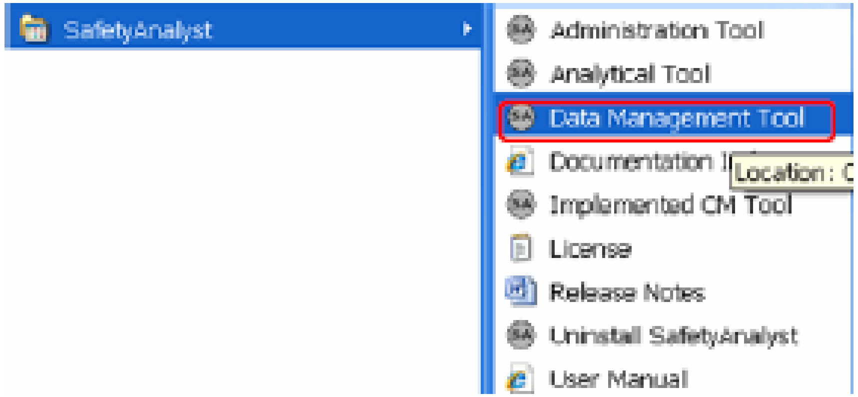
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	19	FRST_EVNT_CAUS_CD	25	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	20	FRST_EVNT_CAUS_CD	21	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	21			
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	22			
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	23			
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	24			
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	25	FRST_EVNT_CAUS_CD	29	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	26			
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	27	FRST_EVNT_CAUS_CD	18	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	28			
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	29	FRST_EVNT_CAUS_CD	20	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	30	FRST_EVNT_CAUS_CD	24	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	31	FRST_EVNT_CAUS_CD	22	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	32	FRST_EVNT_CAUS_CD	17	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	33			
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	34	FRST_EVNT_CAUS_CD	16	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	35			
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	36	FRST_EVNT_CAUS_CD	19	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	37			
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	38	FRST_EVNT_CAUS_CD	27	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	39	FRST_EVNT_CAUS_CD	26	51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	41			51
189	v1firstEvent	First Harmful Event - Vehicle 1	Other	99	FRST_EVNT_CAUS_CD	00	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	1	FRST_EVNT_CAUS_CD	31	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	2	FRST_EVNT_CAUS_CD	34	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	2	FRST_EVNT_CAUS_CD	35	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	3			
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	4	FRST_EVNT_CAUS_CD	33	51

190	v2firstEvent	First Harmful Event - Vehicle 2	Other	5	FRST_EVNT_CAUS_CD	37	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	6	FRST_EVNT_CAUS_CD	32	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	7			
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	8	FRST_EVNT_CAUS_CD	30	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	8	FRST_EVNT_CAUS_CD	36	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	8	FRST_EVNT_CAUS_CD	38	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	8	FRST_EVNT_CAUS_CD	39	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	9			
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	10	FRST_EVNT_CAUS_CD	10	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	11	FRST_EVNT_CAUS_CD	11	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	11	FRST_EVNT_CAUS_CD	12	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	12	FRST_EVNT_CAUS_CD	14	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	13	FRST_EVNT_CAUS_CD	15	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	14	FRST_EVNT_CAUS_CD	13	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	15	FRST_EVNT_CAUS_CD	08	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	16	FRST_EVNT_CAUS_CD	23	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	17	FRST_EVNT_CAUS_CD	01	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	17	FRST_EVNT_CAUS_CD	02	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	17	FRST_EVNT_CAUS_CD	03	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	17	FRST_EVNT_CAUS_CD	04	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	17	FRST_EVNT_CAUS_CD	05	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	17	FRST_EVNT_CAUS_CD	06	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	17	FRST_EVNT_CAUS_CD	07	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	17	FRST_EVNT_CAUS_CD	09	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	18	FRST_EVNT_CAUS_CD	28	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	19	FRST_EVNT_CAUS_CD	25	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	20	FRST_EVNT_CAUS_CD	21	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	21			

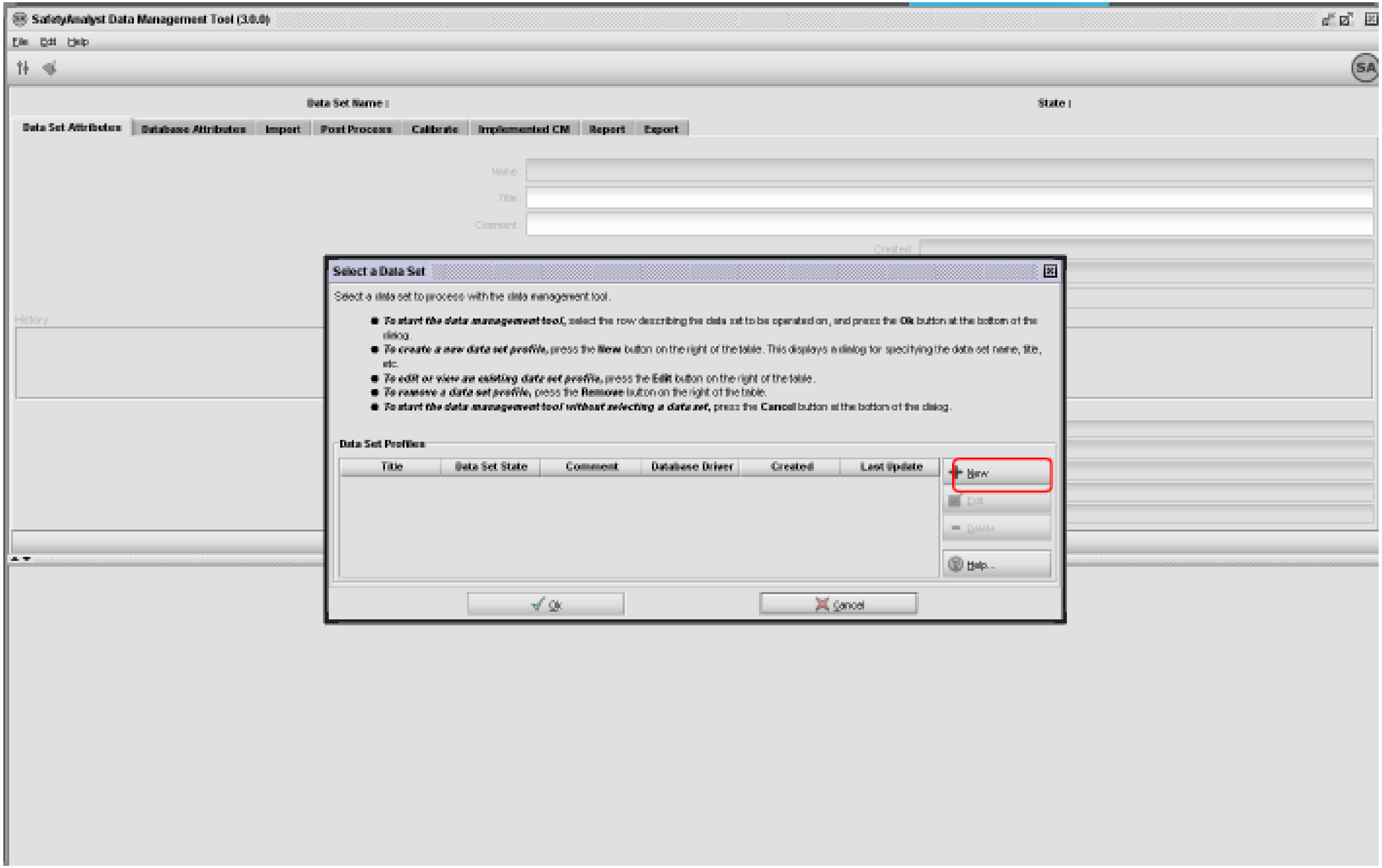
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	22			
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	23			
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	24			
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	25	FRST_EVNT_CAUS_CD	29	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	26	FRST_EVNT_CAUS_CD	77	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	27	FRST_EVNT_CAUS_CD	18	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	28			
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	29	FRST_EVNT_CAUS_CD	20	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	30	FRST_EVNT_CAUS_CD	24	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	31	FRST_EVNT_CAUS_CD	22	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	32	FRST_EVNT_CAUS_CD	17	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	33			
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	34	FRST_EVNT_CAUS_CD	16	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	35			
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	36	FRST_EVNT_CAUS_CD	19	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	37			
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	38	FRST_EVNT_CAUS_CD	27	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	39	FRST_EVNT_CAUS_CD	26	51
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	41			
190	v2firstEvent	First Harmful Event - Vehicle 2	Other	99	FRST_EVNT_CAUS_CD	00	51
191	v1driverDOB	Driver Date of Birth - Vehicle 1	Other		VHCL_OWN_BRTH_DT		51
192	v2driverDOB	Driver Date of Birth - Vehicle 2	Other		VHCL_OWN_BRTH_DT		51

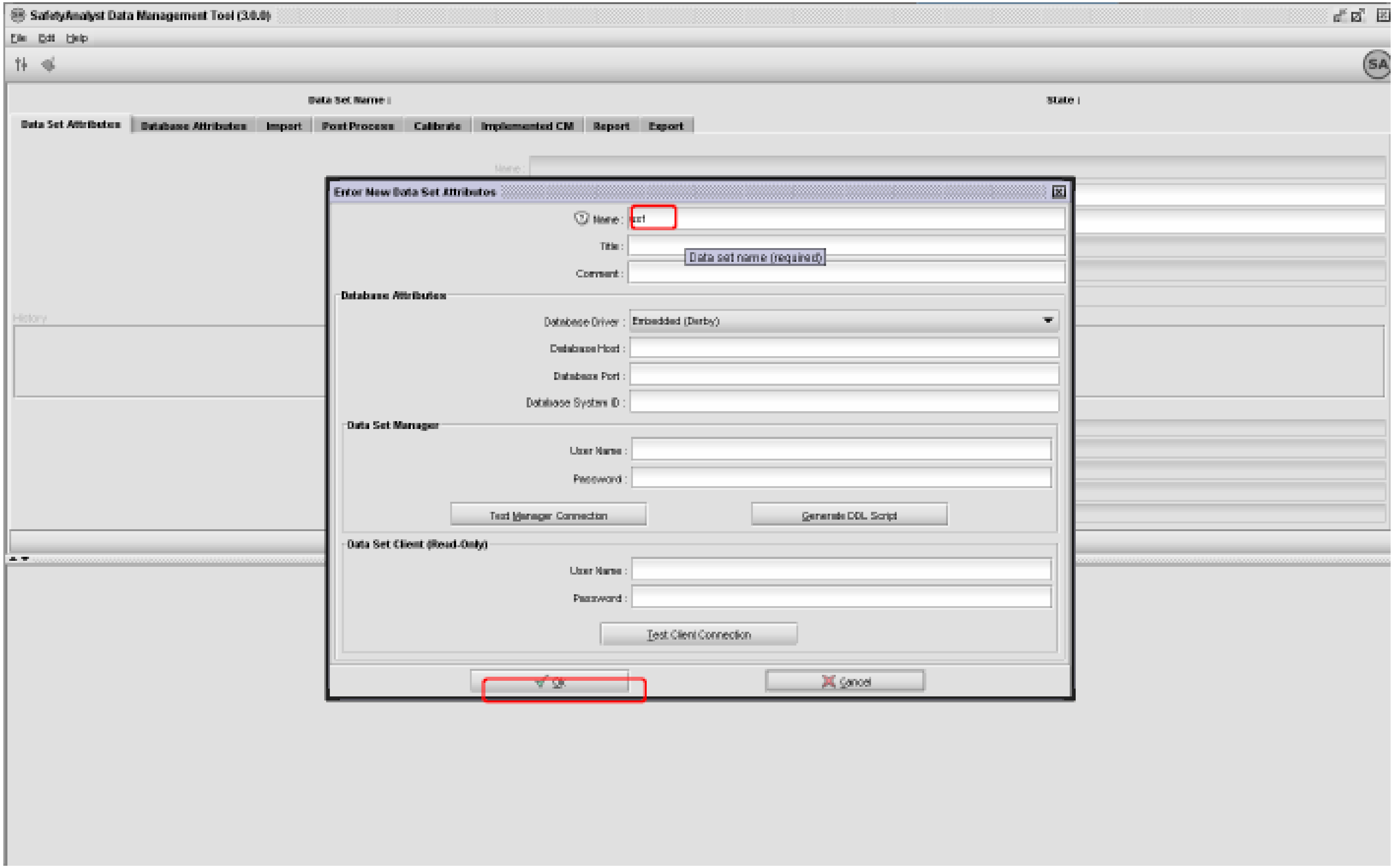
APENDIX D SA Data Import Process

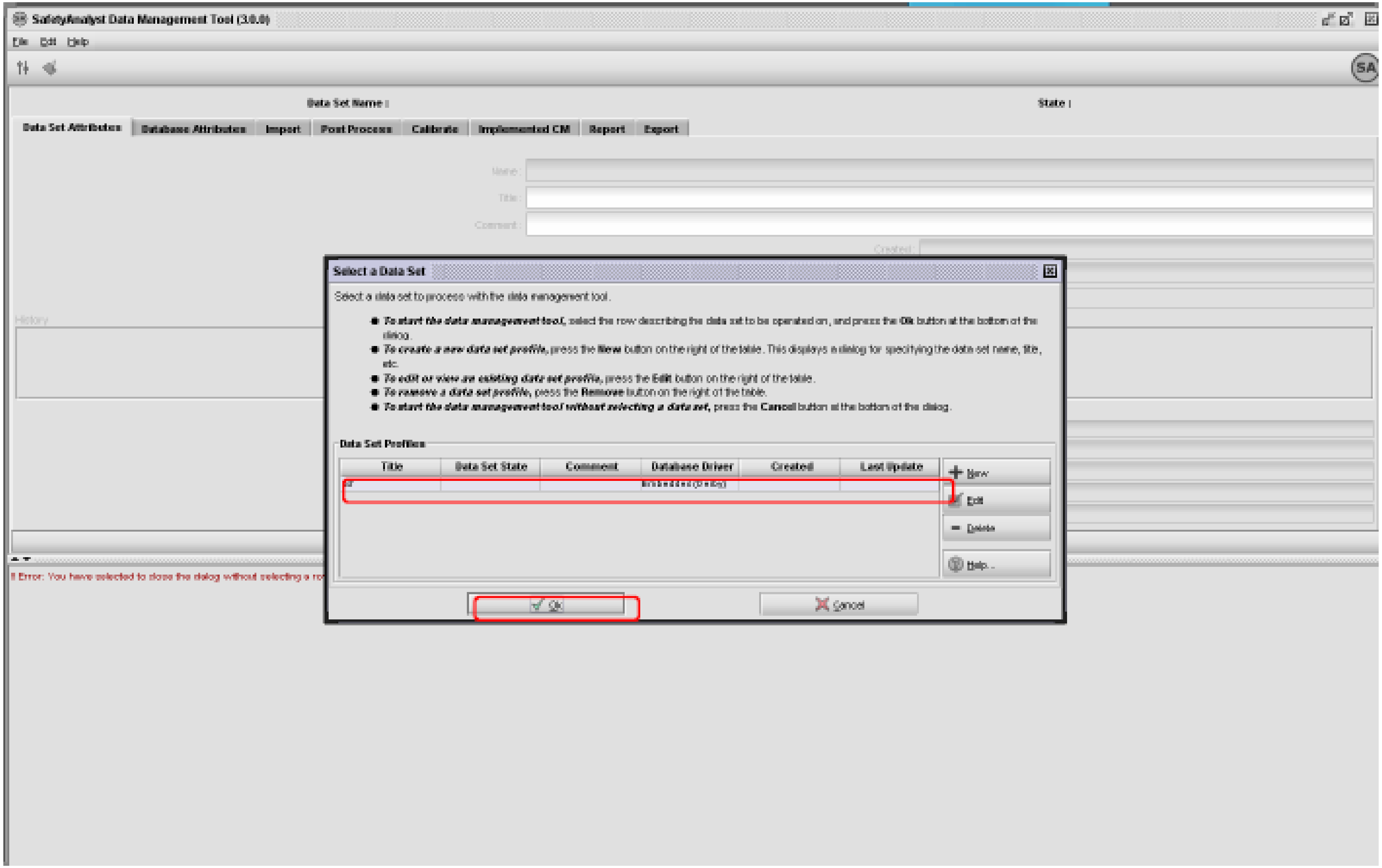
(This part is the sectional drawing from Safety Analyst)

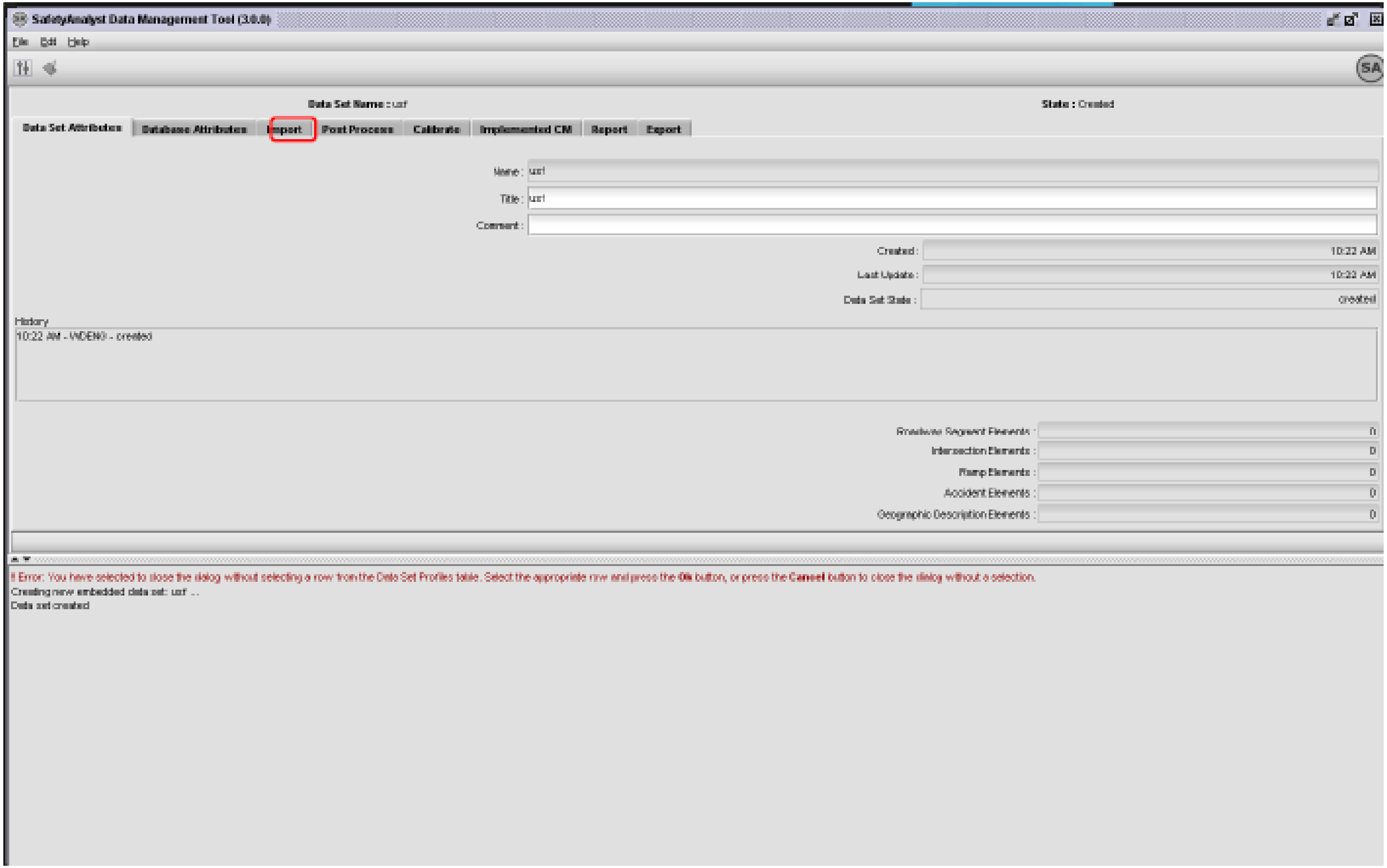

SafetyAnalyst
Administration Tool
Analytical Tool
Data Management Tool
Documentation I
Location : C
Implemented CM Tool
License
Release Notes
Uninstall SafetyAnalyst
User Manual

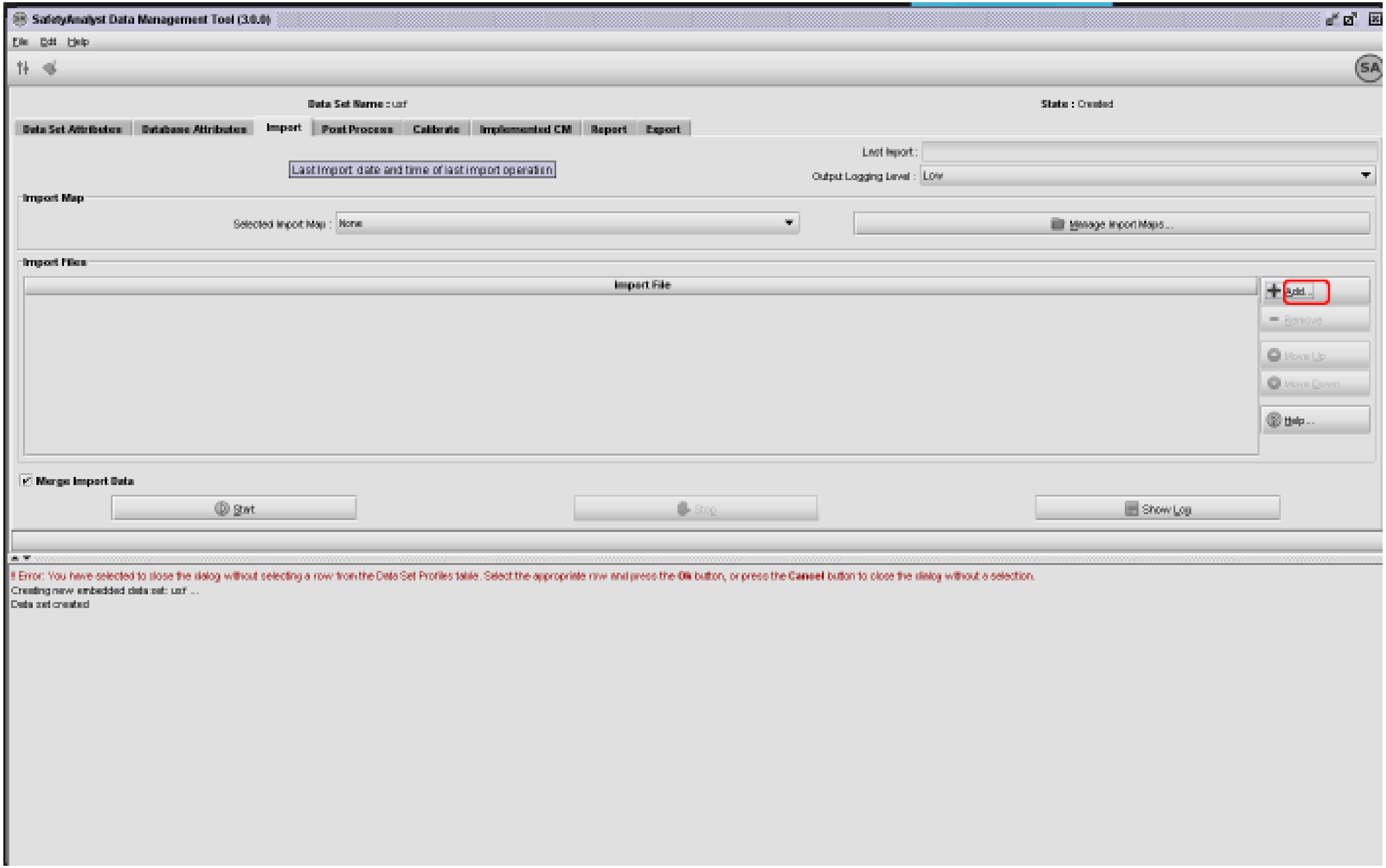

SafetyAnalyst Login
User Name :
Password :
Log In To :
Local Database
Login Message
A User Name and Password are not required when logging in to the Local Database
Ok
Cancel
Databases...
Help ...

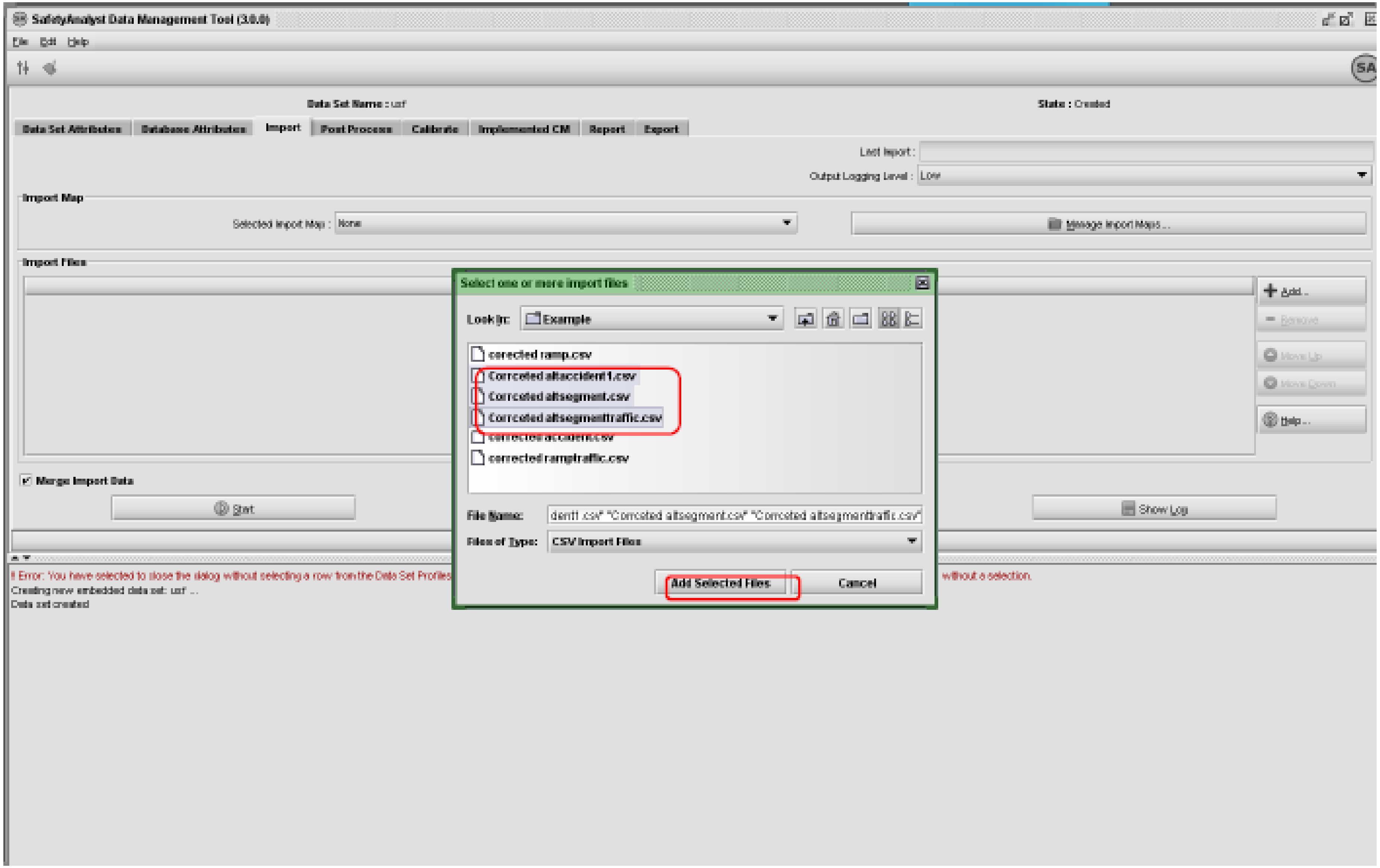

SafetyAnalyst Data Management Tool (3.0.0)
File Edit Help
Data Set Name :
State :
Data Set Attributes
Database Attributes
Import
Post Process
Calibrate
Implemented CM
Report
Export
Name :
Title :
Comment :
Created :
History
Select a Data Set
Select a data set to process with the data management tool.
To start the data management tool, select the row describing the data set to be operated on, and press the Ok button at the bottom of the dialog.
To create a new data set profile, press the New button on the right of the table. This displays a dialog for specifying the data set name, title, etc.
To edit or view an existing data set profile, press the Edit button on the right of the table.
To remove a data set profile, press the Remove button on the right of the table.
To start the data management tool without selecting a data set, press the Cancel button at the bottom of the dialog.
Data Set Profiles
Title
Data Set State
Comment
Database Driver
Created
Last Update
New
Edit
Delete
Help...
Ok
Cancel

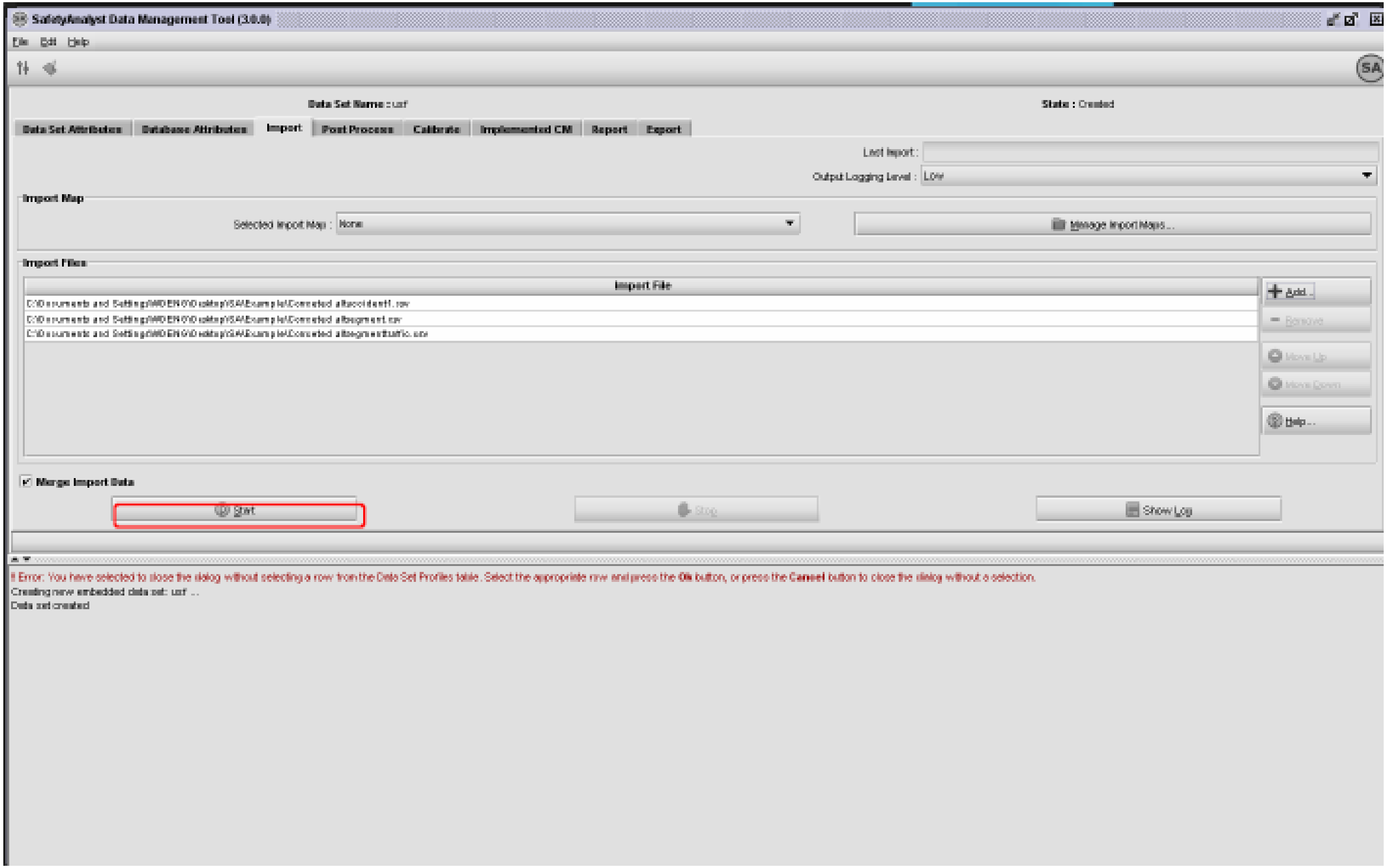

SafetyAnalyst Data Management Tool (3.0.0)
File Edit Help
Data Set Name :
State :
Data Set Attributes
Database Attributes
Import
Post Process
Calibrate
Implemented CM
Report
Export
History
Enter New Data Set Attributes
Name :
Title :
Data set name (required)
Comment :
Database Attributes
Database Driver :
Embedded (Derby)
Database Host :
Database Port :
Database System ID :
Data Set Manager
User Name :
Password :
Test Manager Connection
Generate DDL Script
Data Set Client (Read-Only)
User Name :
Password :
Test Client Connection
OK
Cancel

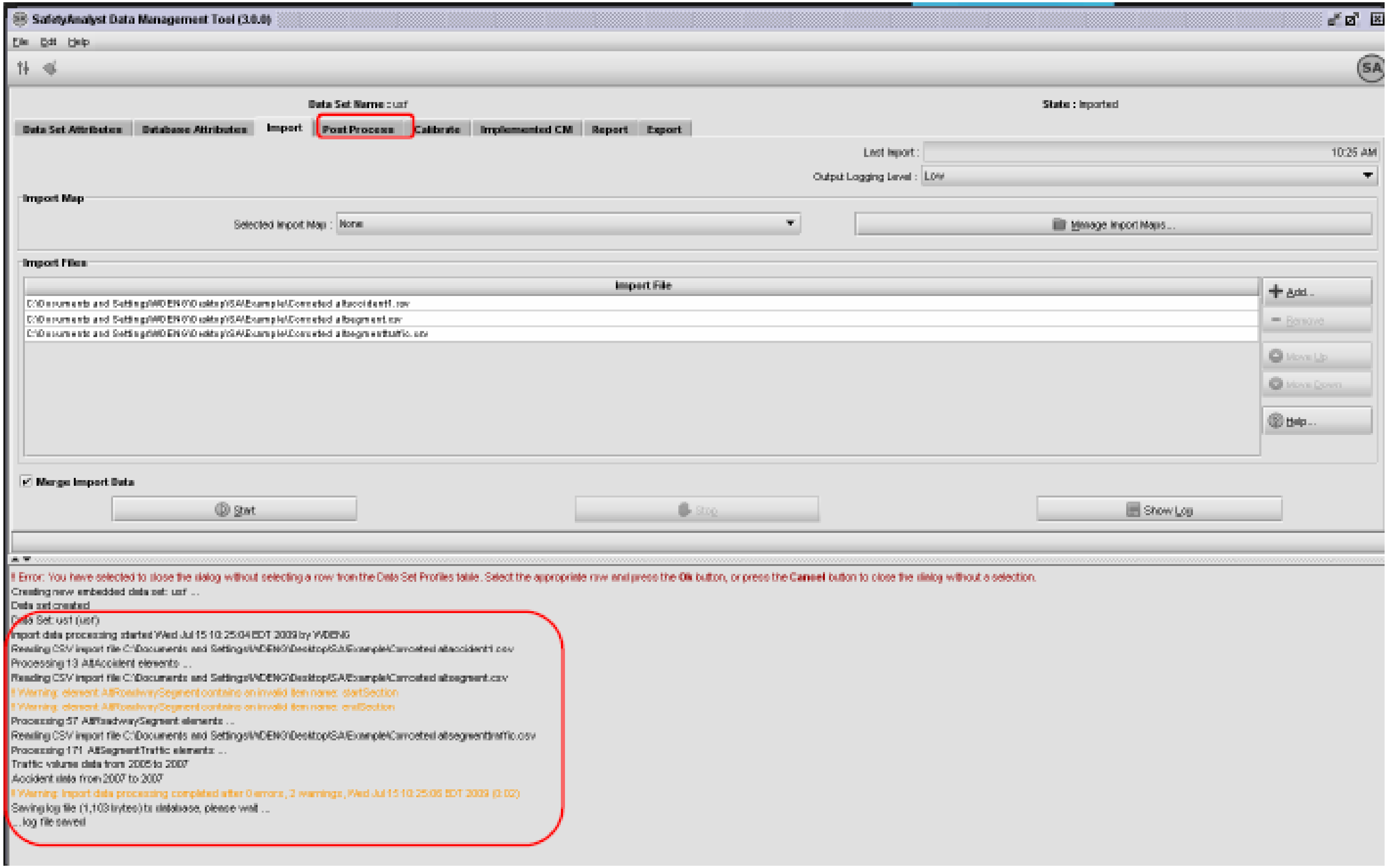

SafetyAnalyst Data Management Tool (3.0.0)
File Edit Help
Data Set Name :
State :
Data Set Attributes
Database Attributes
Import
Post Process
Calibrate
Implemented CM
Report
Export
Select a Data Set
Select a data set to process with the data management tool.
To start the data management tool, select the row describing the data set to be operated on, and press the Ok button at the bottom of the dialog.
To create a new data set profile, press the New button on the right of the table. This displays a dialog for specifying the data set name, title, etc.
To edit or view an existing data set profile, press the Edit button on the right of the table.
To remove a data set profile, press the Remove button on the right of the table.
To start the data management tool without selecting a data set, press the Cancel button at the bottom of the dialog.
Data Set Profiles
Title
Data Set State
Comment
Database Driver
Created
Last Update
New
Edit
Delete
Help...
Ok
Cancel

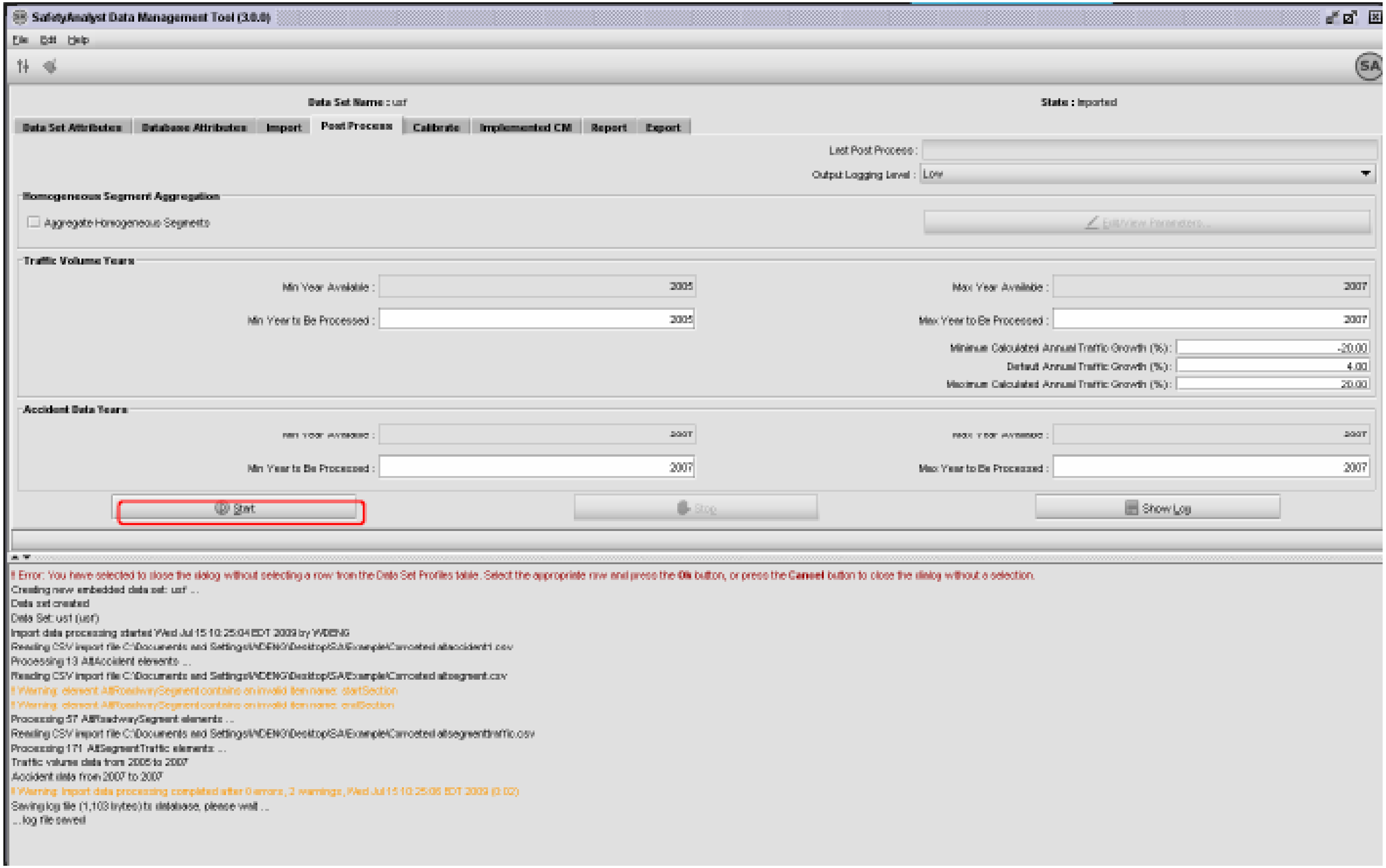

SafetyAnalyst Data Management Tool (3.0.0)
File Edit Help
Data Set Name : usf
State : Created
Data Set Attributes
Database Attributes
Import
Post Process
Calibrate
Implemented CM
Report
Export
Name : usf
Title : usf
Comment :
Created : 10:22 AM
Last Update : 10:22 AM
Data Set State : created
History
10:22 AM - WDENO - created
Roadway Segment Elements : 0
Intersection Elements : 0
Ramp Elements : 0
Accident Elements : 0
Geographic Description Elements : 0
! Error: You have selected to close the dialog without selecting a row from the Data Set Profiles table. Select the appropriate row and press the Ok button, or press the Cancel button to close the dialog without a selection.
Creating new embedded data set: usf ...
Data set created


SafetyAnalyst Data Management Tool (3.0.0)
File Edit Help
Data Set Name : usf
State : Created
Data Set Attributes
Database Attributes
Import
Post Process
Calibrate
Implemented CM
Report
Export
Last Import :
Last Import date and time of last import operation
Output Logging Level : Low
Import Map
Selected Import Map : None
Manage Import Maps ...
Import Files
Import File
Add...
Remove
Move Up
Move Down
Help ...
Merge Import Data
Start
Stop
Show Log
Creating new embedded data set: usf ...
Data set created

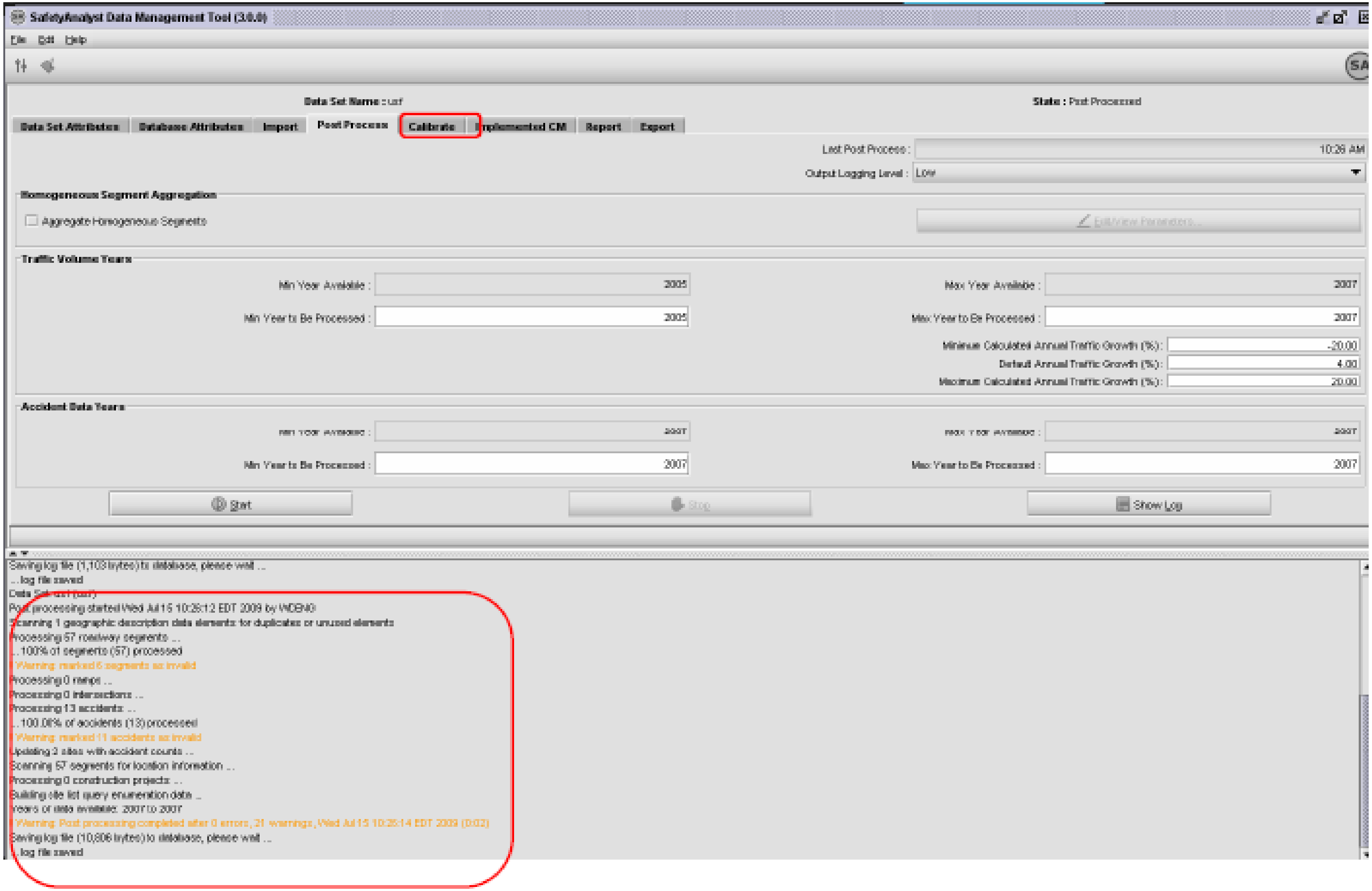

SafetyAnalyst Data Management Tool (3.0.0)
File Edit Help
Data Set Name : usf
State : Created
Data Set Attributes
Database Attributes
Import
Post Process
Calibrate
Implemented CM
Report
Export
Last Import :
Output Logging Level : Low
Import Map
Selected Import Map : None
Manage Import Maps ...
Import Files
Add ...
Remove
Move Up
Move Down
Help ...
Merge Import Data
Start
Show Log
Select one or more import files
Look In: Example
corected ramp.csv
Corrceted altaccident1.csv
Corrceted altsegment.csv
Corrceted altsegmenttraffic.csv
corrected accident.csv
corrected ramptraffic.csv
File Name:
Files of Type: CSV Import Files
Add Selected Files
Cancel
Creating new embedded data set: usf ...
Data set created

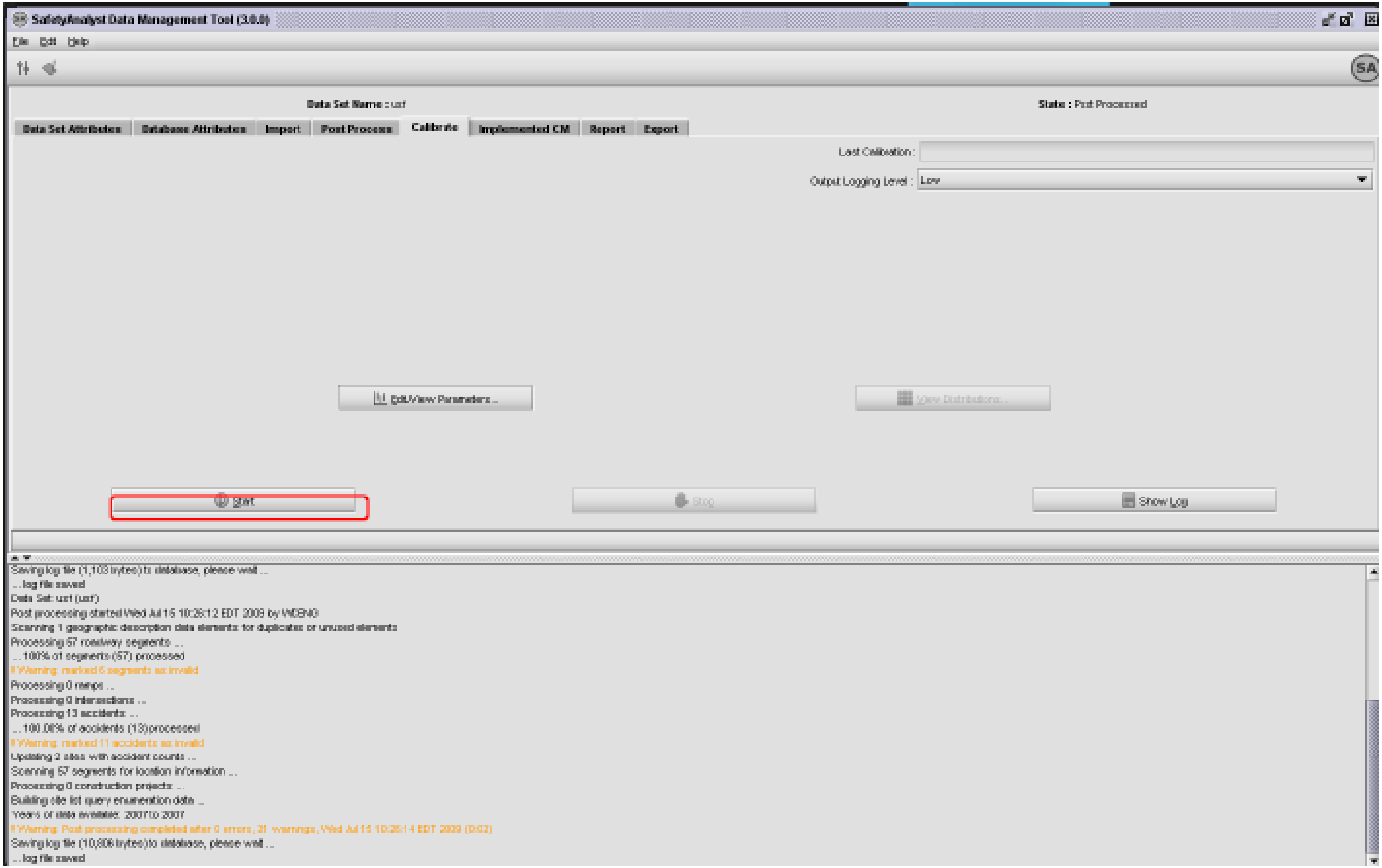

SafetyAnalyst Data Management Tool (3.0.0)
File Edit Help
Data Set Name : usf
State : Created
Data Set Attributes
Database Attributes
Import
Post Process
Calibrate
Implemented CM
Report
Export
Last Import :
Output Logging Level : Low
Import Map
Selected Import Map : None
Manage Import Maps...
Import Files
Import File
Add...
Remove
Move Up
Move Down
Help...
Merge Import Data
Start
Stop
Show Log
Creating new embedded data set: usf ...
Data set created

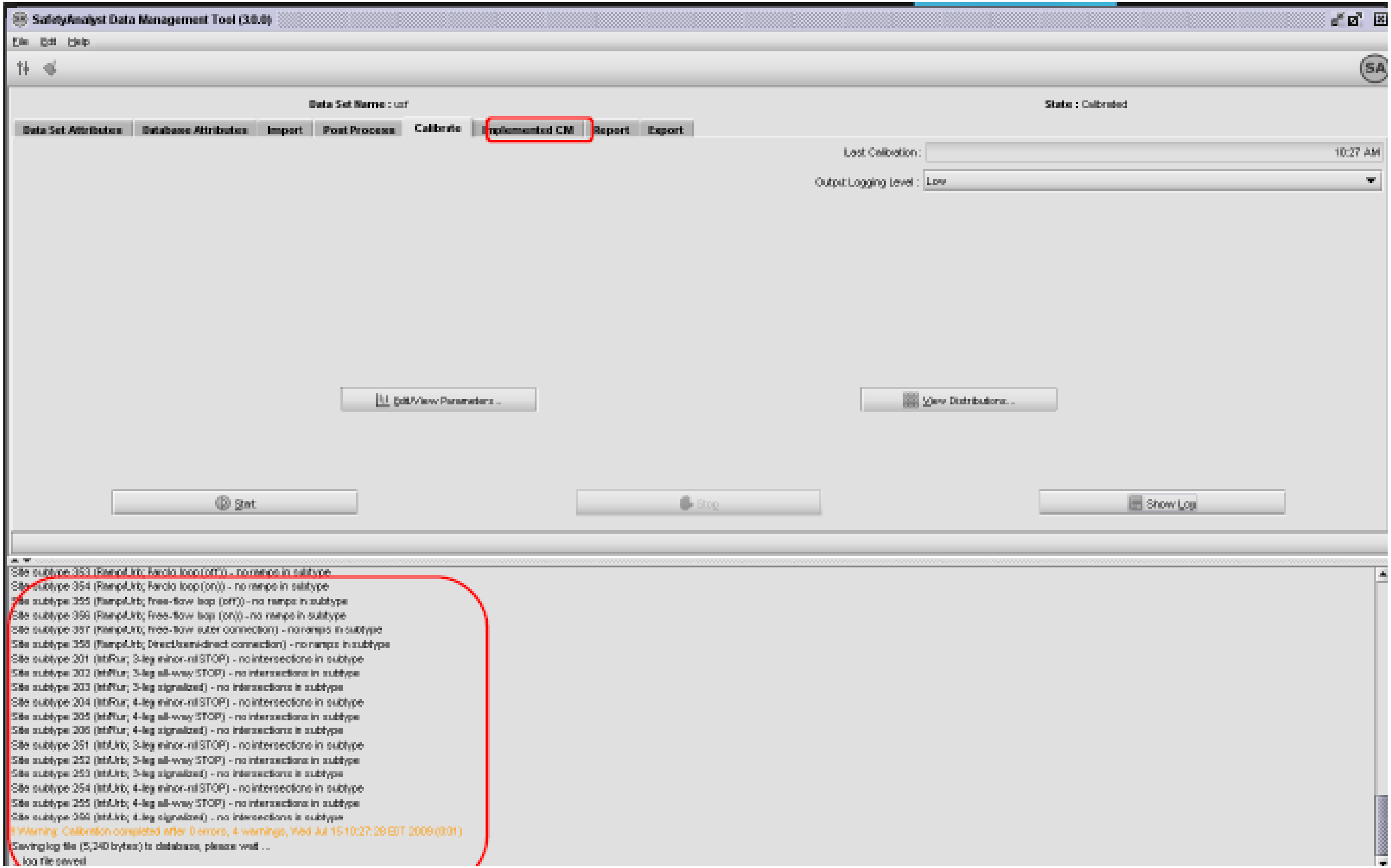

SafetyAnalyst Data Management Tool (3.0.0)
File Edit Help
Data Set Name : usf
State : Imported
Data Set Attributes
Database Attributes
Import
Post Process
Calibrate
Implemented CM
Report
Export
Last Import :
10:25 AM
Output Logging Level : Low
Import Map
Selected Import Map : None
Manage Import Maps...
Import Files
Import File
Add...
Remove
Move Up
Move Down
Help...
Merge Import Data
Start
Stop
Show Log
Creating new embedded data set: usf ...
Data set created
Processing 13 AllAccident elements ...
Processing 57 AllRoadwaySegment elements ...
Processing 171 AllSegmentTraffic elements ...
Traffic volume data from 2005 to 2007
Accident data from 2007 to 2007
...log file saved

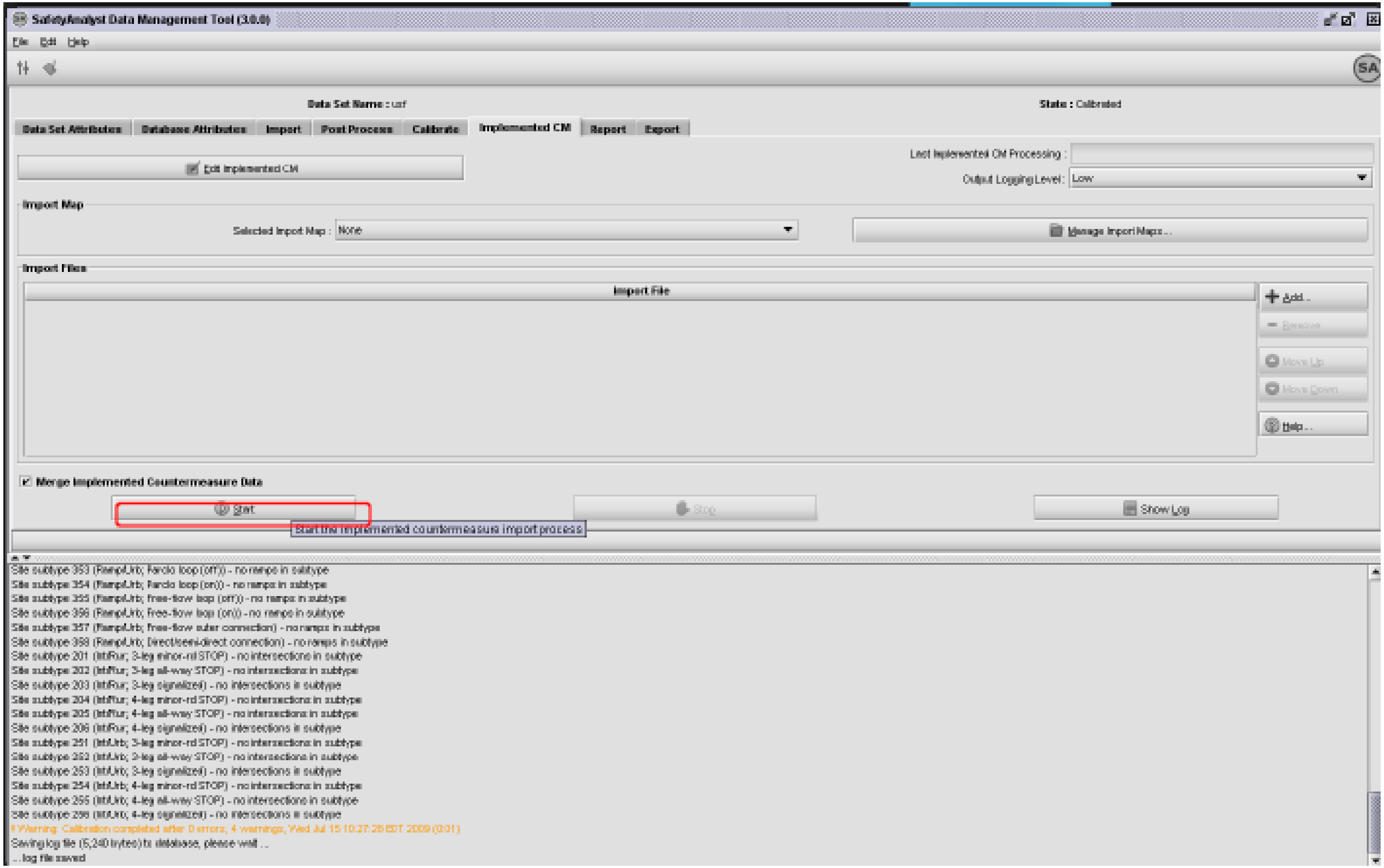


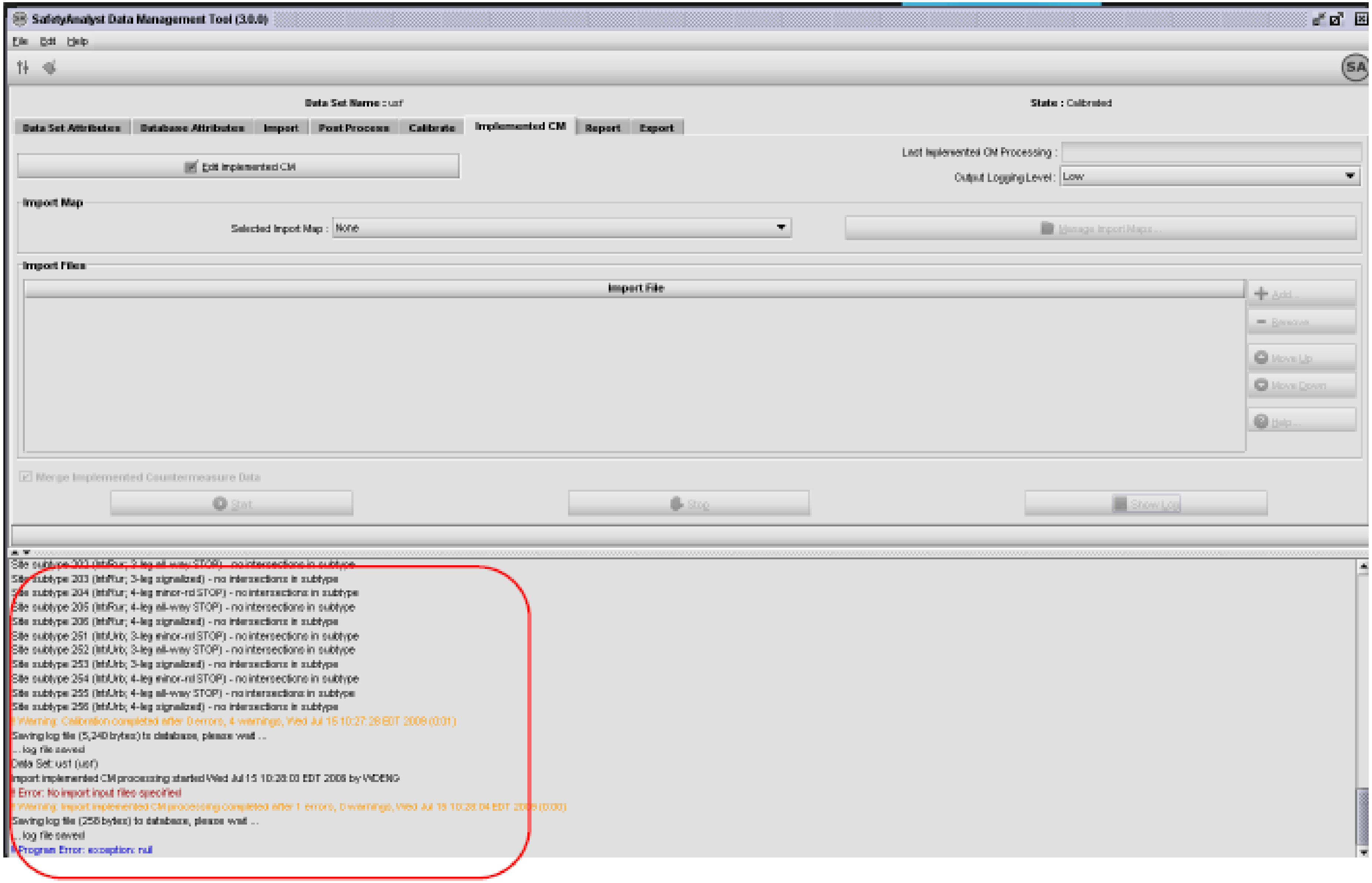
SafetyAnalyst Data Management Tool (3.0.0)
File Edit Help
Data Set Name : usf
State : Imported
Data Set Attributes
Database Attributes
Import
Post Process
Calibrate
Implemented CM
Report
Export
Last Post Process :
Output Logging Level : Low
Homogeneous Segment Aggregation
Aggregate Homogeneous Segments
Traffic Volume Years
Min Year Available : 2005
Max Year Available : 2007
Min Year to Be Processed : 2005
Max Year to Be Processed : 2007
Minimum Calculated Annual Traffic Growth (%): -20.00
Default Annual Traffic Growth (%): 4.00
Maximum Calculated Annual Traffic Growth (%): 20.00
Accident Data Years
Min Year to Be Processed : 2007
Max Year to Be Processed : 2007
Start
Stop
Show Log
Creating new embedded data set: usf ...
Data set created
Data Set: usf (usf)
Processing 13 AllAccident elements ...
Processing 57 AllRoadwaySegment elements ...
Processing 171 AllSegmentTraffic elements ...
Traffic volume data from 2005 to 2007
Accident data from 2007 to 2007
...log file saved


SafetyAnalyst Data Management Tool (3.0.0)
File Edit Help
Data Set Name : usf
State : Post Processed
Data Set Attributes
Database Attributes
Import
Post Process
Calibrate
Implemented CM
Report
Export
Last Post Process :
10:26 AM
Output Logging Level :
Low
Homogeneous Segment Aggregation
Aggregate Homogeneous Segments
Edit/View Parameters...
Traffic Volume Years
Min Year Available :
2005
Max Year Available :
2007
Min Year to Be Processed :
2005
Max Year to Be Processed :
2007
Minimum Calculated Annual Traffic Growth (%):
-20.00
Default Annual Traffic Growth (%):
4.00
Maximum Calculated Annual Traffic Growth (%):
20.00
Accident Data Years
Min Year to Be Processed :
2007
Max Year to Be Processed :
2007
Start
Stop
Show Log
Saving log file (1,103 bytes) to database, please wait ...
...log file saved
Post processing started Wed Jul 15 10:26:12 EDT 2009
Scanning 1 geographic description data elements for duplicates or unused elements
Processing 57 roadway segments ...
...100% of segments (57) processed
Warning: marked 6 segments as invalid
Processing 0 ramps ...
Processing 0 intersections ...
Processing 13 accidents ...
...100.00% of accidents (13) processed
Warning: marked 11 accidents as invalid
Updating 2 sites with accident counts ...
Scanning 57 segments for location information ...
Processing 0 construction projects ...
Building site list query enumeration data ...
Years of data available: 2007 to 2007
Warning: Post processing completed after 0 errors, 21 warnings, Wed Jul 15 10:26:14 EDT 2009 (0:02)
Saving log file (10,806 bytes) to database, please wait ...
...log file saved


SafetyAnalyst Data Management Tool (3.0.0)
File Edit Help
Data Set Name : ust
State : Post Processed
Data Set Attributes
Database Attributes
Import
Post Process
Calibrate
Implemented CM
Report
Export
Last Calibration :
Output Logging Level : Low
Edit/View Parameters ...
View Distributions ...
Start
Stop
Show Log
Saving log file (1,103 bytes) to database, please wait ...
... log file saved
Data Set: ust (ust)
Post processing started Wed Jul 15 10:26:12 EDT 2009 by WDENG
Scanning 1 geographic description data elements for duplicates or unused elements
Processing 57 roadway segments ...
... 100% of segments (57) processed
! Warning: marked 6 segments as invalid
Processing 0 ramps ...
Processing 0 intersections ...
Processing 13 accidents ...
... 100.00% of accidents (13) processed
! Warning: marked 11 accidents as invalid
Updating 2 sites with accident counts ...
Scanning 57 segments for location information ...
Processing 0 construction projects ...
Building site list query enumeration data ...
Years of data available: 2007 to 2007
! Warning: Post processing completed after 0 errors, 21 warnings, Wed Jul 15 10:26:14 EDT 2009 (0:02)
Saving log file (10,306 bytes) to database, please wait ...
... log file saved

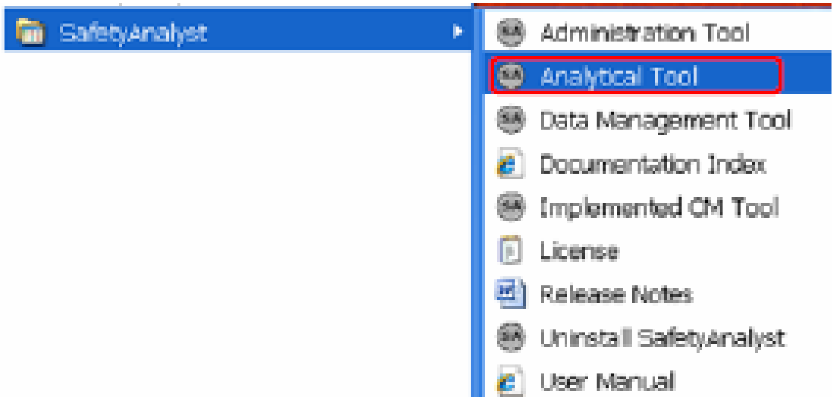

SafetyAnalyst Data Management Tool (3.0.0)
File Edit Help
Data Set Name : usf
State : Calibrated
Data Set Attributes
Database Attributes
Import
Post Process
Calibrate
Implemented CM
Report
Export
Last Calibration :
10:27 AM
Output Logging Level :
Low
Edit/View Parameters ...
View Distributions ...
Start
Stop
Show Log
Site subtype 353 (Ramp/Urb; Parclo loop (off)) - no ramps in subtype
Site subtype 354 (Ramp/Urb; Parclo loop (on)) - no ramps in subtype
Site subtype 355 (Ramp/Urb; Free-flow loop (off)) - no ramps in subtype
Site subtype 356 (Ramp/Urb; Free-flow loop (on)) - no ramps in subtype
Site subtype 357 (Ramp/Urb; Free-flow outer connection) - no ramps in subtype
Site subtype 358 (Ramp/Urb; Direct/semi-direct connection) - no ramps in subtype
Site subtype 201 (Int/Rur; 3-leg minor-rd STOP) - no intersections in subtype
Site subtype 202 (Int/Rur; 3-leg all-way STOP) - no intersections in subtype
Site subtype 203 (Int/Rur; 3-leg signalized) - no intersections in subtype
Site subtype 204 (Int/Rur; 4-leg minor-rd STOP) - no intersections in subtype
Site subtype 205 (Int/Rur; 4-leg all-way STOP) - no intersections in subtype
Site subtype 206 (Int/Rur; 4-leg signalized) - no intersections in subtype
Site subtype 251 (Int/Urb; 3-leg minor-rd STOP) - no intersections in subtype
Site subtype 252 (Int/Urb; 3-leg all-way STOP) - no intersections in subtype
Site subtype 253 (Int/Urb; 3-leg signalized) - no intersections in subtype
Site subtype 254 (Int/Urb; 4-leg minor-rd STOP) - no intersections in subtype
Site subtype 255 (Int/Urb; 4-leg all-way STOP) - no intersections in subtype
Site subtype 256 (Int/Urb; 4-leg signalized) - no intersections in subtype
Saving log file (5,240 bytes) to database, please wait ...
... log file saved


SafetyAnalyst Data Management Tool (3.0.0)
File Edit Help
Data Set Name : usf
State : Calibrated
Data Set Attributes
Database Attributes
Import
Post Process
Calibrate
Implemented CM
Report
Export
Edit Implemented CM
Last Implemented CM Processing :
Output Logging Level : Low
Import Map
Selected Import Map : None
Manage Import Maps ...
Import Files
Import File
Add ...
Remove
Move Up
Move Down
Help ...
Merge Implemented Countermeasure Data
Start
Stop
Show Log
Start the implemented countermeasure import process
Saving log file (5,240 bytes) to database, please wait ...
... log file saved

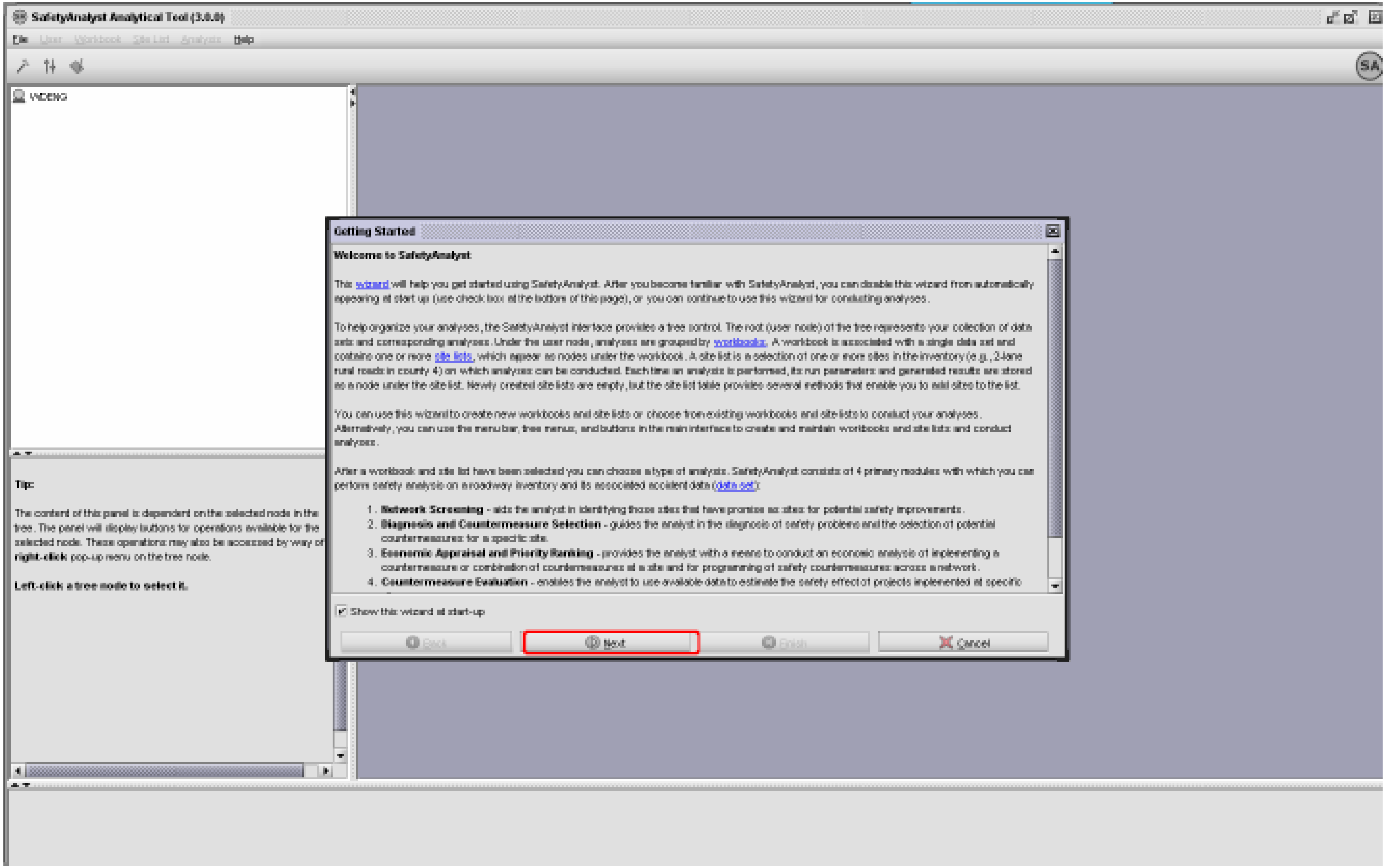

SafetyAnalyst Data Management Tool (3.0.0)
File Edit Help
Data Set Name : ust
State : Calibrated
Data Set Attributes
Database Attributes
Import
Post Process
Calibrate
Implemented CM
Report
Export
Edit Implemented CM
Last Implemented CM Processing :
Output Logging Level : Low
Import Map
Selected Import Map : None
Manage Import Maps ...
Import Files
Import File
Add ...
Remove
Move Up
Move Down
Help ...
Merge Implemented Countermeasure Data
Start
Stop
Show Log
Site subtype 203 (Int/Rur; 3-leg signalized) - no intersections in subtype
Site subtype 204 (Int/Rur; 4-leg minor-rd STOP) - no intersections in subtype
Site subtype 205 (Int/Rur; 4-leg all-way STOP) - no intersections in subtype
Site subtype 206 (Int/Rur; 4-leg signalized) - no intersections in subtype
Site subtype 251 (Int/Urb; 3-leg minor-rd STOP) - no intersections in subtype
Site subtype 252 (Int/Urb; 3-leg all-way STOP) - no intersections in subtype
Site subtype 253 (Int/Urb; 3-leg signalized) - no intersections in subtype
Site subtype 254 (Int/Urb; 4-leg minor-rd STOP) - no intersections in subtype
Site subtype 255 (Int/Urb; 4-leg all-way STOP) - no intersections in subtype
Site subtype 256 (Int/Urb; 4-leg signalized) - no intersections in subtype
Saving log file (5,240 bytes) to database, please wait ...
... log file saved
Data Set: ust (ust)
Error: No import input files specified
Saving log file (258 bytes) to database, please wait ...
... log file saved
Program Error: exception: null

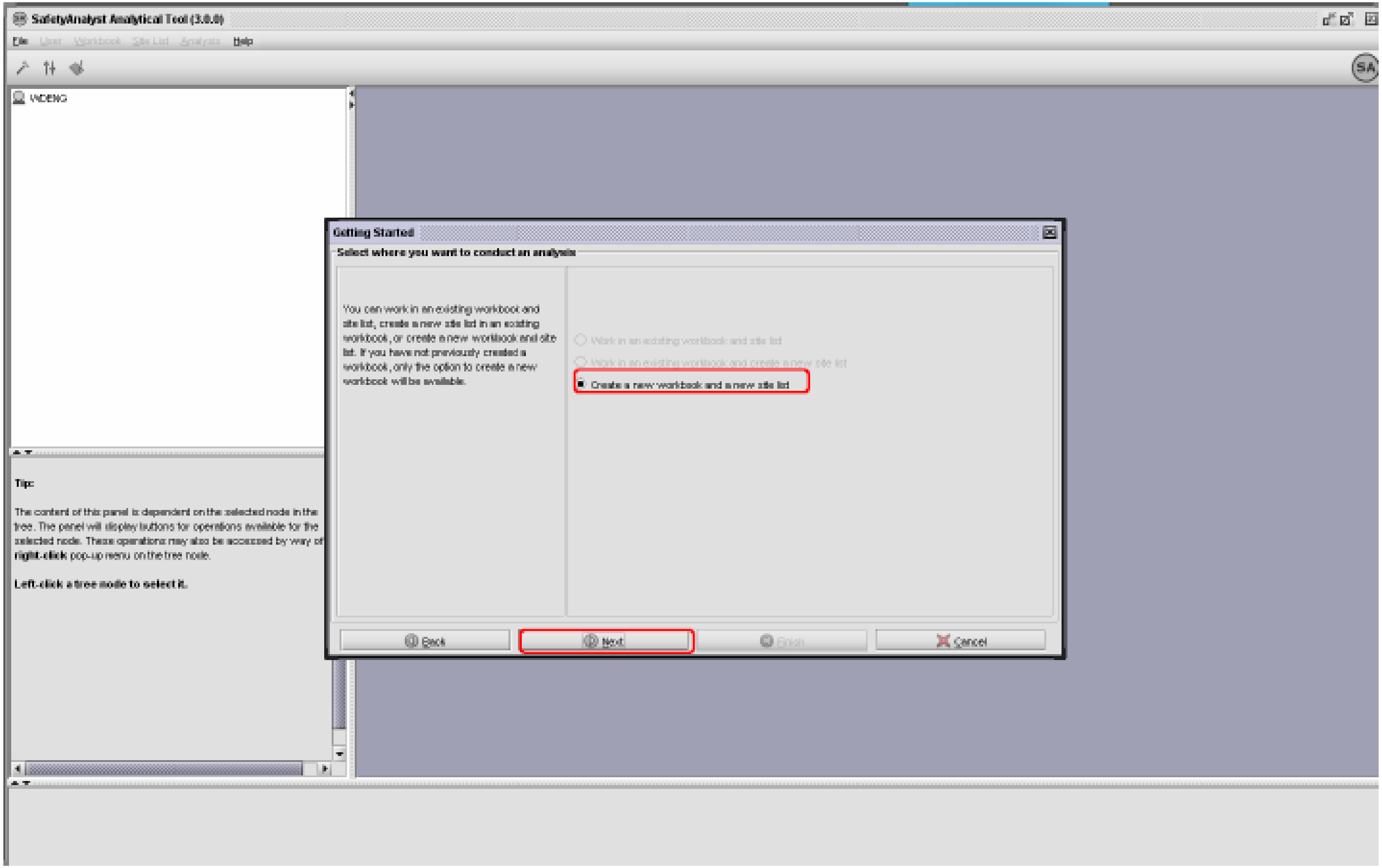
APENDIX D SA Analytical Process

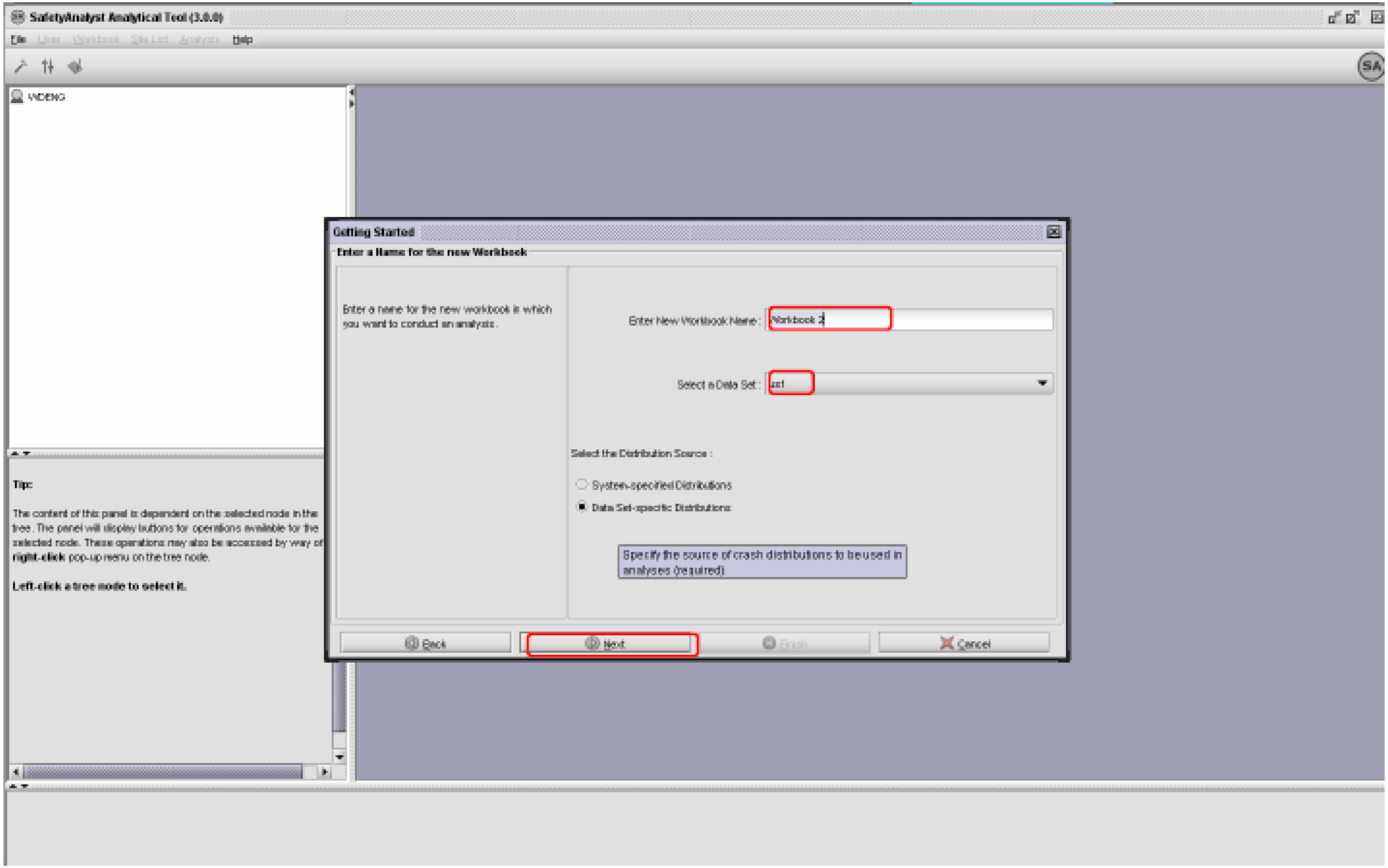
(This part is the sectional drawing from Safety Analyst)

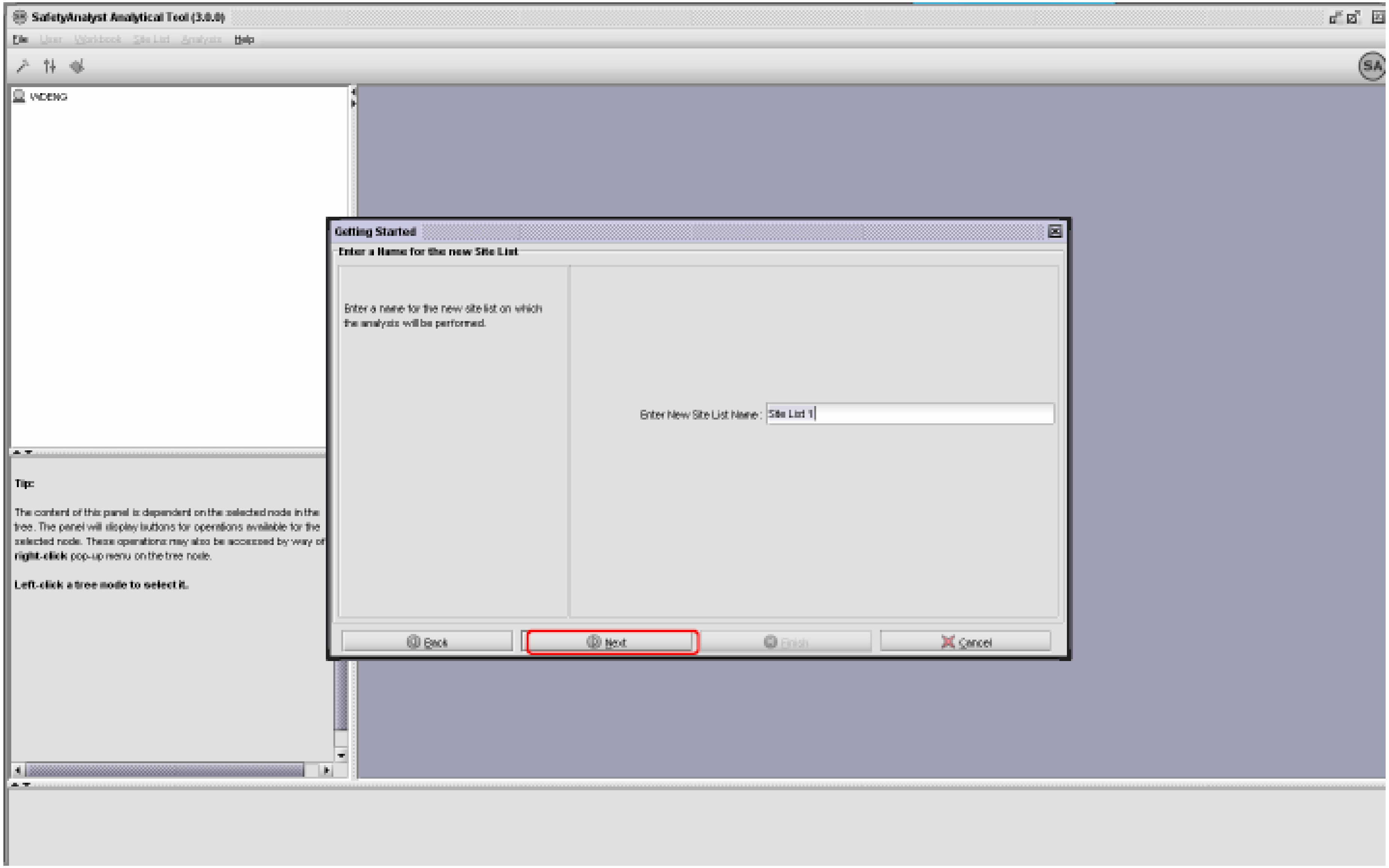


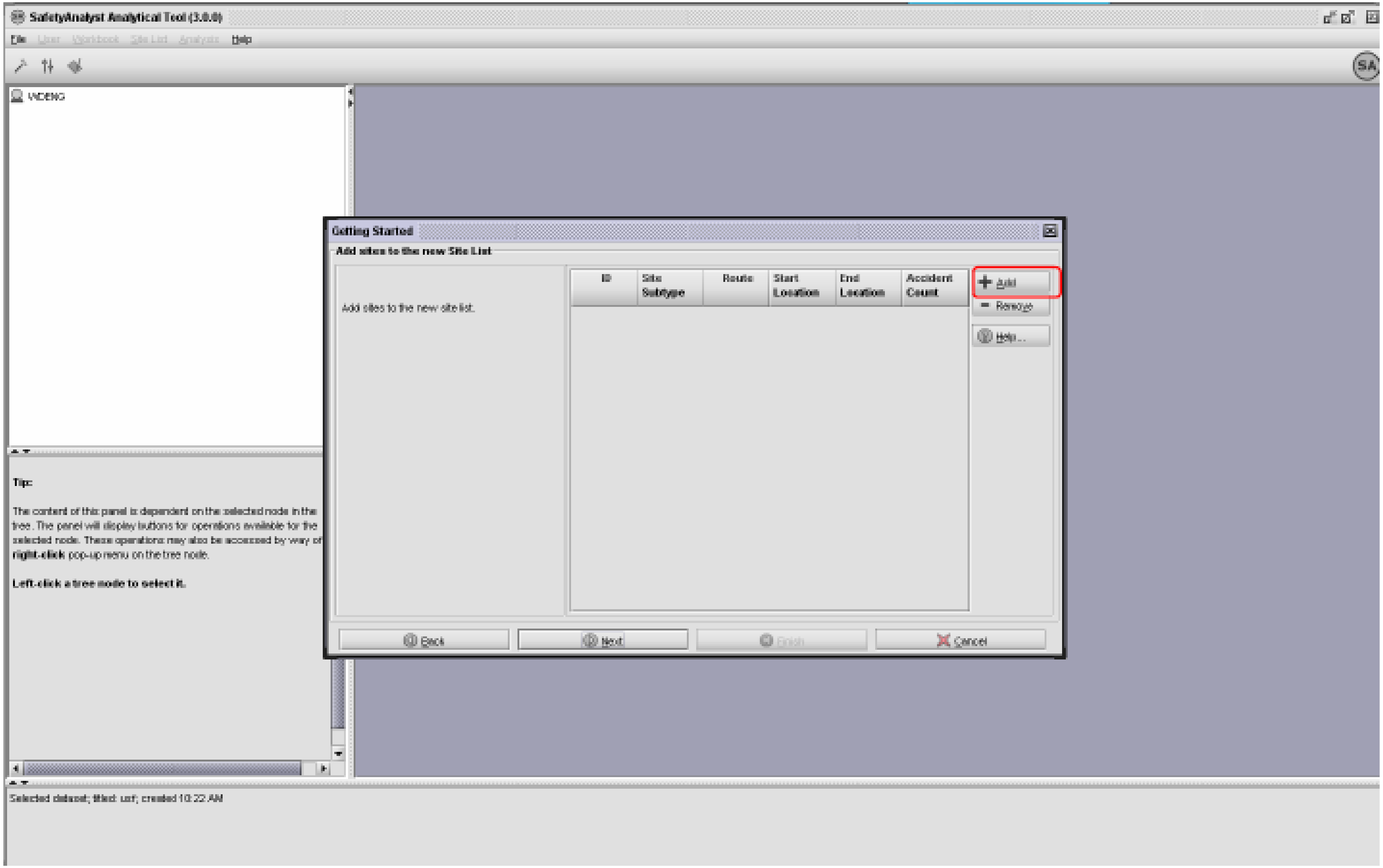

SafetyAnalyst Login
User Name :
Password :
Log In To :
Local Database
Login Message
A **User Name** and **Password** are not required when logging in to the **Local Database**
Ok
Cancel
Databases ...
Help...

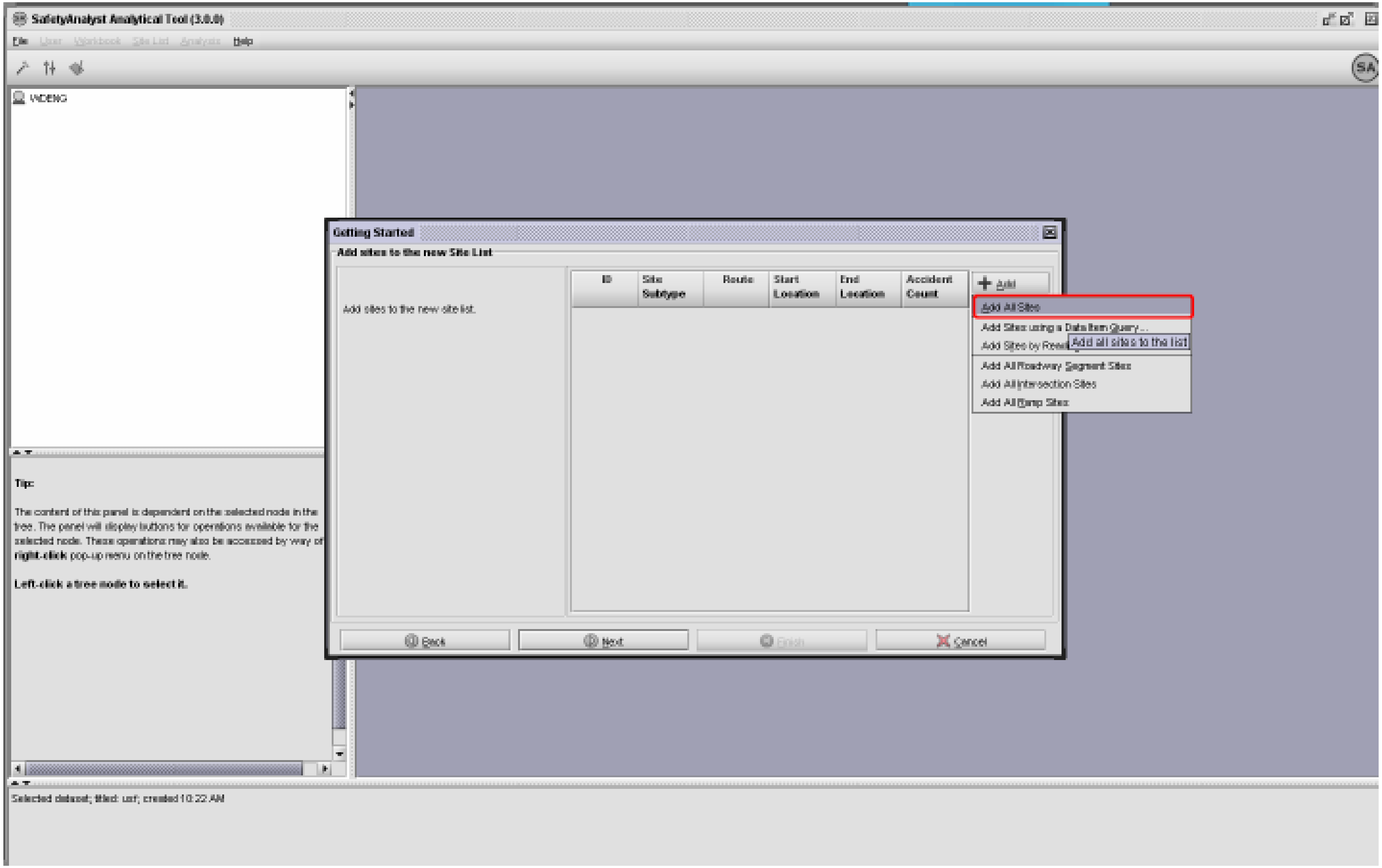

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
Getting Started
Welcome to SafetyAnalyst
This wizard will help you get started using SafetyAnalyst. After you become familiar with SafetyAnalyst, you can disable this wizard from automatically appearing at start up (use check box at the bottom of this page), or you can continue to use this wizard for conducting analyses.
To help organize your analyses, the SafetyAnalyst interface provides a tree control. The root (user node) of the tree represents your collection of data sets and corresponding analyses. Under the user node, analyses are grouped by workbooks. A workbook is associated with a single data set and contains one or more site lists, which appear as nodes under the workbook. A site list is a selection of one or more sites in the inventory (e.g., 2-lane rural roads in county 4) on which analyses can be conducted. Each time an analysis is performed, its run parameters and generated results are stored as a node under the site list. Newly created site lists are empty, but the site list table provides several methods that enable you to add sites to the list.
You can use this wizard to create new workbooks and site lists or choose from existing workbooks and site lists to conduct your analyses. Alternatively, you can use the menu bar, tree menus, and buttons in the main interface to create and maintain workbooks and site lists and conduct analyses.
After a workbook and site list have been selected you can choose a type of analysis. SafetyAnalyst consists of 4 primary modules with which you can perform safety analysis on a roadway inventory and its associated accident data (data set):
1. Network Screening - aids the analyst in identifying those sites that have promise as sites for potential safety improvements.
2. Diagnosis and Countermeasure Selection - guides the analyst in the diagnosis of safety problems and the selection of potential countermeasures for a specific site.
3. Economic Appraisal and Priority Ranking - provides the analyst with a means to conduct an economic analysis of implementing a countermeasure or combination of countermeasures at a site and for programming of safety countermeasures across a network.
4. Countermeasure Evaluation - enables the analyst to use available data to estimate the safety effect of projects implemented at specific
Show this wizard at start-up
Back
Next
Finish
Cancel
Tip:
The content of this panel is dependent on the selected node in the tree. The panel will display buttons for operations available for the selected node. These operations may also be accessed by way of right-click pop-up menu on the tree node.
Left-click a tree node to select it.

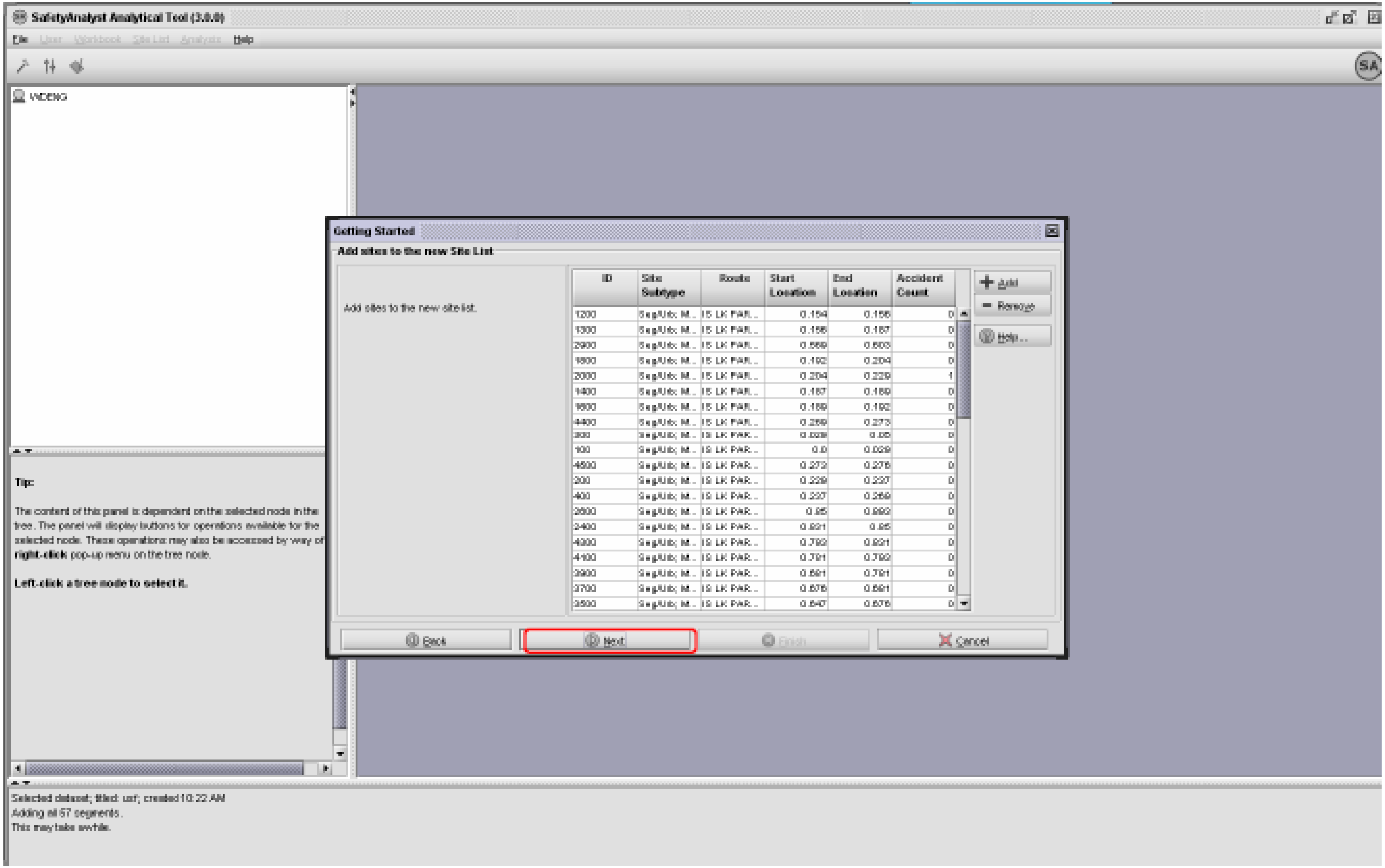

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
Getting Started
Select where you want to conduct an analysis
You can work in an existing workbook and site list, create a new site list in an existing workbook, or create a new workbook and site list. If you have not previously created a workbook, only the option to create a new workbook will be available.
Work in an existing workbook and site list
Work in an existing workbook and create a new site list
Create a new workbook and a new site list
Back
Next
Finish
Cancel
Tip:
The content of this panel is dependent on the selected node in the tree. The panel will display buttons for operations available for the selected node. These operations may also be accessed by way of right-click pop-up menu on the tree node.
Left-click a tree node to select it.

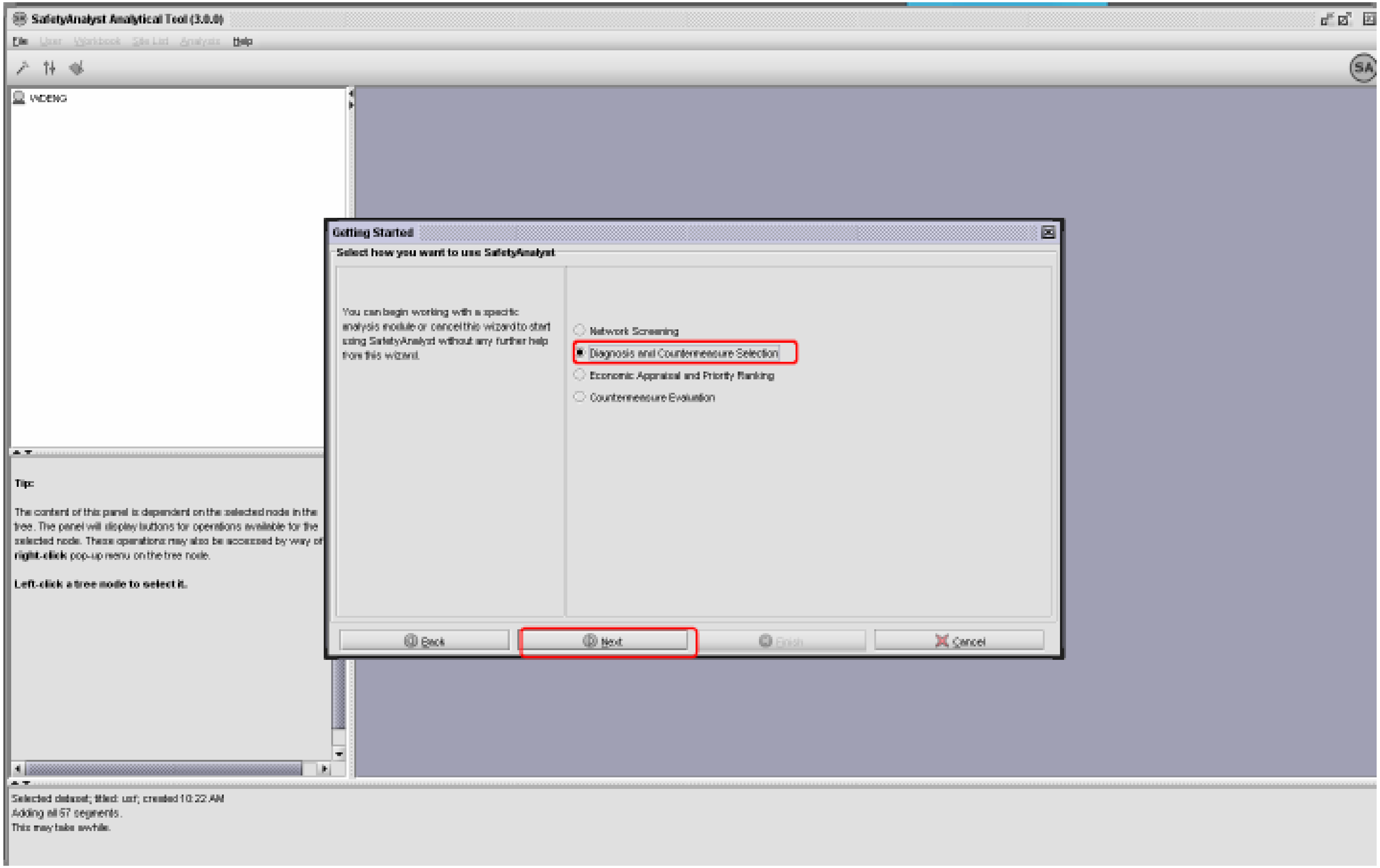

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
Getting Started
Enter a Name for the new Workbook
Enter a name for the new workbook in which you want to conduct an analysis.
Enter New Workbook Name :
Workbook 2
Select a Data Set :
Select the Distribution Source :
System-specified Distributions
Data Set-specific Distributions
Specify the source of crash distributions to be used in analyses (required)
Back
Next
Finish
Cancel
Tip:
The content of this panel is dependent on the selected node in the tree. The panel will display buttons for operations available for the selected node. These operations may also be accessed by way of right-click pop-up menu on the tree node.
Left-click a tree node to select it.

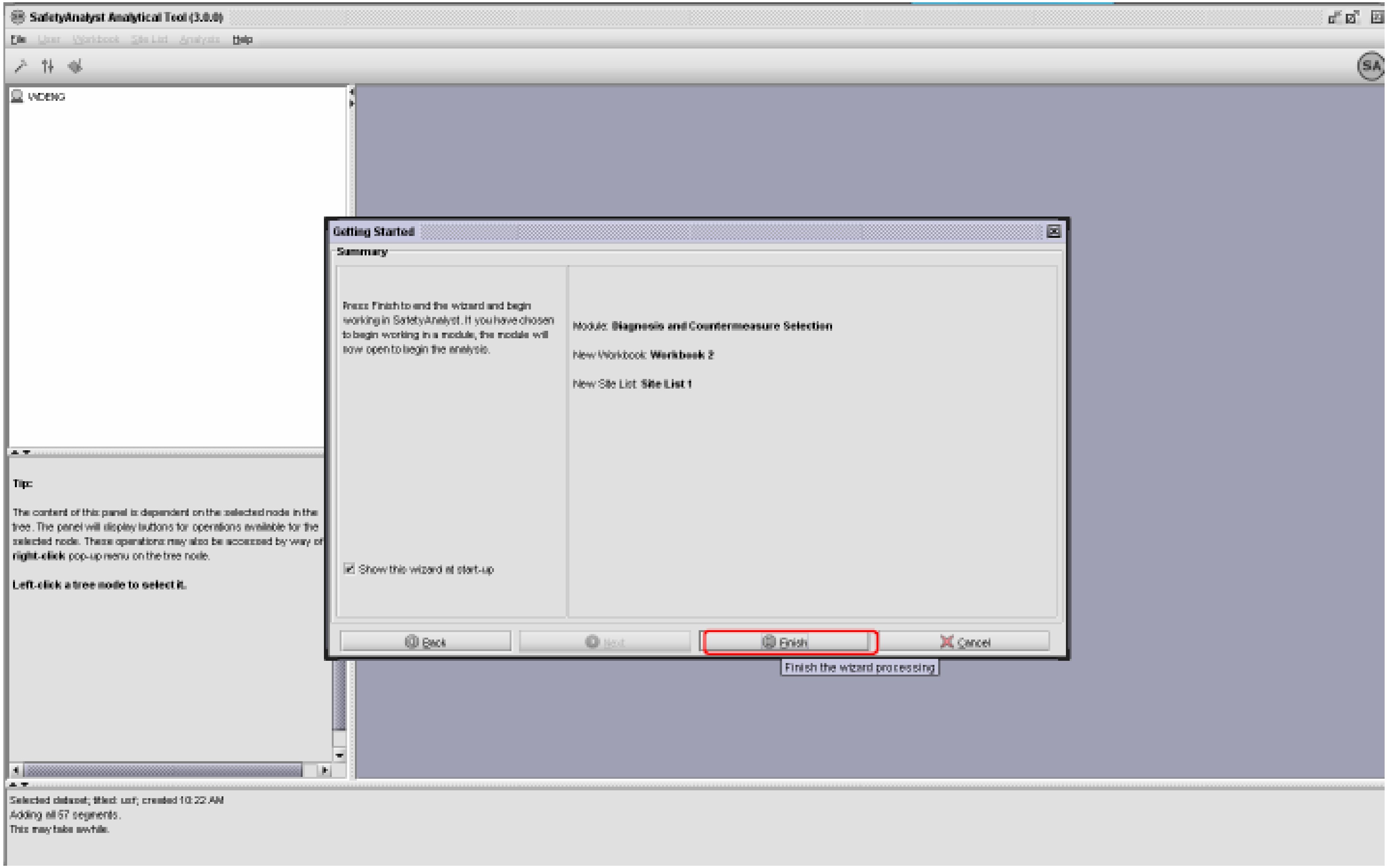

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
Getting Started
Enter a Name for the new Site List
Enter a name for the new site list on which the analysis will be performed.
Enter New Site List Name: Site List 1
Back
Next
Finish
Cancel
Tip:
The content of this panel is dependent on the selected node in the tree. The panel will display buttons for operations available for the selected node. These operations may also be accessed by way of right-click pop-up menu on the tree node.
Left-click a tree node to select it.

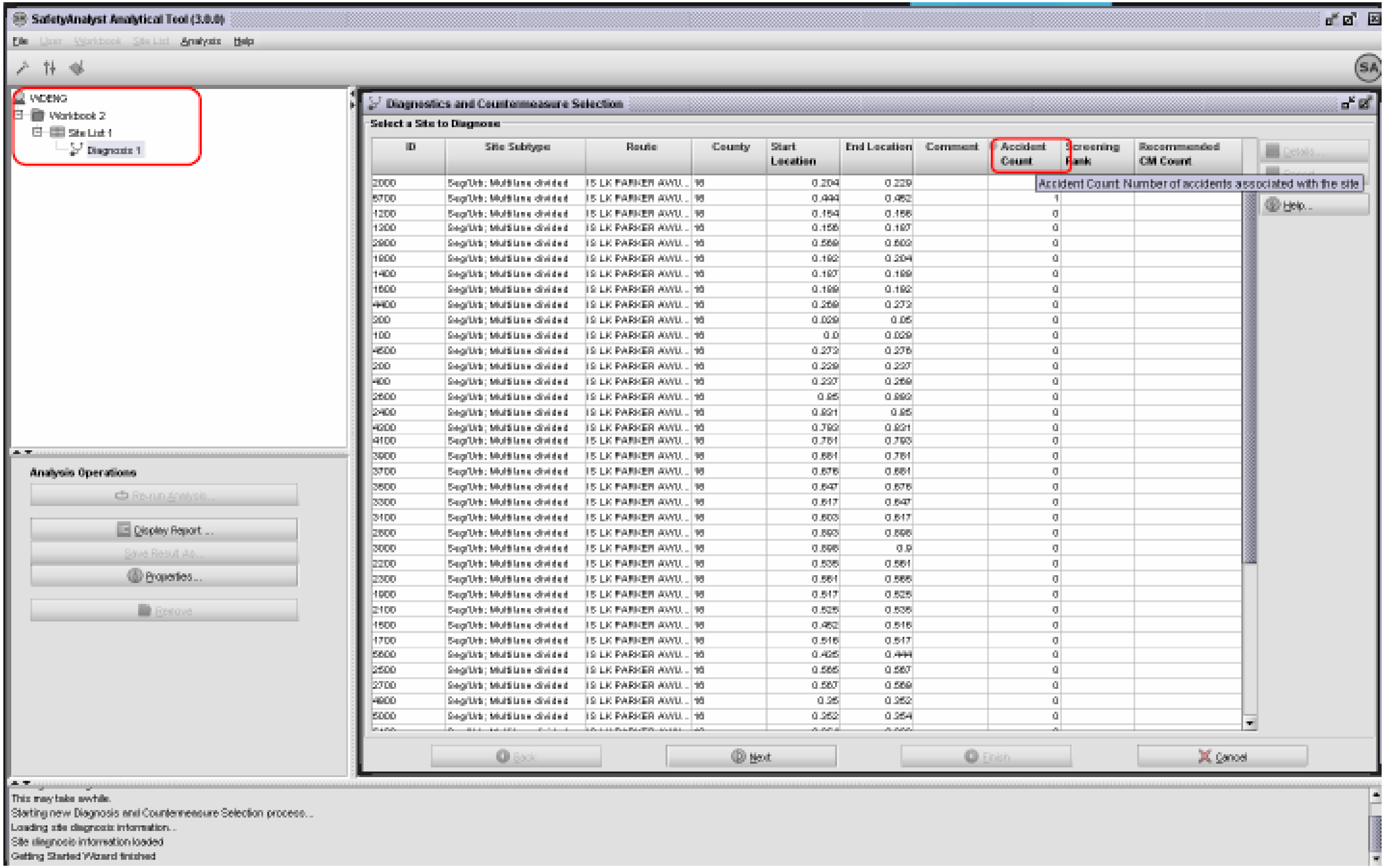

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
Getting Started
Add sites to the new Site List
Add sites to the new site list.
ID
Site Subtype
Route
Start Location
End Location
Accident Count
Add
Remove
Help...
Back
Next
Finish
Cancel
Tip:
The content of this panel is dependent on the selected node in the tree. The panel will display buttons for operations available for the selected node. These operations may also be accessed by way of right-click pop-up menu on the tree node.
Left-click a tree node to select it.

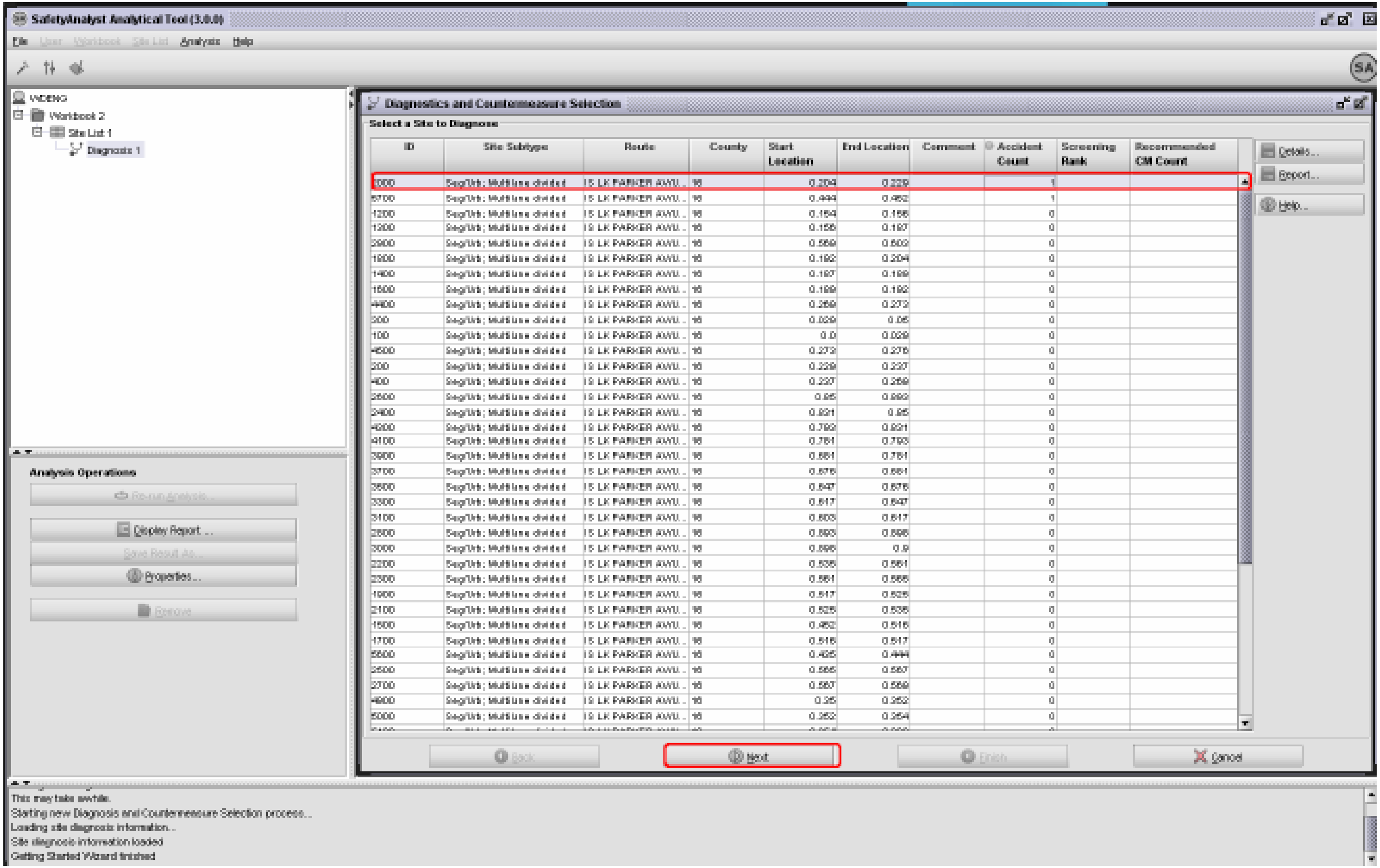

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
Getting Started
Add sites to the new Site List
Add sites to the new site list.
ID
Site Subtype
Route
Start Location
End Location
Accident Count
Add
Add All Sites
Add Sites using a Data Item Query...
Add all sites to the list
Add All Roadway Segment Sites
Add All Intersection Sites
Add All Ramp Sites
Back
Next
Finish
Cancel
Tip:
The content of this panel is dependent on the selected node in the tree. The panel will display buttons for operations available for the selected node. These operations may also be accessed by way of right-click pop-up menu on the tree node.
Left-click a tree node to select it.

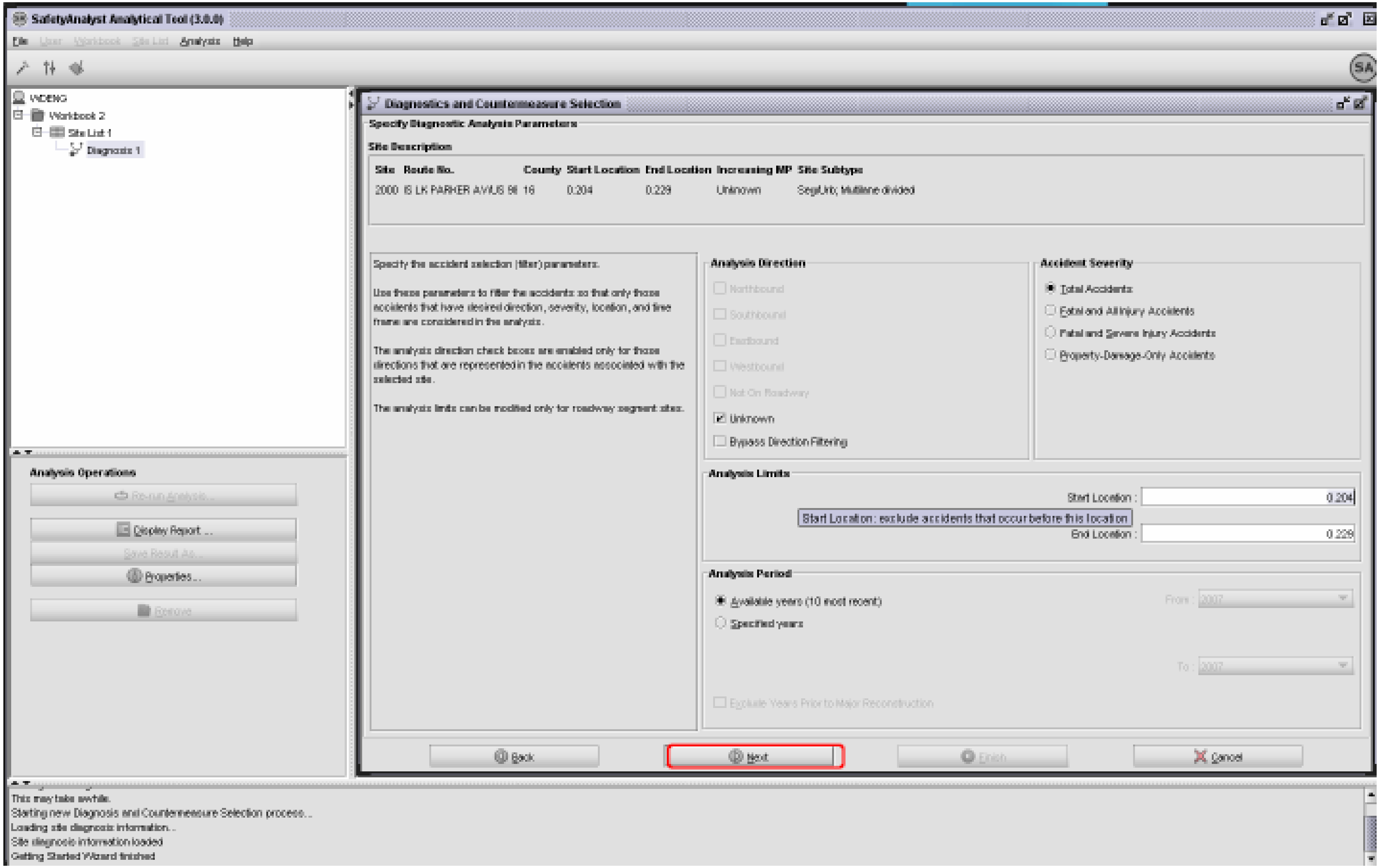

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
WDENG
Getting Started
Add sites to the new Site List
Add sites to the new site list.
ID Site Subtype Route Start Location End Location Accident Count
1200 Seg/Urb; M... I5 LK PAR... 0.154 0.156 0
1300 Seg/Urb; M... I5 LK PAR... 0.156 0.187 0
2900 Seg/Urb; M... I5 LK PAR... 0.569 0.603 0
1800 Seg/Urb; M... I5 LK PAR... 0.192 0.204 0
2000 Seg/Urb; M... I5 LK PAR... 0.204 0.229 1
1400 Seg/Urb; M... I5 LK PAR... 0.187 0.189 0
1600 Seg/Urb; M... I5 LK PAR... 0.189 0.192 0
4400 Seg/Urb; M... I5 LK PAR... 0.269 0.273 0
100 Seg/Urb; M... I5 LK PAR... 0.0 0.029 0
4500 Seg/Urb; M... I5 LK PAR... 0.273 0.276 0
200 Seg/Urb; M... I5 LK PAR... 0.229 0.237 0
400 Seg/Urb; M... I5 LK PAR... 0.237 0.269 0
2600 Seg/Urb; M... I5 LK PAR... 0.85 0.892 0
2400 Seg/Urb; M... I5 LK PAR... 0.831 0.85 0
4000 Seg/Urb; M... I5 LK PAR... 0.792 0.831 0
4100 Seg/Urb; M... I5 LK PAR... 0.781 0.792 0
3900 Seg/Urb; M... I5 LK PAR... 0.691 0.781 0
3700 Seg/Urb; M... I5 LK PAR... 0.676 0.691 0
3500 Seg/Urb; M... I5 LK PAR... 0.647 0.676 0
Add
Remove
Help...
Back
Next
Finish
Cancel
Tip:
The content of this panel is dependent on the selected node in the tree. The panel will display buttons for operations available for the selected node. These operations may also be accessed by way of right-click pop-up menu on the tree node.
Left-click a tree node to select it.
Selected dataset; titled: usf; created 10:22 AM
Adding all 57 segments.
This may take awhile.

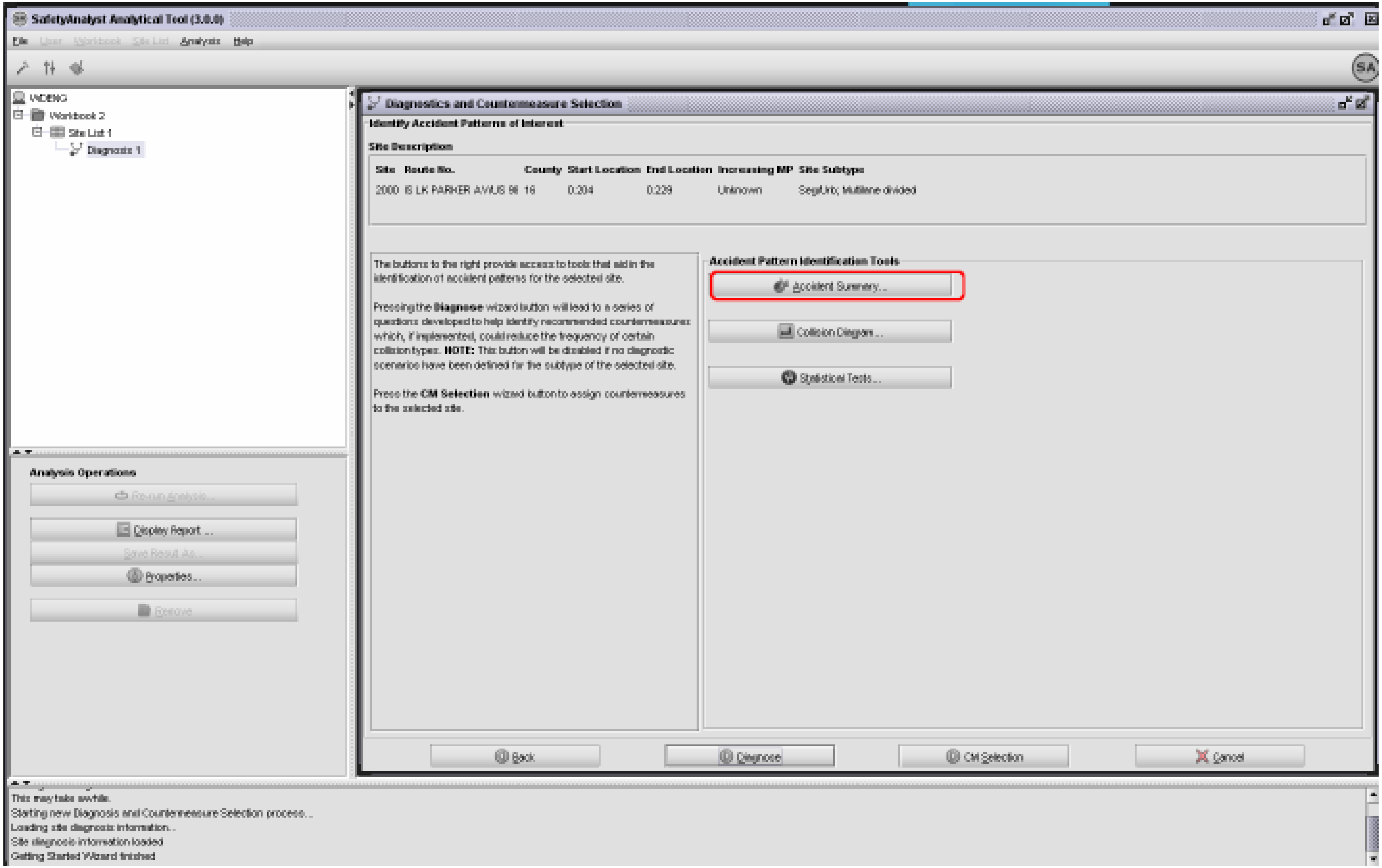

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
Getting Started
Select how you want to use SafetyAnalyst
You can begin working with a specific analysis module or cancel this wizard to start using SafetyAnalyst without any further help from this wizard.
Network Screening
Diagnosis and Countermeasure Selection
Economic Appraisal and Priority Ranking
Countermeasure Evaluation
Back
Next
Finish
Cancel
Tip:
The content of this panel is dependent on the selected node in the tree. The panel will display buttons for operations available for the selected node. These operations may also be accessed by way of right-click pop-up menu on the tree node.
Left-click a tree node to select it.

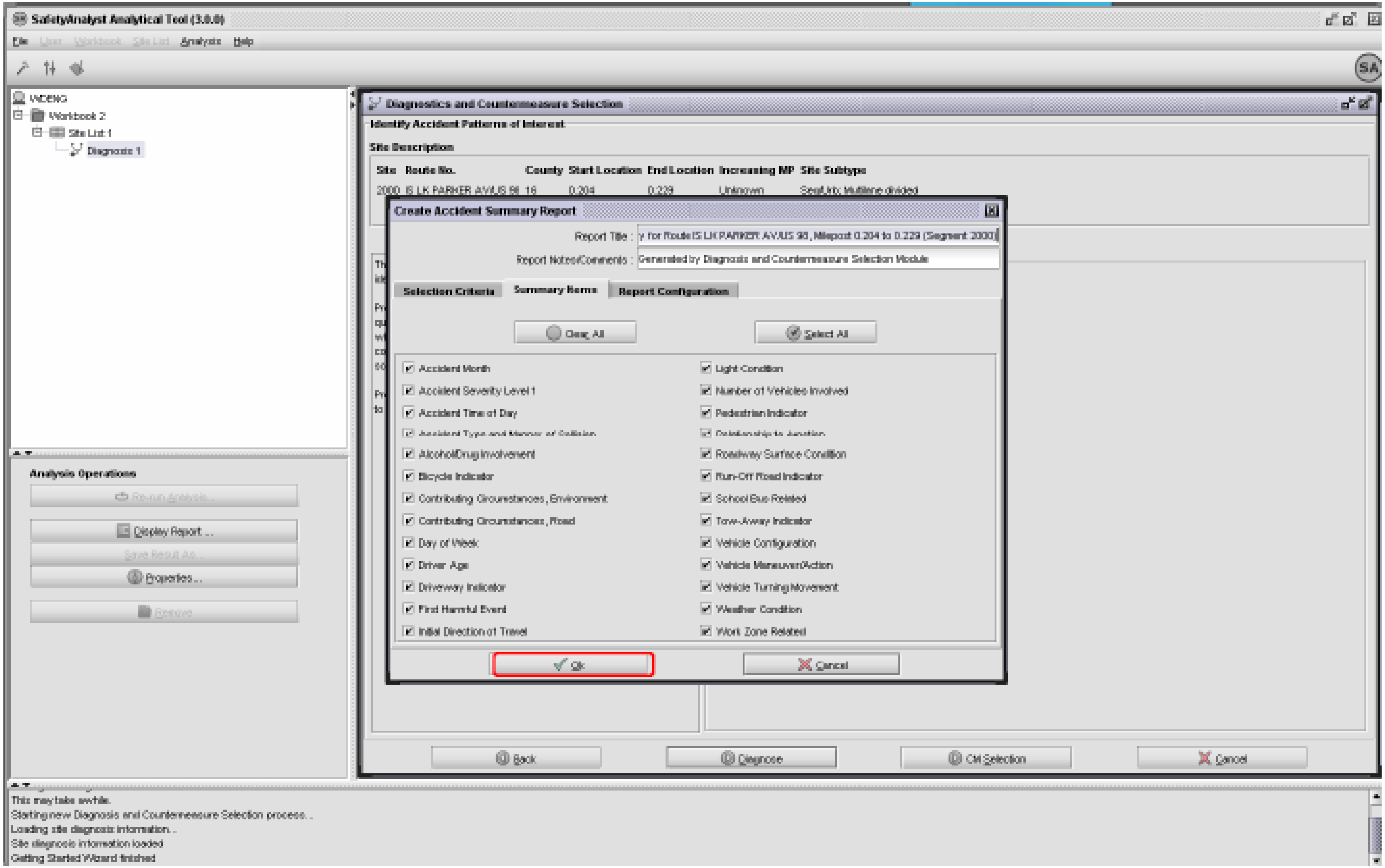

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
WDENG
Tip:
The content of this panel is dependent on the selected node in the tree. The panel will display buttons for operations available for the selected node. These operations may also be accessed by way of right-click pop-up menu on the tree node.
Left-click a tree node to select it.
Getting Started
Summary
Press Finish to end the wizard and begin working in SafetyAnalyst. If you have chosen to begin working in a module, the module will now open to begin the analysis.
Show this wizard at start-up
Module: Diagnosis and Countermeasure Selection
New Workbook: Workbook 2
New Site List: Site List 1
Back
Next
Finish
Cancel
Finish the wizard processing
Selected dataset; titled: usf; created 10:22 AM
Adding all 57 segments.
This may take awhile.


SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
WDENG
Workbook 2
Site List 1
Diagnosis 1
Analysis Operations
Re-run Analysis...
Display Report...
Save Result As...
Properties...
Remove
Diagnostics and Countermeasure Selection
Select a Site to Diagnose
ID
Site Subtype
Route
County
Start Location
End Location
Comment
Accident Count
Screening Rank
Recommended CM Count
Details...
Help...
Accident Count Number of accidents associated with the site
Back
Next
Finish
Cancel
This may take awhile.
Starting new Diagnosis and Countermeasure Selection process...
Loading site diagnosis information...
Site diagnosis information loaded
Getting Started Wizard finished

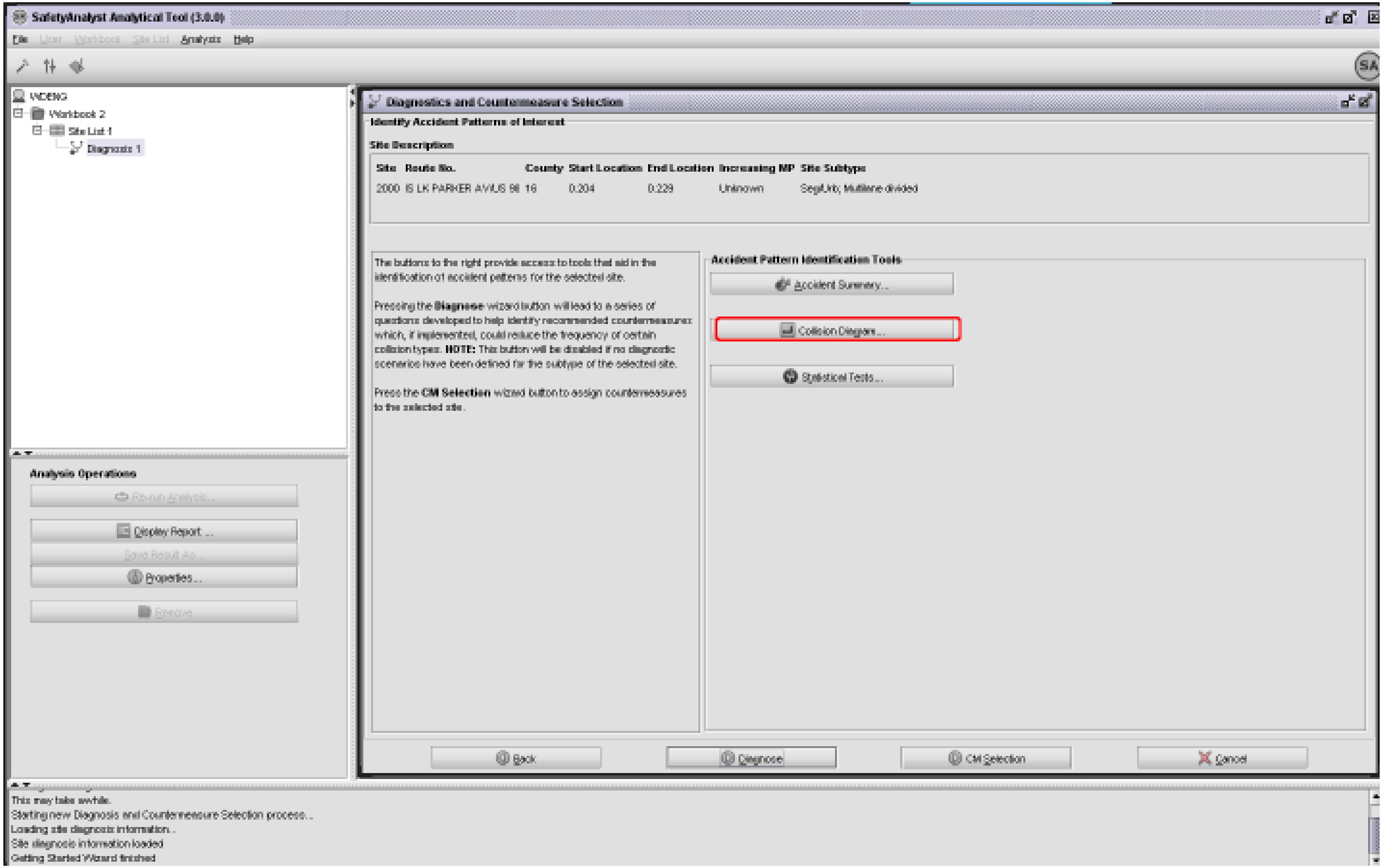

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
Workbook 2
Site List 1
Diagnosis 1
Analysis Operations
Re-run Analysis...
Display Report ...
Save Result As...
Properties...
Remove
Diagnostics and Countermeasure Selection
Select a Site to Diagnose
ID
Site Subtype
Route
County
Start Location
End Location
Comment
Accident Count
Screening Rank
Recommended CM Count
Details...
Report...
Help...
Back
Next
Finish
Cancel
This may take awhile.
Starting new Diagnosis and Countermeasure Selection process...
Loading site diagnosis information...
Site diagnosis information loaded
Getting Started Wizard finished

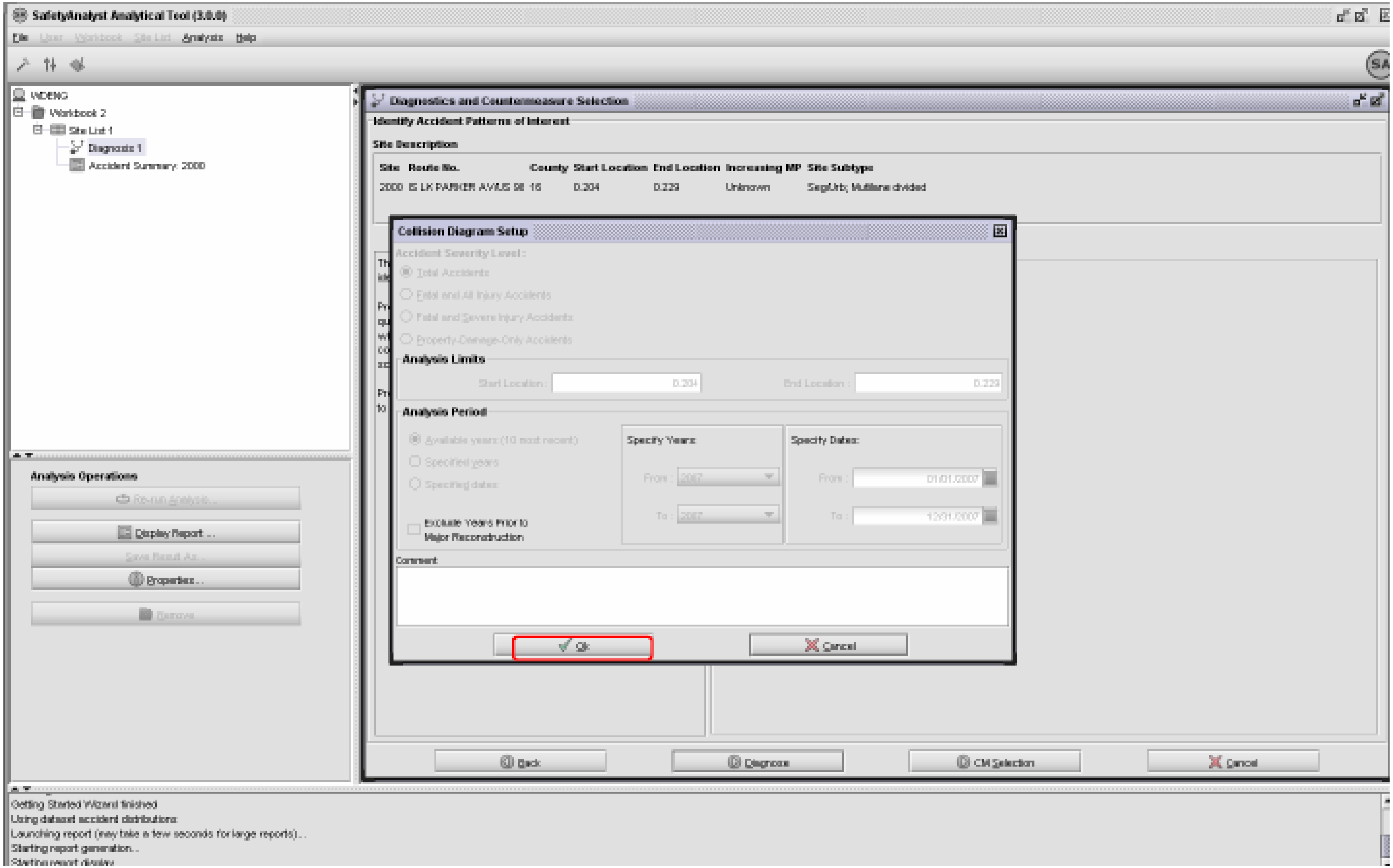

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
Workbook 2
Site List 1
Diagnosis 1
Analysis Operations
Re-run Analysis...
Display Report ...
Save Result As...
Properties...
Remove
Diagnostics and Countermeasure Selection
Specify Diagnostic Analysis Parameters
Site Description
Site Route No. County Start Location End Location Increasing MP Site Subtype
2000 IS LK PARKER AV/US 98 16 0.204 0.229 Unknown Seg/Urb; Multilane divided
Specify the accident selection (filter) parameters.
Use these parameters to filter the accidents so that only those accidents that have desired direction, severity, location, and time frame are considered in the analysis.
The analysis direction check boxes are enabled only for those directions that are represented in the accidents associated with the selected site.
The analysis limits can be modified only for roadway segment sites.
Analysis Direction
Northbound
Southbound
Eastbound
Westbound
Not On Roadway
Unknown
Bypass Direction Filtering
Accident Severity
Total Accidents
Fatal and All Injury Accidents
Fatal and Severe Injury Accidents
Property-Damage-Only Accidents
Analysis Limits
Start Location : 0.204
Start Location: exclude accidents that occur before this location
End Location : 0.229
Analysis Period
Available years (10 most recent)
Specified years
From : 2007
To : 2007
Exclude Years Prior to Major Reconstruction
Back
Next
Finish
Cancel
This may take awhile.
Starting new Diagnosis and Countermeasure Selection process...
Loading site diagnosis information...
Site diagnosis information loaded
Getting Started Wizard finished

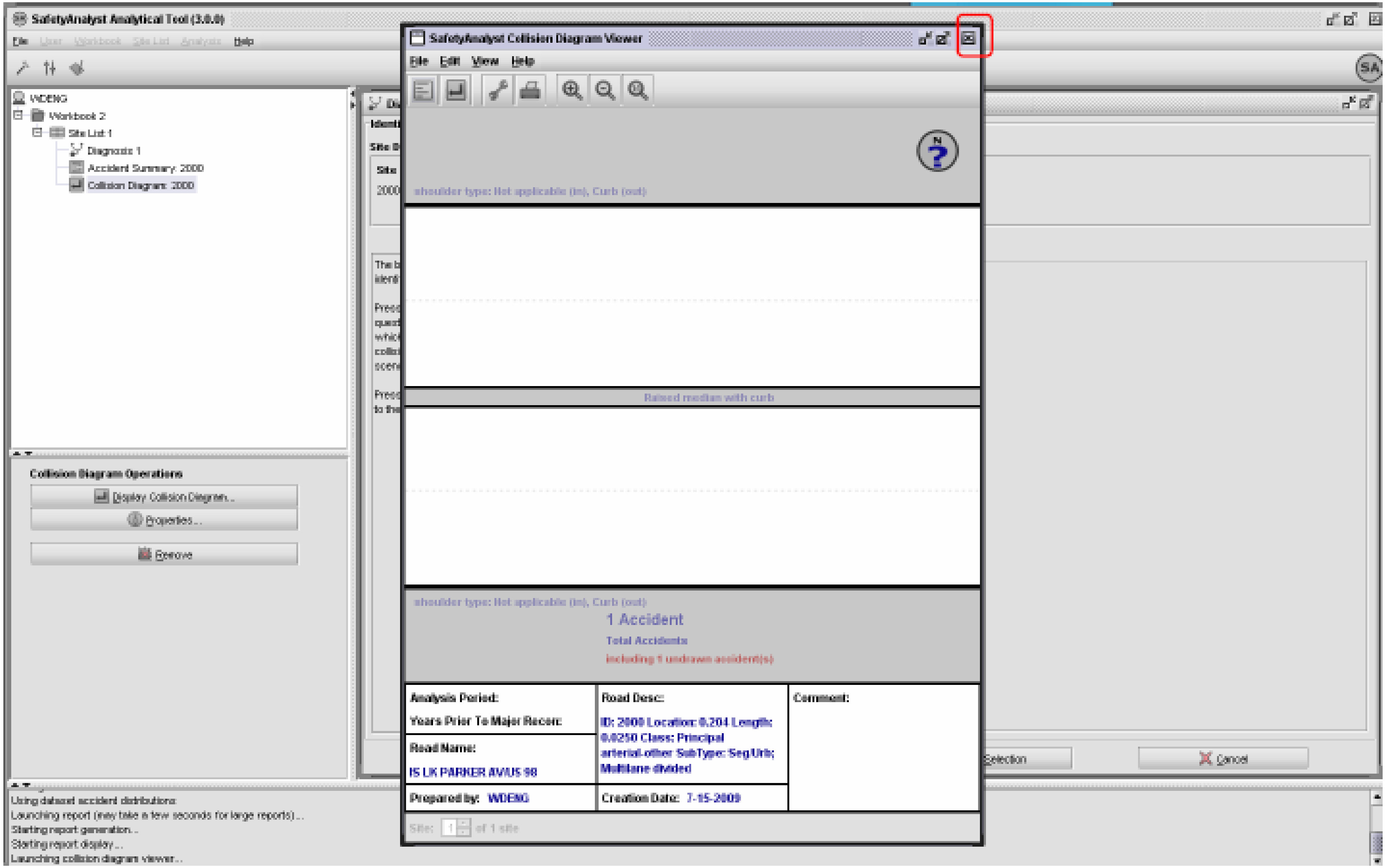

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
Workbook 2
Site List 1
Diagnosis 1
Diagnostics and Countermeasure Selection
Identify Accident Patterns of Interest
Site Description
Site Route No. County Start Location End Location Increasing MP Site Subtype
2000 IS LK PARKER AVIUS 98 16 0.204 0.229 Unknown Seg/Urb; Multilane divided
The buttons to the right provide access to tools that aid in the identification of accident patterns for the selected site.
Pressing the Diagnose wizard button will lead to a series of questions developed to help identify recommended countermeasures which, if implemented, could reduce the frequency of certain collision types. NOTE: This button will be disabled if no diagnostic scenarios have been defined for the subtype of the selected site.
Press the CM Selection wizard button to assign countermeasures to the selected site.
Accident Pattern Identification Tools
Accident Summary...
Collision Diagram...
Statistical Tests...
Analysis Operations
Re-run Analysis...
Display Report...
Save Result As...
Properties...
Remove
Back
Diagnose
CM Selection
Cancel
This may take awhile.
Starting new Diagnosis and Countermeasure Selection process...
Loading site diagnosis information...
Site diagnosis information loaded
Getting Started Wizard finished

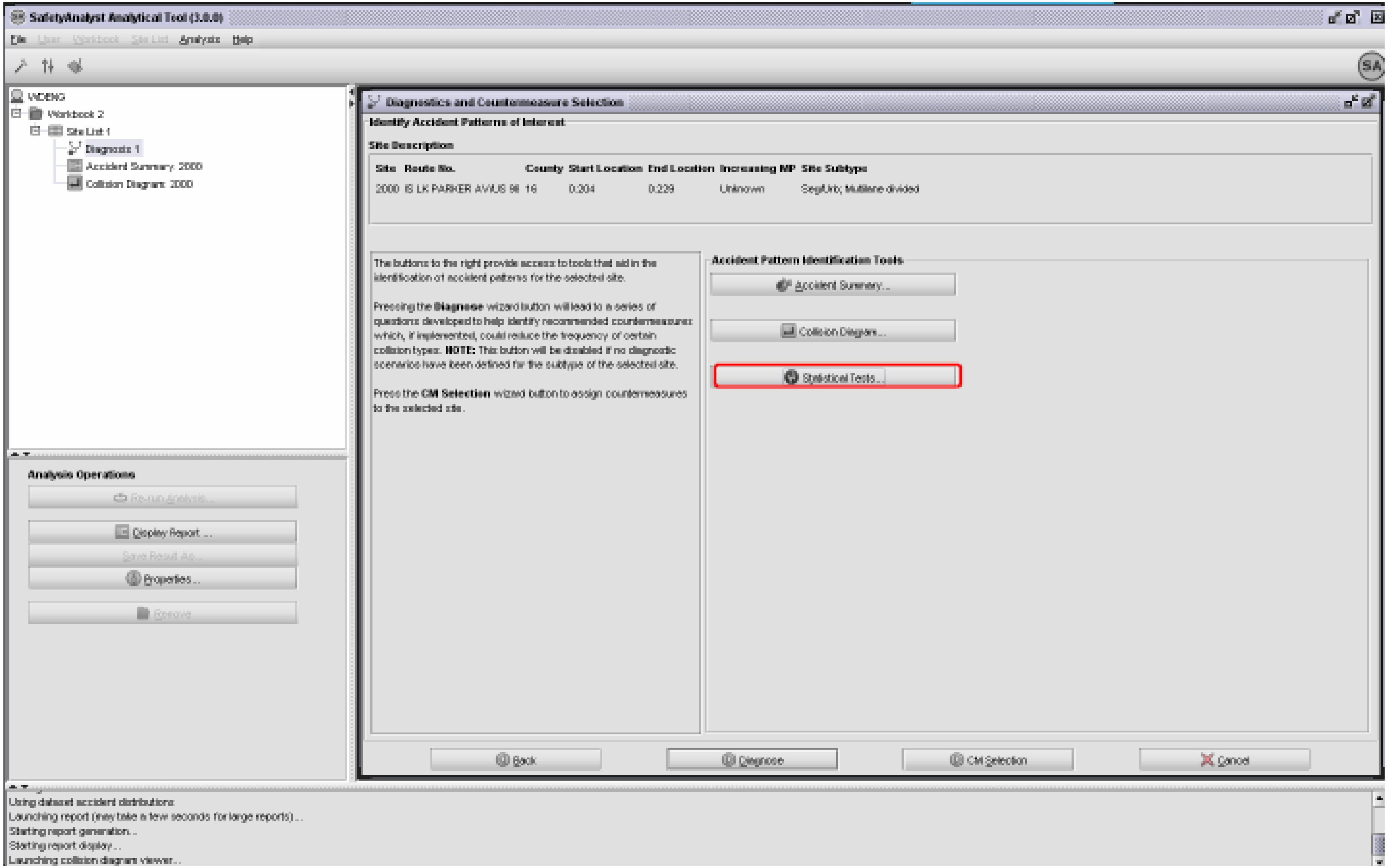

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
Workbook 2
Site List 1
Diagnosis 1
Diagnostics and Countermeasure Selection
Identify Accident Patterns of Interest
Site Description
Site Route No. County Start Location End Location Increasing MP Site Subtype
Create Accident Summary Report
Report Title :
Report Notes/Comments :
Selection Criteria
Summary Items
Report Configuration
Clear All
Select All
Accident Month
Accident Severity Level 1
Accident Time of Day
Alcohol/Drug Involvement
Bicycle Indicator
Contributing Circumstances, Environment
Contributing Circumstances, Road
Day of Week
Driver Age
Driveway Indicator
First Harmful Event
Initial Direction of Travel
Light Condition
Number of Vehicles Involved
Pedestrian Indicator
Roadway Surface Condition
Run-Off Road Indicator
School Bus Related
Tow-Away Indicator
Vehicle Configuration
Vehicle Maneuver/Action
Vehicle Turning Movement
Weather Condition
Work Zone Related
Ok
Cancel
Analysis Operations
Display Report ...
Properties...
Back
Diagnose
CM Selection
Cancel
Starting new Diagnosis and Countermeasure Selection process...
Site diagnosis information loaded
Getting Started Wizard finished

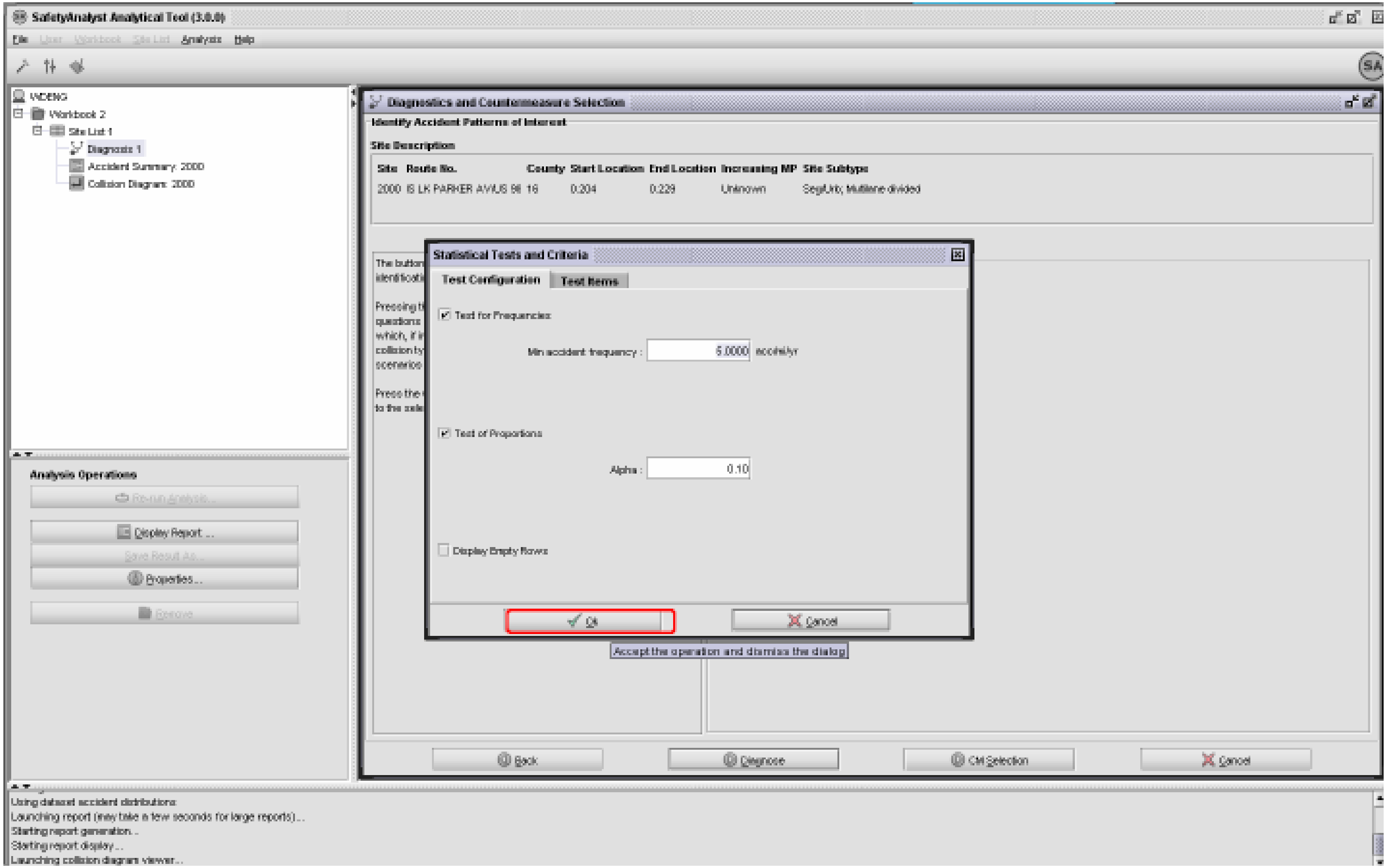

Accident Summary for Route IS LK PARKER AV/US 98, Milepost 0.204 to 0.229 (Segment 2000) - Windows Internet Explorer
File Edit View Favorites Tools Help
Favorites
Accident Summary for Route IS LK PARKER ...
SafetyAnalyst
Accident Summary for Route IS LK PARKER AV/US 98, Milepost 0.204 to 0.229 (Segment 2000)
Jul 15, 2009
Disclaimer
This document is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its content or use thereof. This document does not constitute a standard, specification, or regulation.
The United States Government does not endorse products or manufacturers. Trade and manufacturers' names may appear in this document only because they are considered essential to the objective of the document.
Limited Warranty and Limitations of Remedies
This software product is provided "as-is," without warranty of any kind-either expressed or implied (but not limited to the implied warranties of merchantability and fitness for a particular purpose). The FHWA and distributor do not warrant that the functions contained in the software will meet the end-user's requirements or that the operation of the software will be uninterrupted and error-free.
Under no circumstances will the FHWA or the distributor be liable to the end-user for any damages or claimed lost profits, lost savings, or other incidental or consequential damages rising out of the use or inability to use the software (even if these organizations have been advised of the possibility of such damages), or for any claim by any other party.
Notice
The use and testing of the SafetyAnalyst software is being done strictly on a voluntary basis. In exchange for provision of SafetyAnalyst, the user agrees that the Federal Highway Administration (FHWA), U.S. Department of Transportation and any other agency of the Federal Government shall not be responsible for any errors, damage or other liability that may result from any and all use of the software, including installation and testing of the software. The user further agrees to hold the FHWA and the Federal Government harmless from any resulting liability. The user agrees that this hold harmless provision shall flow to any person to whom or any entity to which the user provides the SafetyAnalyst software. It is the user's full responsibility to inform any person to whom or any entity to which it provides the SafetyAnalyst software of this hold harmless provision.
Table of Contents
1. Accident Summary
1.1 Accident Month
1.2 Accident Severity Level 1
1.3 Accident Time of Day
1.4 Accident Type and Manner of Collision
1.5 Alcohol/Drug Involvement
1.6 Bicycle Indicator
1.7 Contributing Circumstances, Environment
1.8 Contributing Circumstances, Road
1.9 Day of Week
1.10 Driver Age
1.11 Driveway Indicator
1.12 First Harmful Event
1.13 Initial Direction of Travel
1.14 Light Condition
1.15 Number of Vehicles Involved
1.16 Pedestrian Indicator
1.17 Relationship to Junction
1.18 Roadway Surface Condition
1.19 Run-Off Road Indicator
1.20 School Bus Related
1.21 Tow-Away Indicator
1.22 Vehicle Configuration
1.23 Vehicle Maneuver/Action
1.24 Vehicle Turning Movement
1.25 Weather Condition
1.26 Work Zone Related
2. Route IS LK PARKER AV/US 98, Milepost 0.204 to 0.229
List of Tables
1. Accident Month
2. Accident Severity Level 1
3. Accident Time of Day
4. Accident Type and Manner of Collision
5. Alcohol/Drug Involvement
6. Bicycle Indicator
7. Contributing Circumstances, Environment
8. Contributing Circumstances, Road
9. Day of Week
10. Driveway Indicator
11. First Harmful Event
12. Initial Direction of Travel
My Computer
100%
start
Example
2.docx - Microsoft...
SafetyAnalyst Ana...
Accident Summar...
11:03 AM

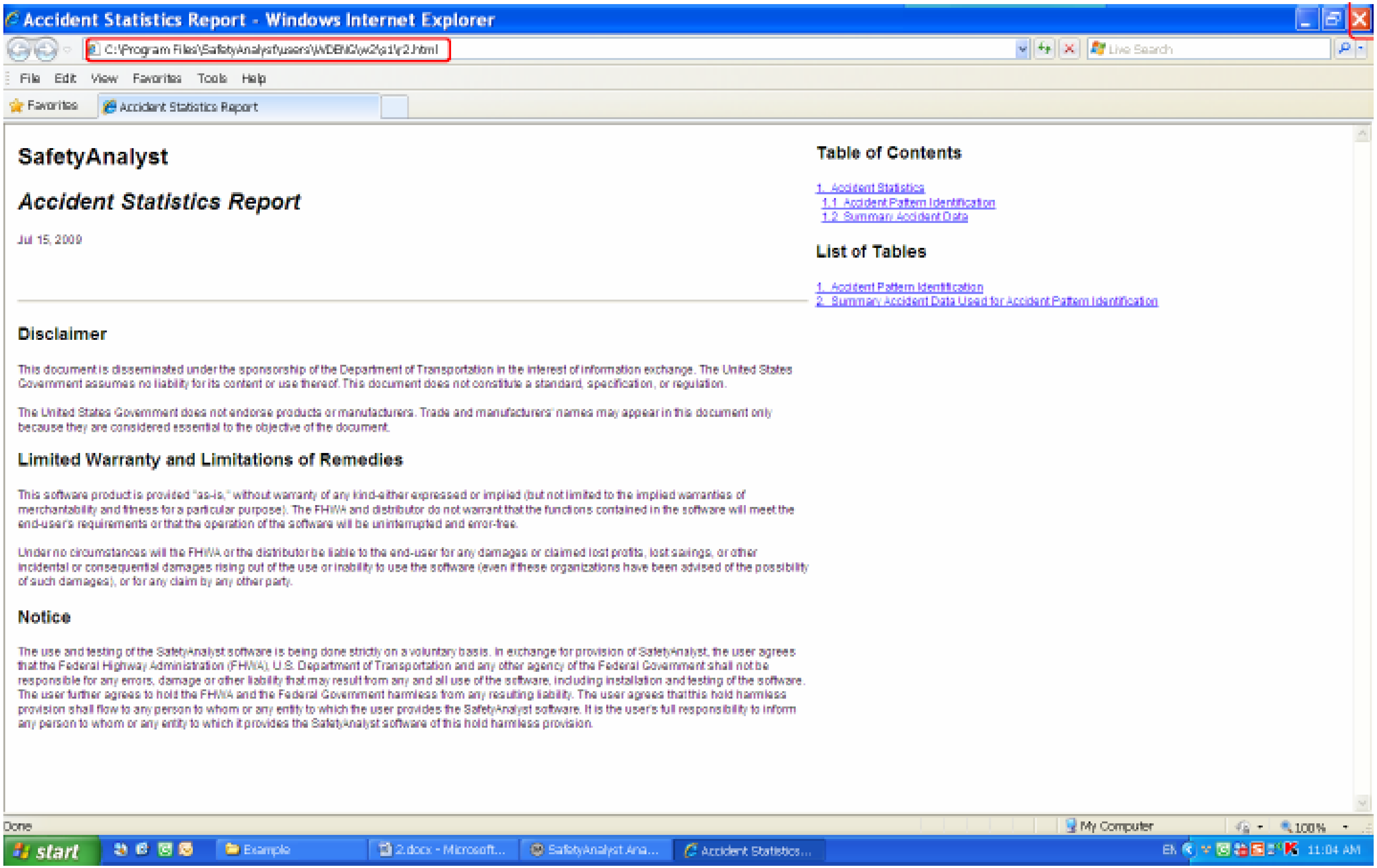

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
VDENG
Workbook 2
Site List 1
Diagnosis 1
Diagnostics and Countermeasure Selection
Identify Accident Patterns of Interest
Site Description
Site Route No. County Start Location End Location Increasing MP Site Subtype
2000 IS LK PARKER AV/US 98 16 0.204 0.229 Unknown Seg/Urb; Multilane divided
The buttons to the right provide access to tools that aid in the identification of accident patterns for the selected site.
Pressing the Diagnose wizard button will lead to a series of questions developed to help identify recommended countermeasures which, if implemented, could reduce the frequency of certain collision types. NOTE: This button will be disabled if no diagnostic scenarios have been defined for the subtype of the selected site.
Press the CM Selection wizard button to assign countermeasures to the selected site.
Accident Pattern Identification Tools
Accident Summary...
Collision Diagram...
Statistical Tests...
Analysis Operations
Re-run Analysis...
Display Report ...
Save Result As...
Properties...
Remove
Back
Diagnose
CM Selection
Cancel
This may take awhile.
Starting new Diagnosis and Countermeasure Selection process...
Loading site diagnosis information...
Site diagnosis information loaded
Getting Started Wizard finished

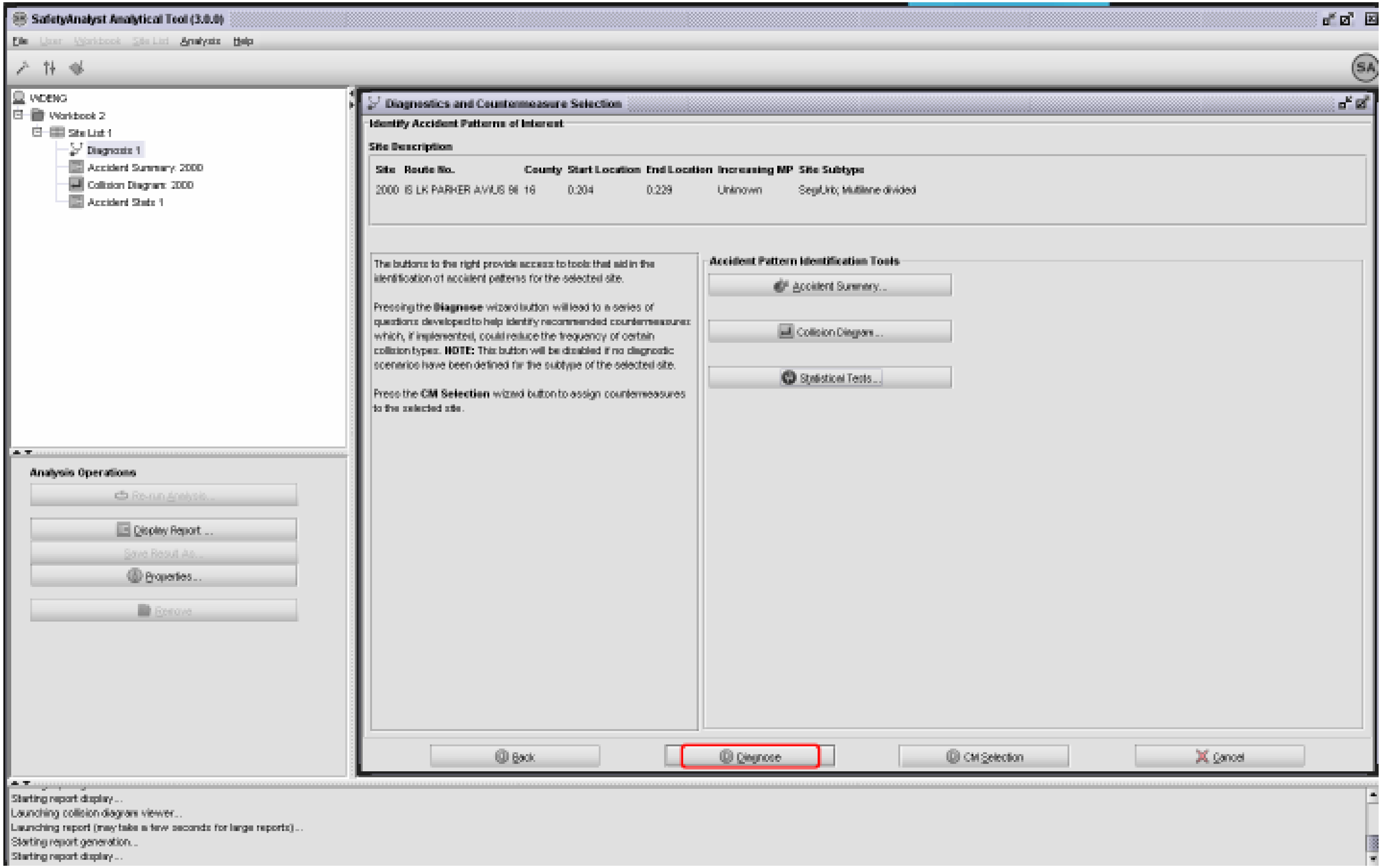

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
WDENG
Workbook 2
Site List 1
Diagnosis 1
Accident Summary: 2000
Analysis Operations
Re-run Analysis...
Display Report ...
Save Result As...
Properties...
Remove
Diagnostics and Countermeasure Selection
Identify Accident Patterns of Interest
Site Description
Site Route No. County Start Location End Location Increasing MP Site Subtype
2000 IS LK PARKER AV/US 98 16 0.204 0.229 Unknown Seg/Urb; Multilane divided
Collision Diagram Setup
Accident Severity Level :
Total Accidents
Fatal and All Injury Accidents
Fatal and Severe Injury Accidents
Property-Damage-Only Accidents
Analysis Limits
Start Location : 0.204
End Location : 0.229
Analysis Period
Available years (10 most recent)
Specified years
Specified dates
Exclude Years Prior to Major Reconstruction
Specify Years:
From : 2007
To : 2007
Specify Dates:
From : 01/01/2007
To : 12/31/2007
Comment
Ok
Cancel
Back
Diagnose
CM Selection
Cancel
Getting Started Wizard finished
Using dataset accident distributions
Launching report (may take a few seconds for large reports)...
Starting report generation...

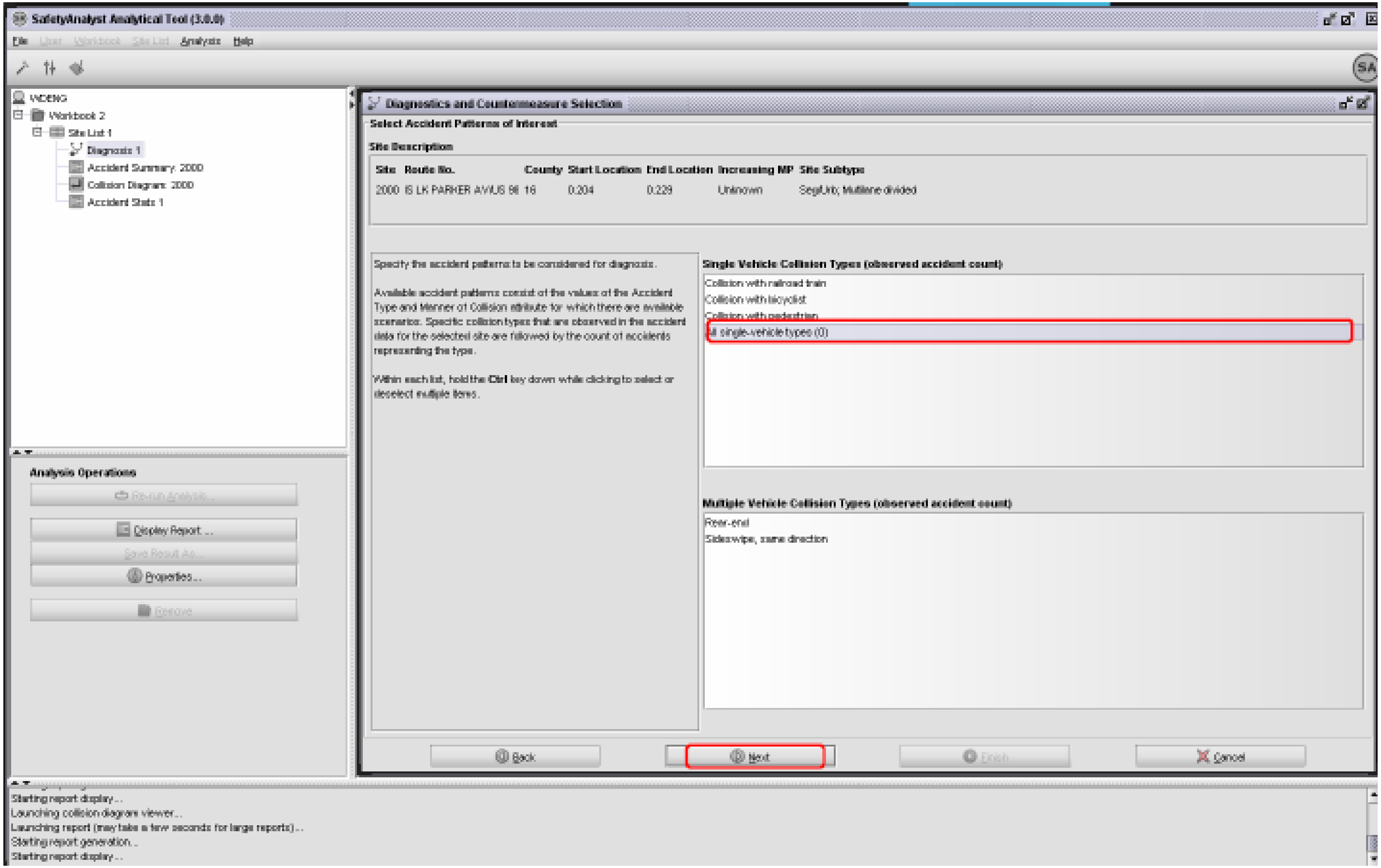

SafetyAnalyst Analytical Tool (3.0.0)
SafetyAnalyst Collision Diagram Viewer
File Edit View Help
WDENG
Workbook 2
Site List 1
Diagnosis 1
Accident Summary: 2000
Collision Diagram: 2000
Collision Diagram Operations
Display Collision Diagram...
Properties...
Remove
shoulder type: Not applicable (in), Curb (out)
Raised median with curb
shoulder type: Not applicable (in), Curb (out)
1 Accident
Total Accidents
including 1 undrawn accident(s)
Analysis Period:
Years Prior To Major Recon:
Road Name:
IS LK PARKER AV/US 98
Prepared by: WDENG
Road Desc:
ID: 2000 Location: 0.204 Length: 0.0250 Class: Principal arterial-other SubType: Seg/Urb; Multilane divided
Creation Date: 7-15-2009
Comment:
Site: 1 of 1 site
Cancel
Using dataset accident distributions
Launching report (may take a few seconds for large reports)...
Starting report generation...
Starting report display...
Launching collision diagram viewer...

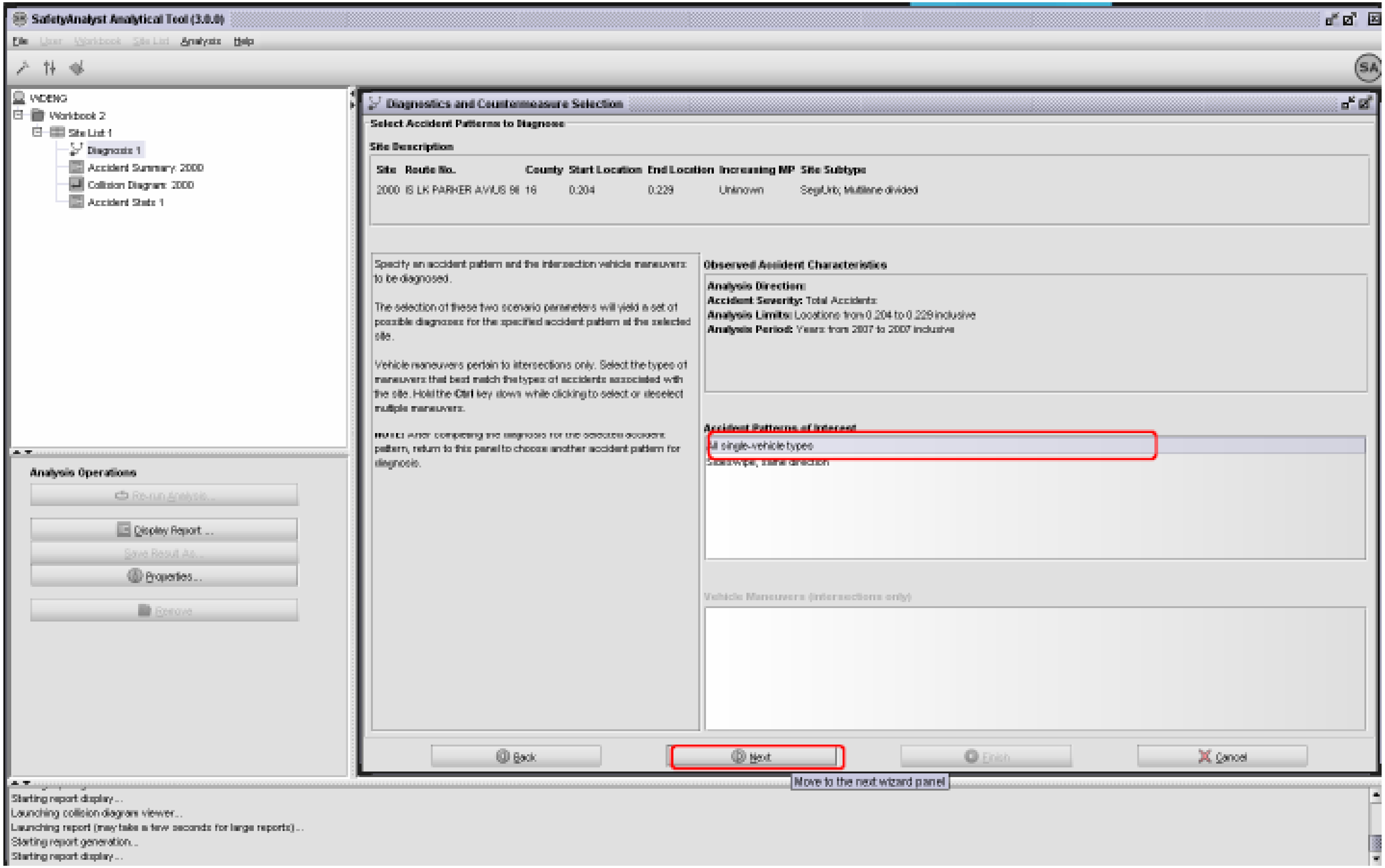

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
WDENG
Workbook 2
Site List 1
Diagnosis 1
Accident Summary: 2000
Collision Diagram: 2000
Analysis Operations
Re-run Analysis...
Display Report ...
Save Result As...
Properties...
Remove
Diagnostics and Countermeasure Selection
Identify Accident Patterns of Interest
Site Description
Site Route No. County Start Location End Location Increasing MP Site Subtype
2000 IS LK PARKER AV/US 98 16 0.204 0.229 Unknown Seg/Urb; Multilane divided
The buttons to the right provide access to tools that aid in the identification of accident patterns for the selected site.
Pressing the Diagnose wizard button will lead to a series of questions developed to help identify recommended countermeasures which, if implemented, could reduce the frequency of certain collision types. NOTE: This button will be disabled if no diagnostic scenarios have been defined for the subtype of the selected site.
Press the CM Selection wizard button to assign countermeasures to the selected site.
Accident Pattern Identification Tools
Accident Summary...
Collision Diagram...
Statistical Tests...
Back
Diagnose
CM Selection
Cancel
Using dataset accident distributions
Launching report (may take a few seconds for large reports)...
Starting report generation...
Starting report display...
Launching collision diagram viewer...

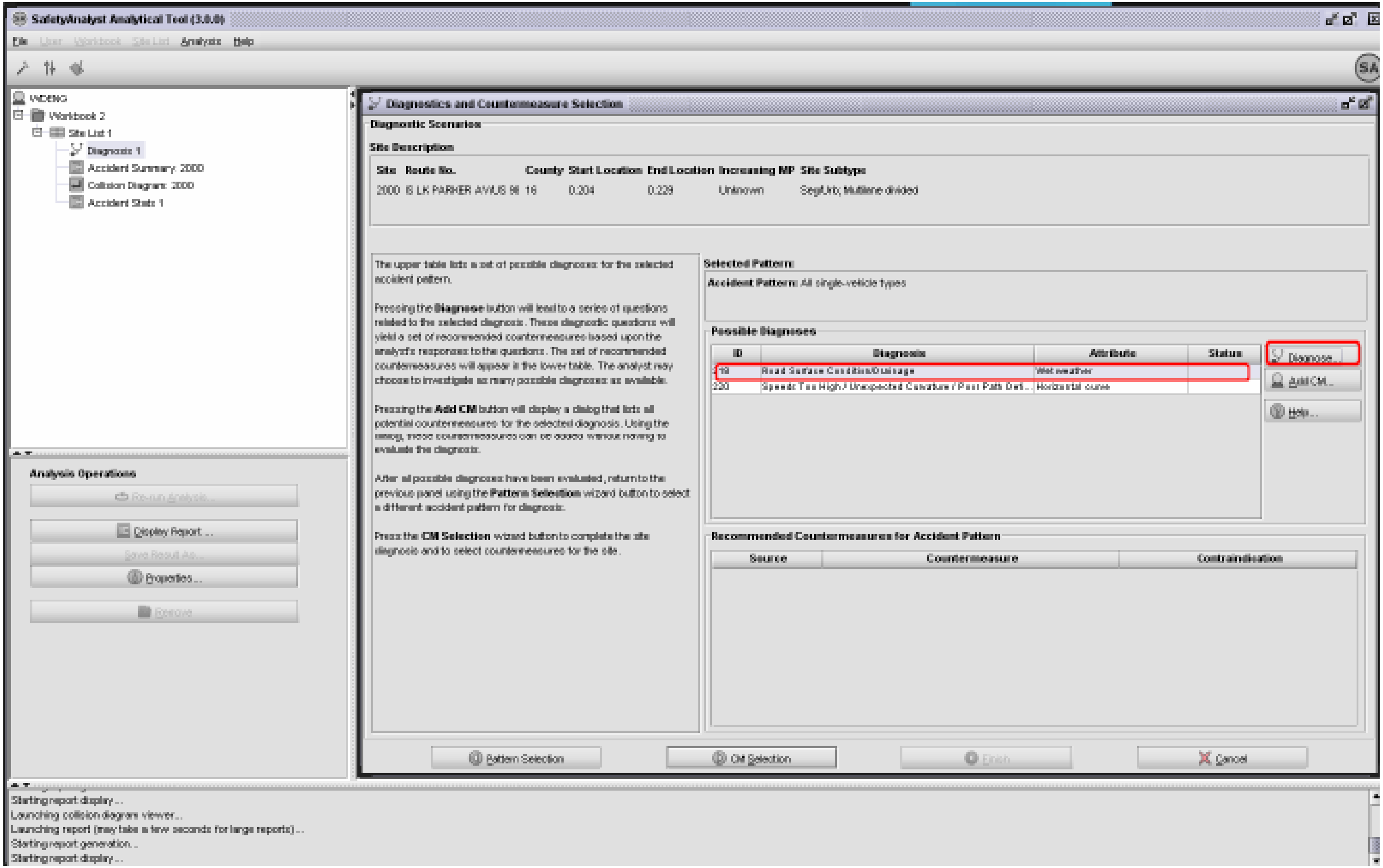

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
WDENG
Workbook 2
Site List 1
Diagnosis 1
Accident Summary: 2000
Collision Diagram: 2000
Analysis Operations
Re-run Analysis...
Display Report...
Save Result As...
Properties...
Remove
Diagnostics and Countermeasure Selection
Identify Accident Patterns of Interest
Site Description
Site Route No. County Start Location End Location Increasing MP Site Subtype
2000 IS LK PARKER AV/US 98 16 0.204 0.229 Unknown Seg/Urb; Multilane divided
Statistical Tests and Criteria
Test Configuration
Test Items
Test for Frequencies
Min accident frequency : 5.0000 accid/yr
Test of Proportions
Alpha : 0.10
Display Empty Rows
Ok
Cancel
Accept the operation and dismiss the dialog
Back
Diagnose
CM Selection
Cancel
Using dataset accident distributions
Launching report (may take a few seconds for large reports)...
Starting report generation...
Starting report display...
Launching collision diagram viewer...

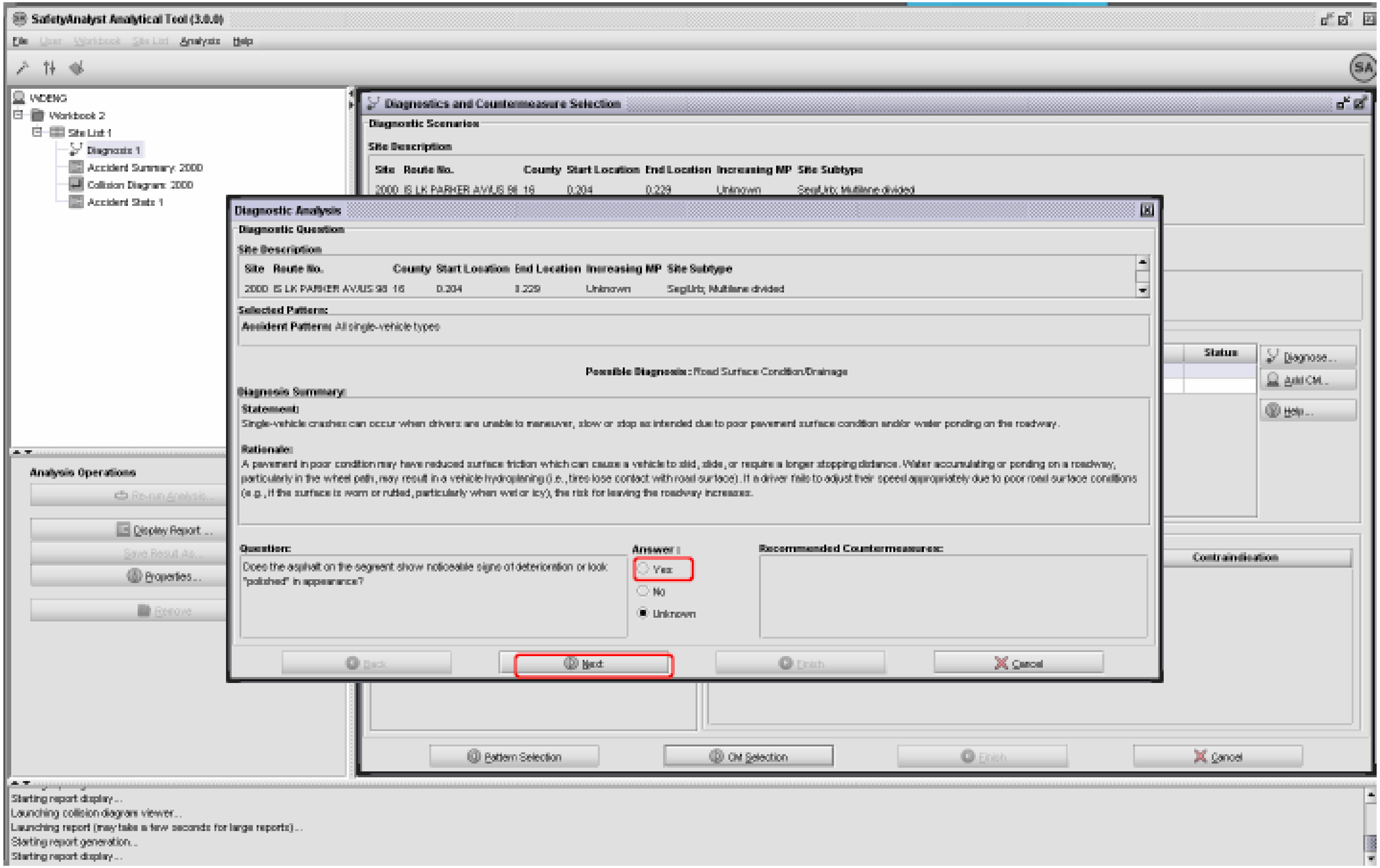

Accident Statistics Report - Windows Internet Explorer
C:\Program Files\SafetyAnalyst\users\WDENG\w2\s1\r2.html
Live Search
File Edit View Favorites Tools Help
Favorites
Accident Statistics Report
SafetyAnalyst
Accident Statistics Report
Jul 15, 2009
Table of Contents
1. Accident Statistics
1.1 Accident Pattern Identification
1.2 Summary Accident Data
List of Tables
1. Accident Pattern Identification
2. Summary Accident Data Used for Accident Pattern Identification
Disclaimer
This document is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its content or use thereof. This document does not constitute a standard, specification, or regulation.
The United States Government does not endorse products or manufacturers. Trade and manufacturers' names may appear in this document only because they are considered essential to the objective of the document.
Limited Warranty and Limitations of Remedies
This software product is provided "as-is," without warranty of any kind-either expressed or implied (but not limited to the implied warranties of merchantability and fitness for a particular purpose). The FHWA and distributor do not warrant that the functions contained in the software will meet the end-user's requirements or that the operation of the software will be uninterrupted and error-free.
Under no circumstances will the FHWA or the distributor be liable to the end-user for any damages or claimed lost profits, lost savings, or other incidental or consequential damages rising out of the use or inability to use the software (even if these organizations have been advised of the possibility of such damages), or for any claim by any other party.
Notice
The use and testing of the SafetyAnalyst software is being done strictly on a voluntary basis. In exchange for provision of SafetyAnalyst, the user agrees that the Federal Highway Administration (FHWA), U.S. Department of Transportation and any other agency of the Federal Government shall not be responsible for any errors, damage or other liability that may result from any and all use of the software, including installation and testing of the software. The user further agrees to hold the FHWA and the Federal Government harmless from any resulting liability. The user agrees that this hold harmless provision shall flow to any person to whom or any entity to which the user provides the SafetyAnalyst software. It is the user's full responsibility to inform any person to whom or any entity to which it provides the SafetyAnalyst software of this hold harmless provision.
Done
My Computer
100%
start
Example
2.docx - Microsoft...
SafetyAnalyst Ana...
Accident Statistics...
EN
11:04 AM

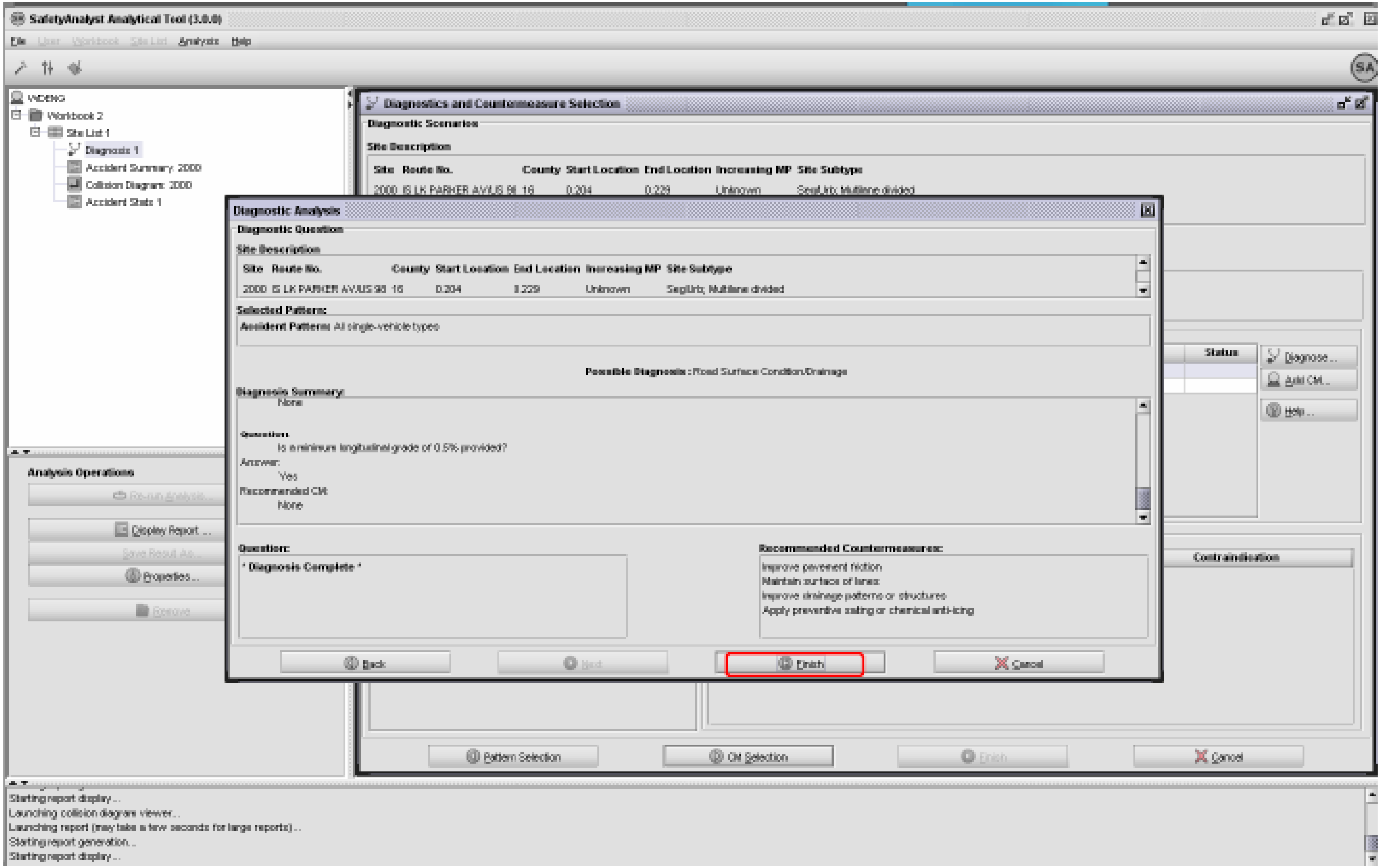

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
Diagnostics and Countermeasure Selection
Identify Accident Patterns of Interest
Site Description
Site Route No. County Start Location End Location Increasing MP Site Subtype
2000 IS LK PARKER AV/US 98 16 0.204 0.229 Unknown Seg/Urb; Multilane divided
The buttons to the right provide access to tools that aid in the identification of accident patterns for the selected site.
Pressing the Diagnose wizard button will lead to a series of questions developed to help identify recommended countermeasures which, if implemented, could reduce the frequency of certain collision types. NOTE: This button will be disabled if no diagnostic scenarios have been defined for the subtype of the selected site.
Press the CM Selection wizard button to assign countermeasures to the selected site.
Accident Pattern Identification Tools
Accident Summary...
Collision Diagram...
Statistical Tests...
Back
Diagnose
CM Selection
Cancel
Workbook 2
Site List 1
Diagnosis 1
Accident Summary: 2000
Collision Diagram: 2000
Accident Stats 1
Analysis Operations
Re-run Analysis...
Display Report ...
Save Result As...
Properties...
Remove
Starting report display...
Launching collision diagram viewer...
Launching report (may take a few seconds for large reports)...
Starting report generation...
Starting report display...

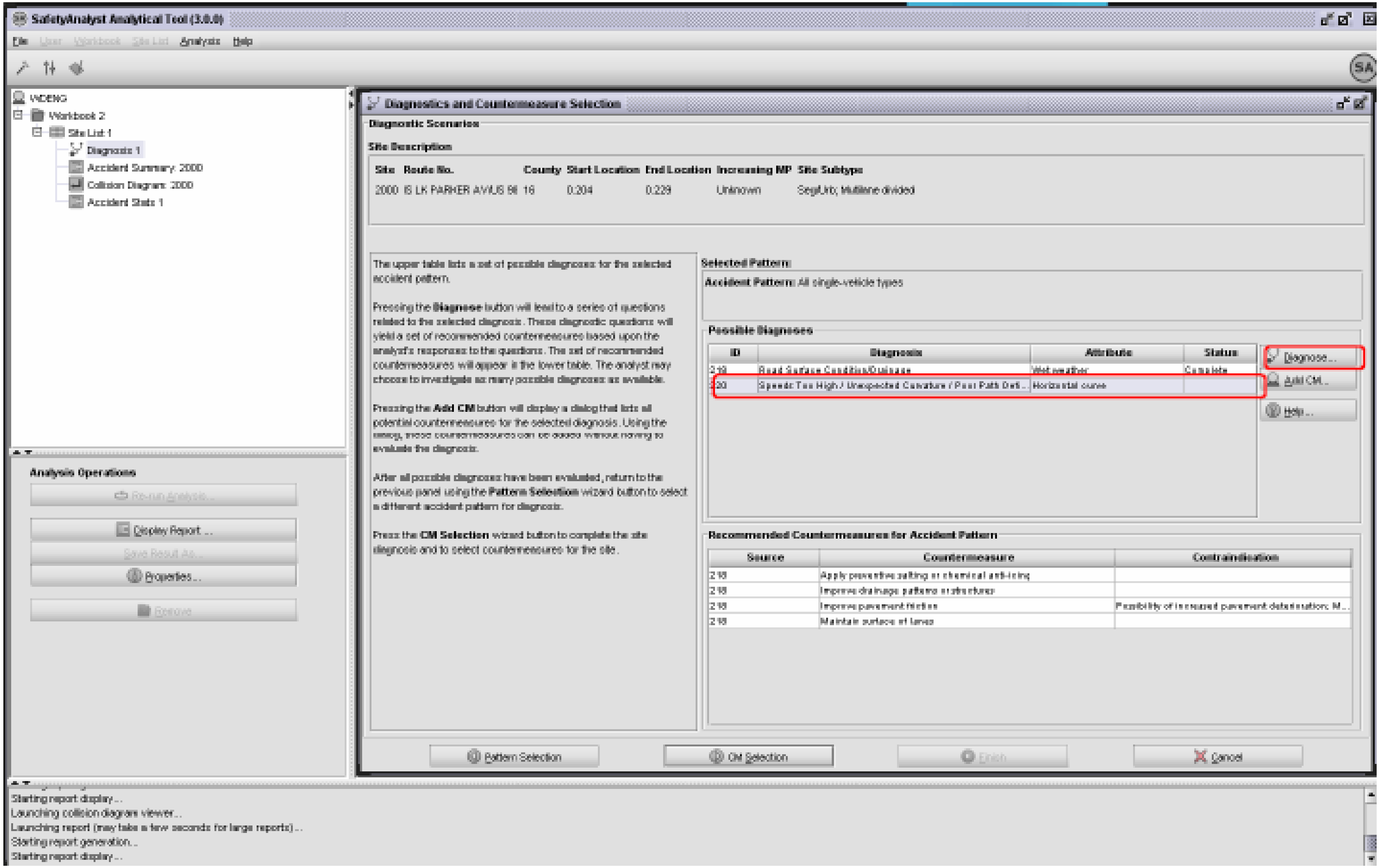

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
WDENG
Workbook 2
Site List 1
Diagnosis 1
Accident Summary: 2000
Collision Diagram: 2000
Accident Stats 1
Analysis Operations
Re-run Analysis...
Display Report ...
Save Result As...
Properties...
Remove
Diagnostics and Countermeasure Selection
Select Accident Patterns of Interest
Site Description
Site Route No. County Start Location End Location Increasing MP Site Subtype
2000 IS LK PARKER AVUS 98 16 0.204 0.229 Unknown Seg/Urb; Multilane divided
Specify the accident patterns to be considered for diagnosis.
Available accident patterns consist of the values of the Accident Type and Manner of Collision attribute for which there are available scenarios. Specific collision types that are observed in the accident data for the selected site are followed by the count of accidents representing the type.
Within each list, hold the Ctrl key down while clicking to select or deselect multiple items.
Single Vehicle Collision Types (observed accident count)
Collision with railroad train
Collision with bicyclist
Collision with pedestrian
All single-vehicle types (0)
Multiple Vehicle Collision Types (observed accident count)
Rear-end
Sideswipe, same direction
Back
Next
Finish
Cancel
Starting report display...
Launching collision diagram viewer...
Launching report (may take a few seconds for large reports)...
Starting report generation...
Starting report display...

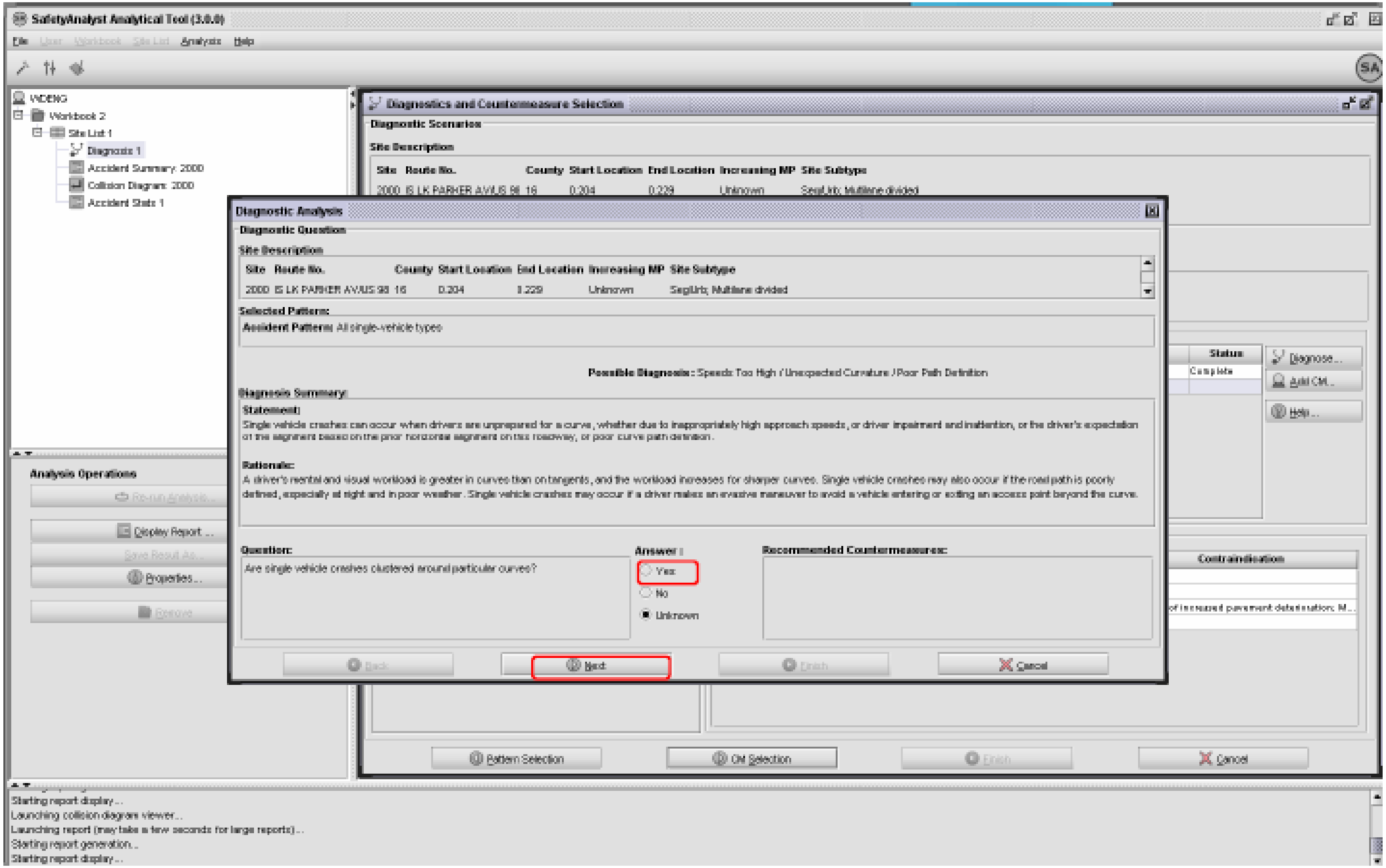

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
Diagnostics and Countermeasure Selection
Select Accident Patterns to Diagnose
Site Description
Site Route No. County Start Location End Location Increasing MP Site Subtype
2000 IS LK PARKER AV/US 98 16 0.204 0.229 Unknown Seg/Urb; Multilane divided
Specify an accident pattern and the intersection vehicle maneuvers to be diagnosed.
The selection of these two scenario parameters will yield a set of possible diagnoses for the specified accident pattern at the selected site.
Vehicle maneuvers pertain to intersections only. Select the types of maneuvers that best match the types of accidents associated with the site. Hold the Ctrl key down while clicking to select or deselect multiple maneuvers.
Observed Accident Characteristics
Analysis Direction:
Accident Severity: Total Accidents
Analysis Limits: Locations from 0.204 to 0.229 inclusive
Analysis Period: Years from 2007 to 2007 inclusive
Accident Patterns of Interest
All single-vehicle types
Vehicle Maneuvers (intersections only)
Back
Next
Finish
Cancel
Move to the next wizard panel
Workbook 2
Site List 1
Diagnosis 1
Accident Summary 2000
Collision Diagram 2000
Accident Stats 1
Analysis Operations
Re-run Analysis...
Display Report ...
Save Result As...
Properties...
Remove
Starting report display...
Launching collision diagram viewer...
Launching report (may take a few seconds for large reports)...
Starting report generation...
Starting report display...

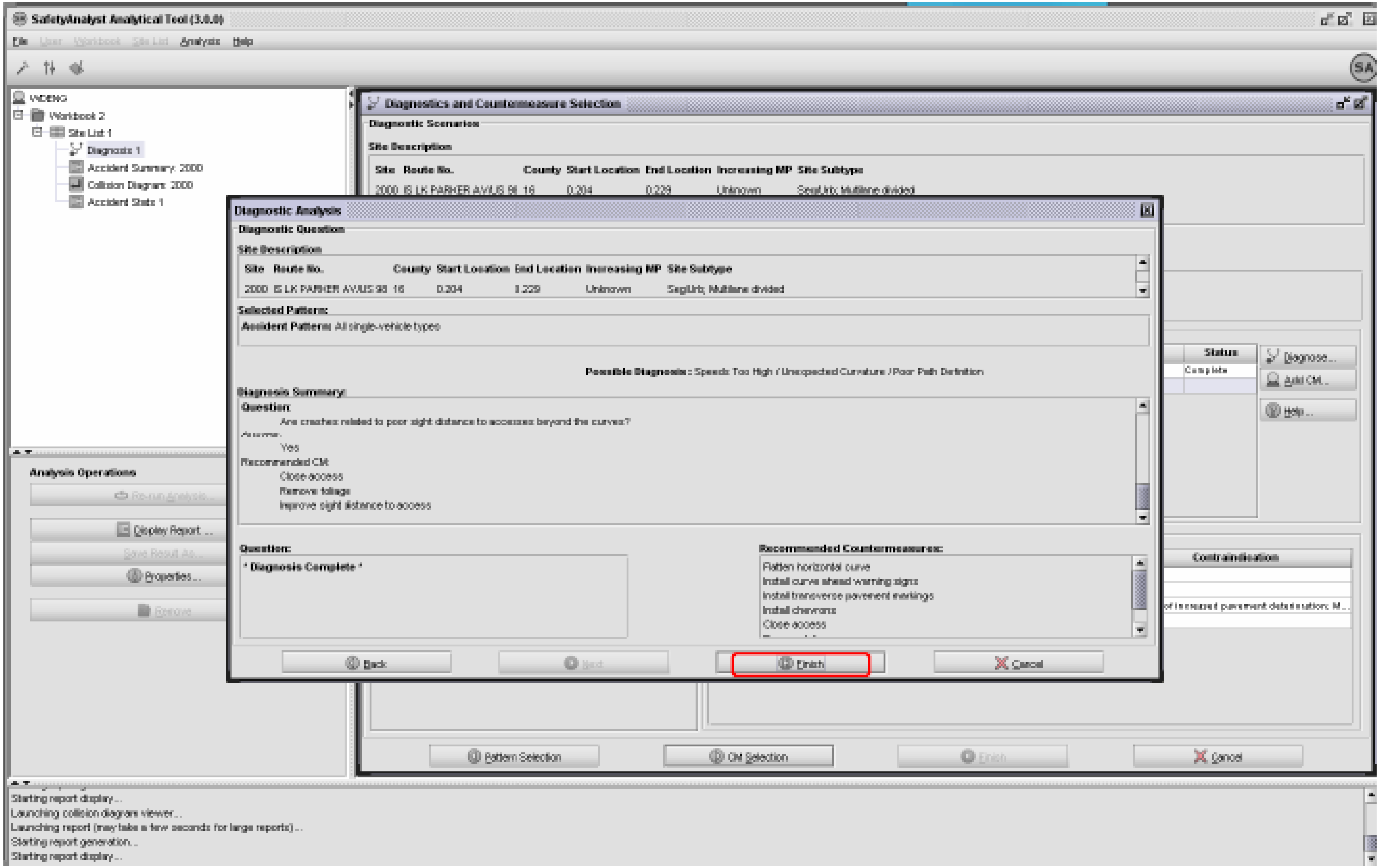

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
Workbook 2
Site List 1
Diagnosis 1
Accident Summary: 2000
Collision Diagram: 2000
Accident Stats 1
Analysis Operations
Re-run Analysis...
Display Report ...
Save Result As...
Properties...
Remove
Diagnostics and Countermeasure Selection
Diagnostic Scenarios
Site Description
Site Route No. County Start Location End Location Increasing MP Site Subtype
2000 IS LK PARKER AV/US 98 16 0.204 0.229 Unknown Seg/Urb; Multilane divided
The upper table lists a set of possible diagnoses for the selected accident pattern.
Pressing the Diagnose button will lead to a series of questions related to the selected diagnosis. These diagnostic questions will yield a set of recommended countermeasures based upon the analyst's responses to the questions. The set of recommended countermeasures will appear in the lower table. The analyst may choose to investigate as many possible diagnoses as available.
Pressing the Add CM button will display a dialog that lists all potential countermeasures for the selected diagnosis.
evaluate the diagnosis.
After all possible diagnoses have been evaluated, return to the previous panel using the Pattern Selection wizard button to select a different accident pattern for diagnosis.
Press the CM Selection wizard button to complete the site diagnosis and to select countermeasures for the site.
Selected Pattern:
Accident Pattern: All single-vehicle types
Possible Diagnoses
ID Diagnosis Attribute Status
Road Surface Condition/Drainage
Wet weather
220
Horizontal curve
Diagnose...
Add CM...
Help...
Recommended Countermeasures for Accident Pattern
Source Countermeasure Contraindication
Pattern Selection
CM Selection
Finish
Cancel
Starting report display...
Launching collision diagram viewer...
Launching report (may take a few seconds for large reports)...
Starting report generation...
Starting report display...

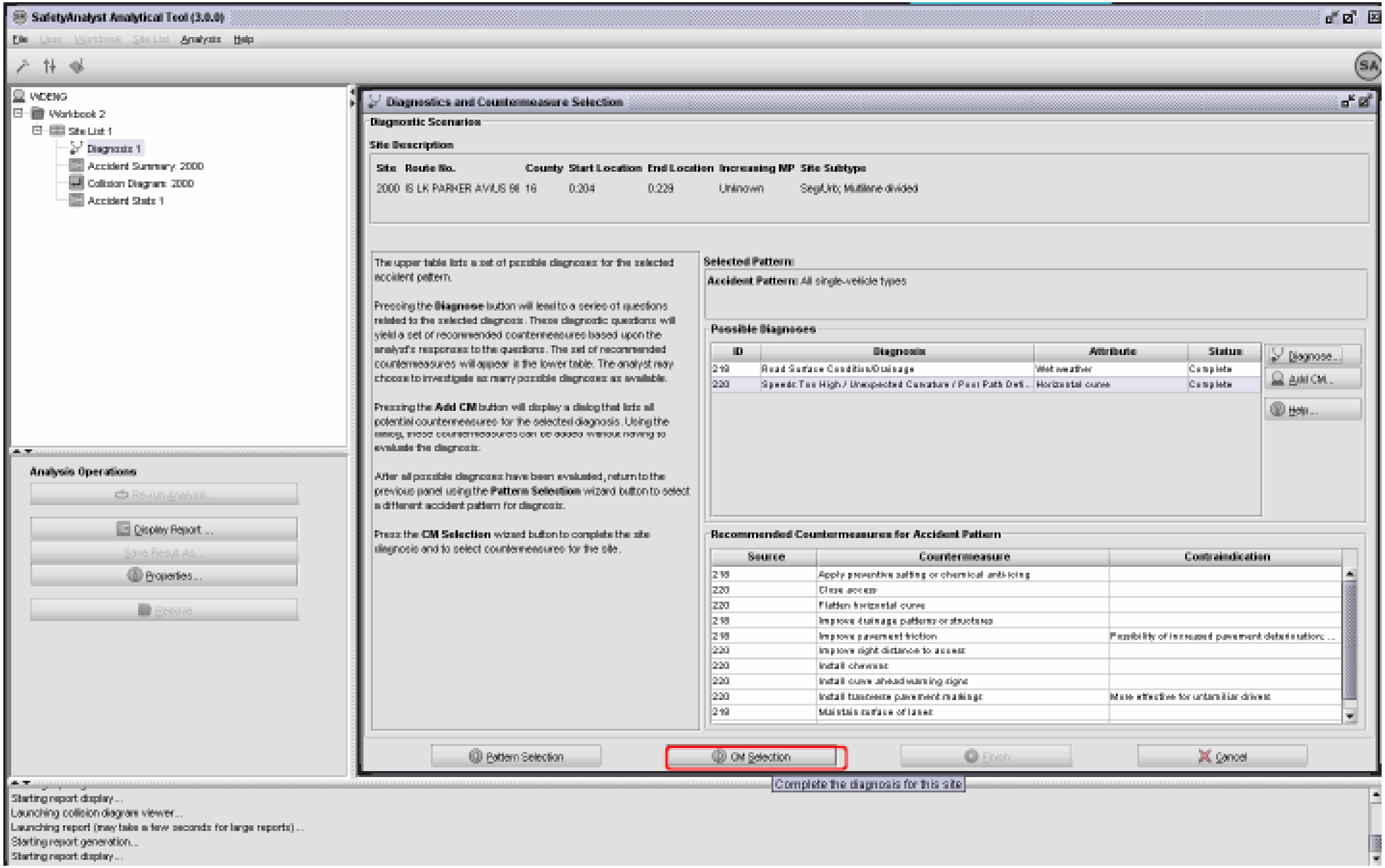

SafetyAnalyst Analytical Tool (3.0.0)
Diagnostics and Countermeasure Selection
Diagnostic Analysis
Diagnostic Question
Site Description
Site Route No. County Start Location End Location Increasing MP Site Subtype
2000 IS LK PARKER AV/US 98 16 0.204 0.229 Unknown Seg/Urb; Multilane divided
Selected Pattern:
Accident Pattern: All single-vehicle types
Possible Diagnosis: Road Surface Condition/Drainage
Diagnosis Summary:
Statement:
Single-vehicle crashes can occur when drivers are unable to maneuver, slow or stop as intended due to poor pavement surface condition and/or water ponding on the roadway.
Rationale:
A pavement in poor condition may have reduced surface friction which can cause a vehicle to skid, slide, or require a longer stopping distance. Water accumulating or ponding on a roadway, particularly in the wheel path, may result in a vehicle hydroplaning (i.e., tires lose contact with road surface). If a driver fails to adjust their speed appropriately due to poor road surface conditions (e.g., if the surface is worn or rutted, particularly when wet or icy), the risk for leaving the roadway increases.
Question:
Does the asphalt on the segment show noticeable signs of deterioration or look "polished" in appearance?
Answer:
Yes
No
Unknown
Recommended Countermeasures:
Back
Next
Finish
Cancel
Analysis Operations
Display Report ...
Properties...
Pattern Selection
CM Selection
Starting report display...
Launching collision diagram viewer...
Launching report (may take a few seconds for large reports)...
Starting report generation...
Starting report display...

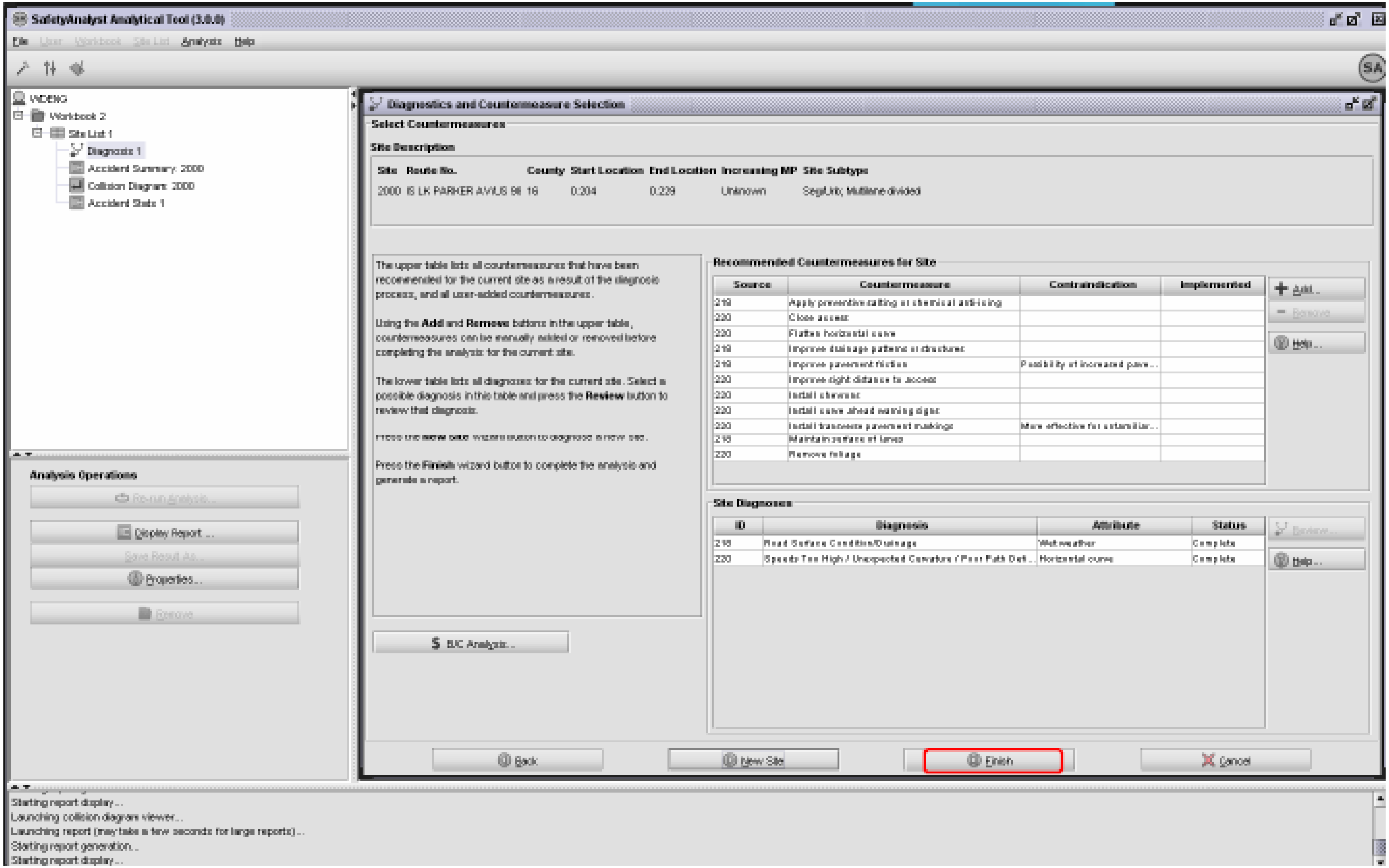

SafetyAnalyst Analytical Tool (3.0.0)
Diagnostics and Countermeasure Selection
Diagnostic Analysis
Diagnostic Question
Site Description
Site Route No. County Start Location End Location Increasing MP Site Subtype
2000 IS LK PARKER AV/US 98 16 0.204 0.229 Unknown Seg/Urb; Multilane divided
Selected Pattern:
Accident Pattern: All single-vehicle types
Possible Diagnosis : Road Surface Condition/Drainage
Diagnosis Summary:
None
Is a minimum longitudinal grade of 0.5% provided?
Answer:
Yes
Recommended CM:
None
Question:
* Diagnosis Complete *
Recommended Countermeasures:
Improve pavement friction
Maintain surface of lanes
Improve drainage patterns or structures
Apply preventive salting or chemical anti-icing
Back
Next
Finish
Cancel
Analysis Operations
Display Report ...
Properties...
Pattern Selection
CM Selection
Starting report display...
Launching collision diagram viewer...
Launching report (may take a few seconds for large reports)...
Starting report generation...
Starting report display...

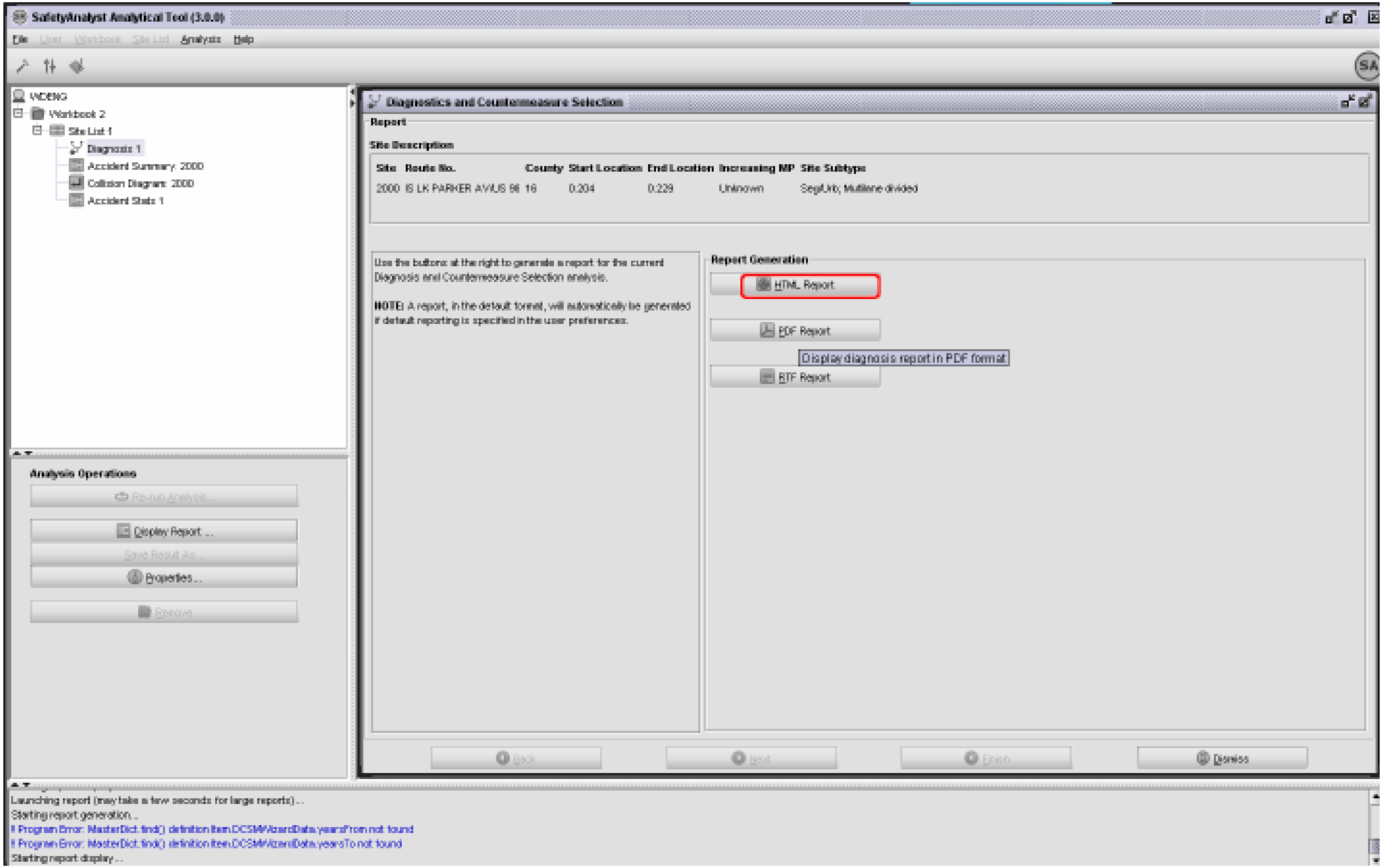

SafetyAnalyst Analytical Tool (3.0.0)
Diagnostics and Countermeasure Selection
Diagnostic Scenarios
Site Description
Site Route No. County Start Location End Location Increasing MP Site Subtype
Selected Pattern:
Accident Pattern: All single-vehicle types
Possible Diagnoses
Recommended Countermeasures for Accident Pattern
Analysis Operations
Pattern Selection
CM Selection
Finish
Cancel

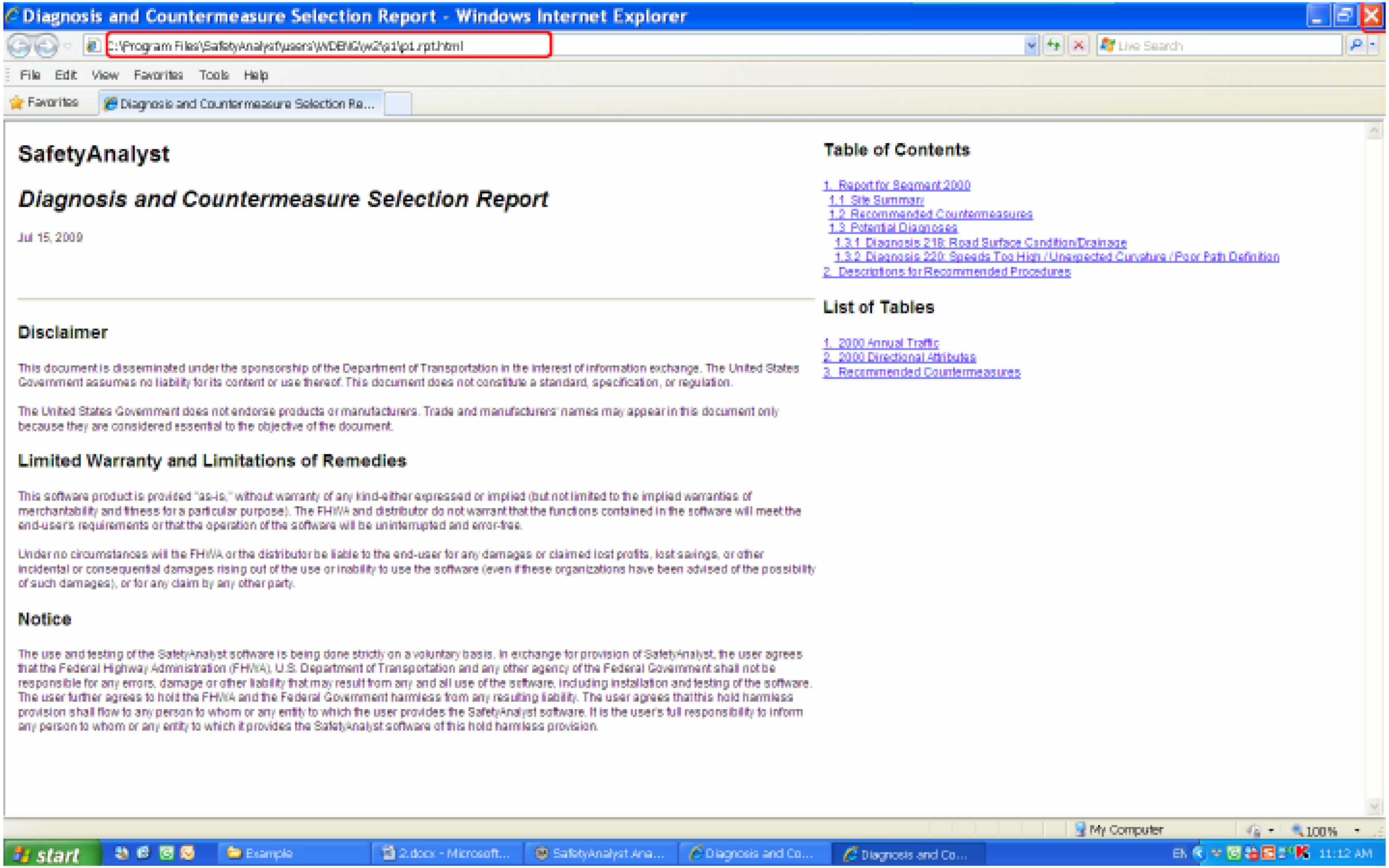

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
Diagnostics and Countermeasure Selection
Diagnostic Scenarios
Site Description
Site Route No. County Start Location End Location Increasing MP Site Subtype
2000 IS LK PARKER AV/US 98 16 0.204 0.229 Unknown Seg/Urb; Multilane divided
Diagnostic Analysis
Diagnostic Question
Site Description
Site Route No. County Start Location End Location Increasing MP Site Subtype
2000 IS LK PARKER AV/US 98 16 0.204 0.229 Unknown Seg/Urb; Multilane divided
Selected Pattern:
Accident Pattern: All single-vehicle types
Possible Diagnosis: Speeds Too High / Unexpected Curvature / Poor Path Definition
Diagnosis Summary:
Statement:
Single vehicle crashes can occur when drivers are unprepared for a curve, whether due to inappropriately high approach speeds, or driver impairment and inattention, or the driver's expectation of the alignment based on the prior horizontal alignment on this roadway, or poor curve path definition.
Rationale:
A driver's mental and visual workload is greater in curves than on tangents, and the workload increases for sharper curves. Single vehicle crashes may also occur if the road path is poorly defined, especially at night and in poor weather. Single vehicle crashes may occur if a driver makes an evasive maneuver to avoid a vehicle entering or exiting an access point beyond the curve.
Question:
Are single vehicle crashes clustered around particular curves?
Answer:
Yes
No
Unknown
Recommended Countermeasures:
Back
Next
Finish
Cancel
Status
Complete
Diagnose...
Add CM...
Help...
Contraindication
of increased pavement deterioration; M...
Pattern Selection
CM Selection
Finish
Cancel
WDENG
Workbook 2
Site List 1
Diagnosis 1
Accident Summary: 2000
Collision Diagram: 2000
Accident Stats 1
Analysis Operations
Re-run Analysis...
Display Report...
Save Result As...
Properties...
Remove
Starting report display...
Launching collision diagram viewer...
Launching report (may take a few seconds for large reports)...
Starting report generation...
Starting report display...

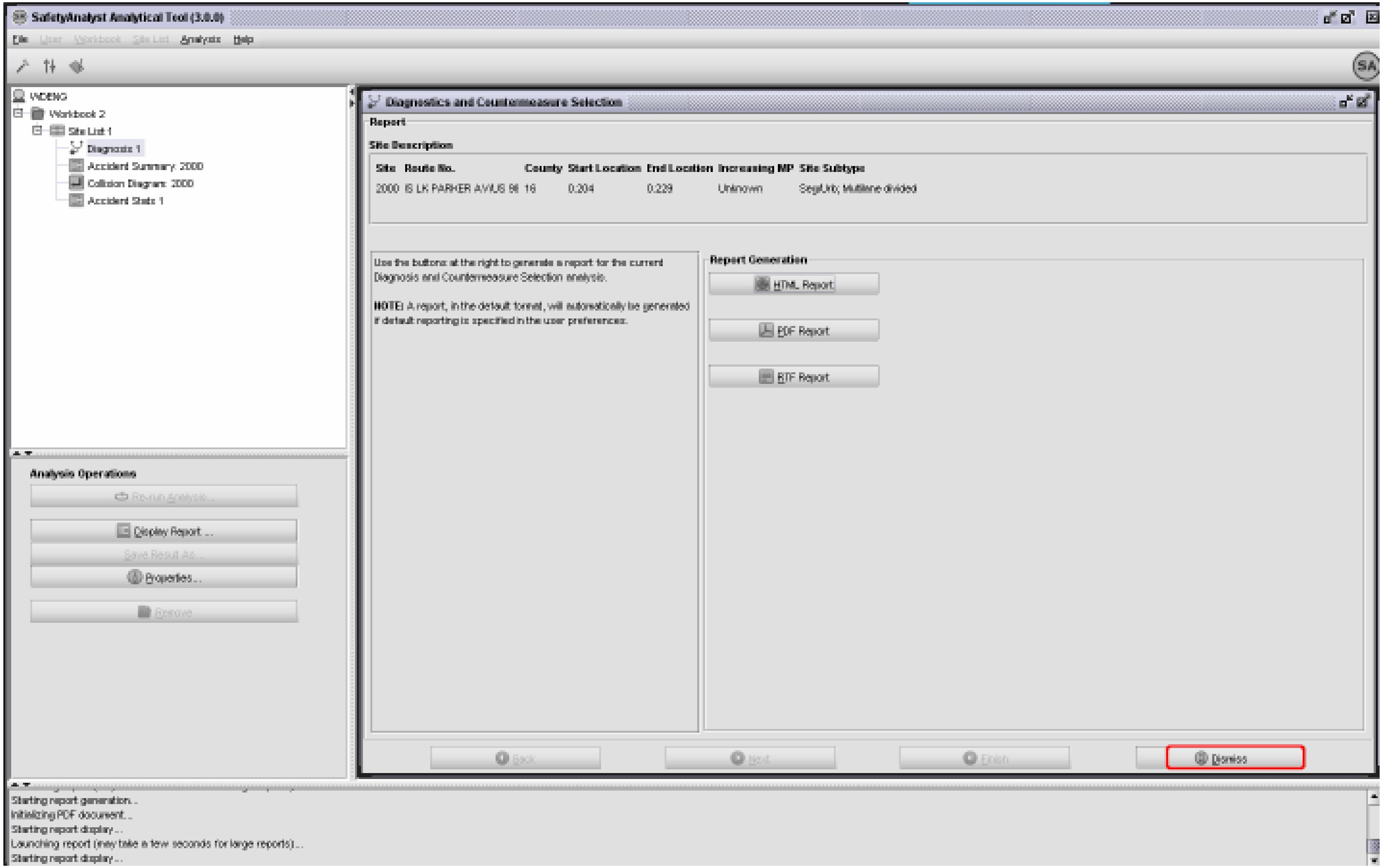

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
WDENG
Workbook 2
Site List 1
Diagnosis 1
Accident Summary 2000
Collision Diagram 2000
Accident Stats 1
Analysis Operations
Re-run Analysis...
Display Report ...
Save Result As...
Properties...
Remove
Diagnostics and Countermeasure Selection
Diagnostic Scenarios
Site Description
Site Route No. County Start Location End Location Increasing MP Site Subtype
2000 IS LK PARKER AV/US 98 16 0.204 0.229 Unknown Seg/Urb; Multilane divided
Diagnostic Analysis
Diagnostic Question
Site Description
Site Route No. County Start Location End Location Increasing MP Site Subtype
2000 IS LK PARKER AV/US 98 16 0.204 0.229 Unknown Seg/Urb; Multilane divided
Selected Pattern:
Accident Pattern: All single-vehicle types
Possible Diagnosis: Speeds Too High / Unexpected Curvature / Poor Path Definition
Diagnosis Summary:
Question:
Are crashes related to poor sight distance to accesses beyond the curves?
Yes
Recommended CM:
Close access
Remove foliage
Improve sight distance to access
Question:
* Diagnosis Complete *
Recommended Countermeasures:
Flatten horizontal curve
Install curve ahead warning signs
Install transverse pavement markings
Install chevrons
Close access
Back
Next
Finish
Cancel
Status
Complete
Diagnose...
Add CM...
Help...
Contraindication
of increased pavement deterioration; M...
Pattern Selection
CM Selection
Finish
Cancel
Starting report display...
Launching collision diagram viewer...
Launching report (may take a few seconds for large reports)...
Starting report generation...
Starting report display...

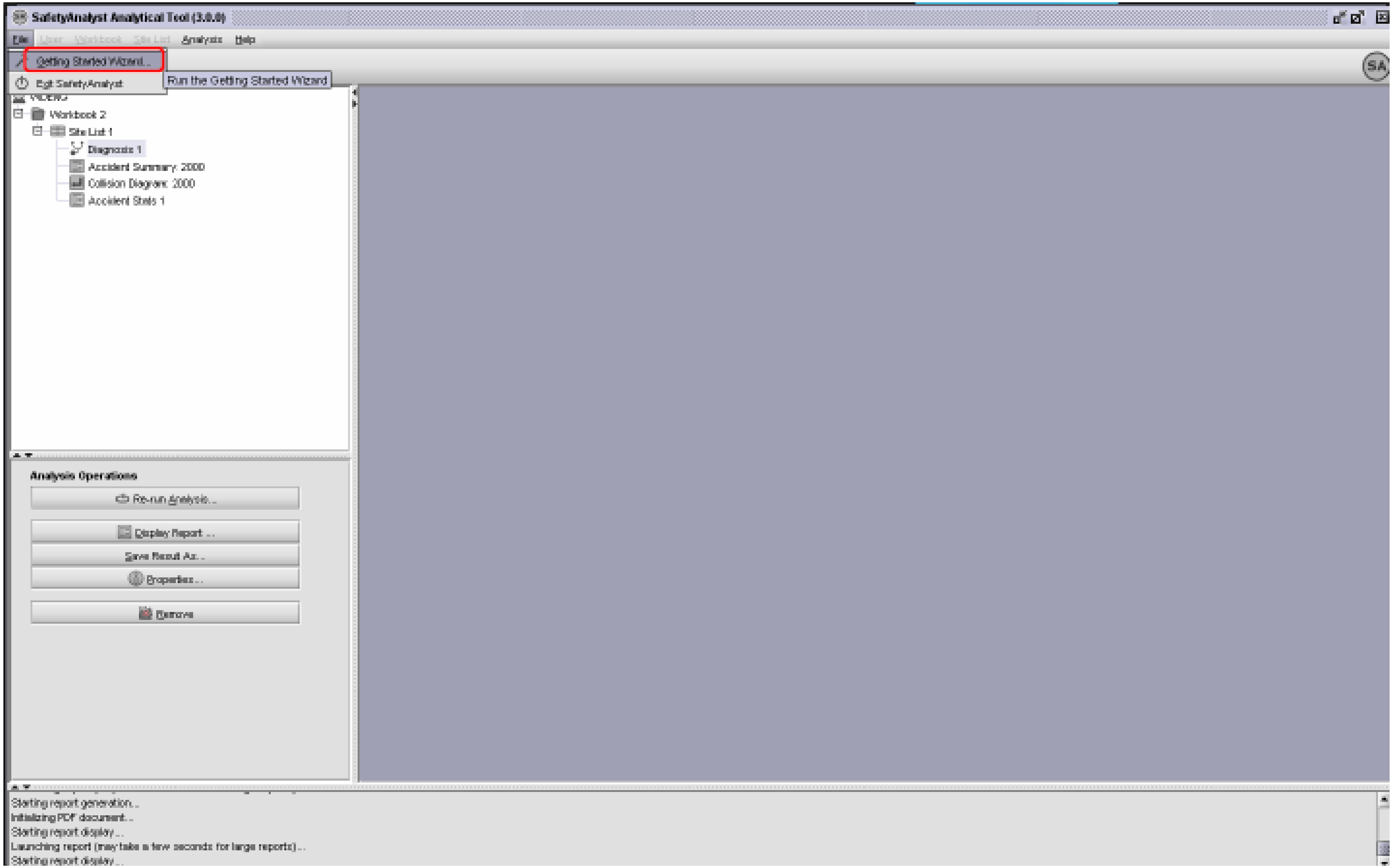


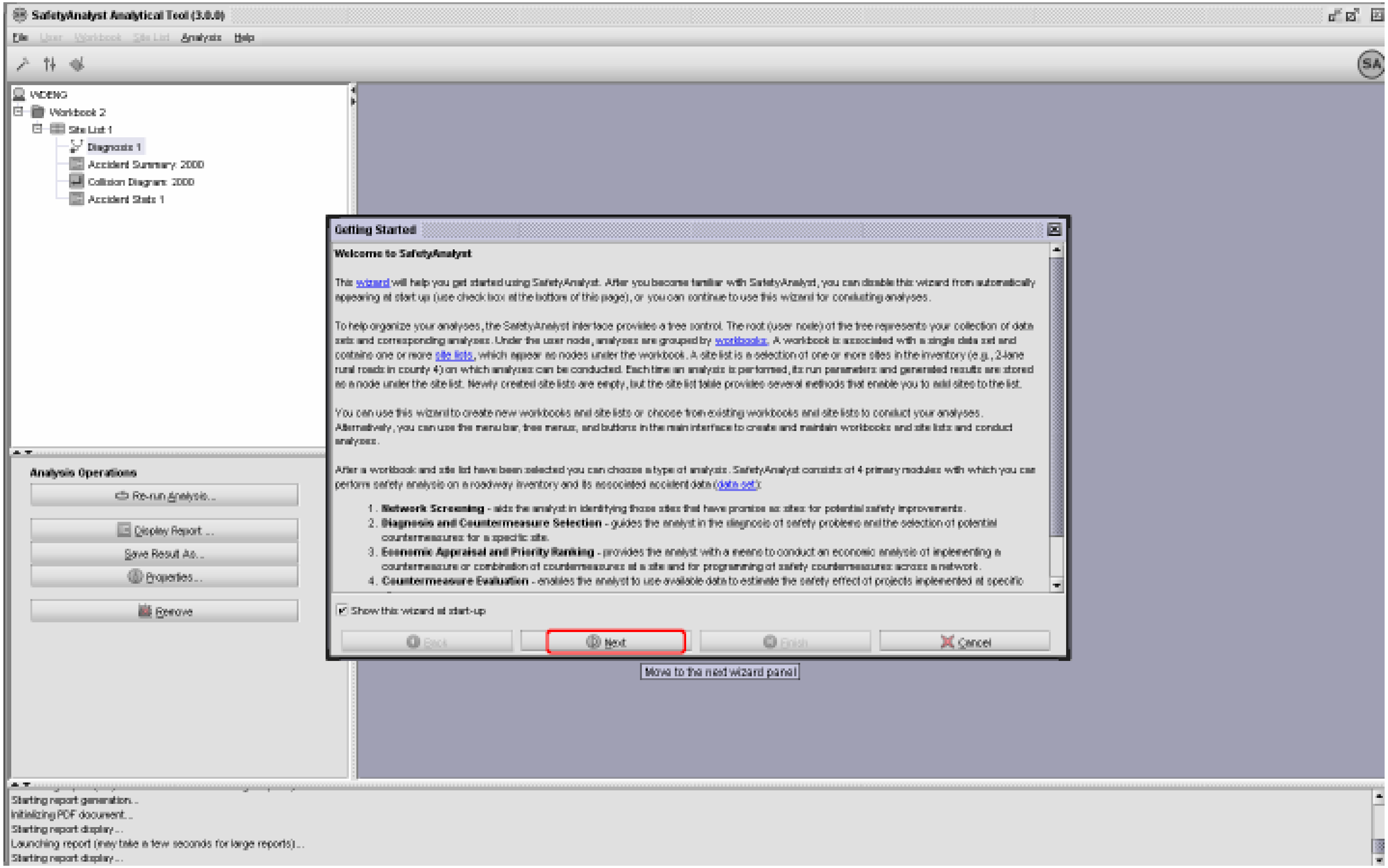

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
Diagnostics and Countermeasure Selection
Select Countermeasures
Site Description
Site Route No. County Start Location End Location Increasing MP Site Subtype
2000 IS LK PARKER AV/US 98 16 0.204 0.229 Unknown Seg/Urb; Multilane divided
The upper table lists all countermeasures that have been recommended for the current site as a result of the diagnosis process, and all user-added countermeasures.
Using the Add and Remove buttons in the upper table, countermeasures can be manually added or removed before completing the analysis for the current site.
The lower table lists all diagnoses for the current site. Select a possible diagnosis in this table and press the Review button to review that diagnosis.
Press the Finish wizard button to complete the analysis and generate a report.
Recommended Countermeasures for Site
Site Diagnoses
Analysis Operations
Display Report ...
Properties ...
B/C Analysis ...
Back
New Site
Finish
Cancel
Starting report display...
Launching collision diagram viewer...
Launching report (may take a few seconds for large reports)...
Starting report generation...
Starting report display...

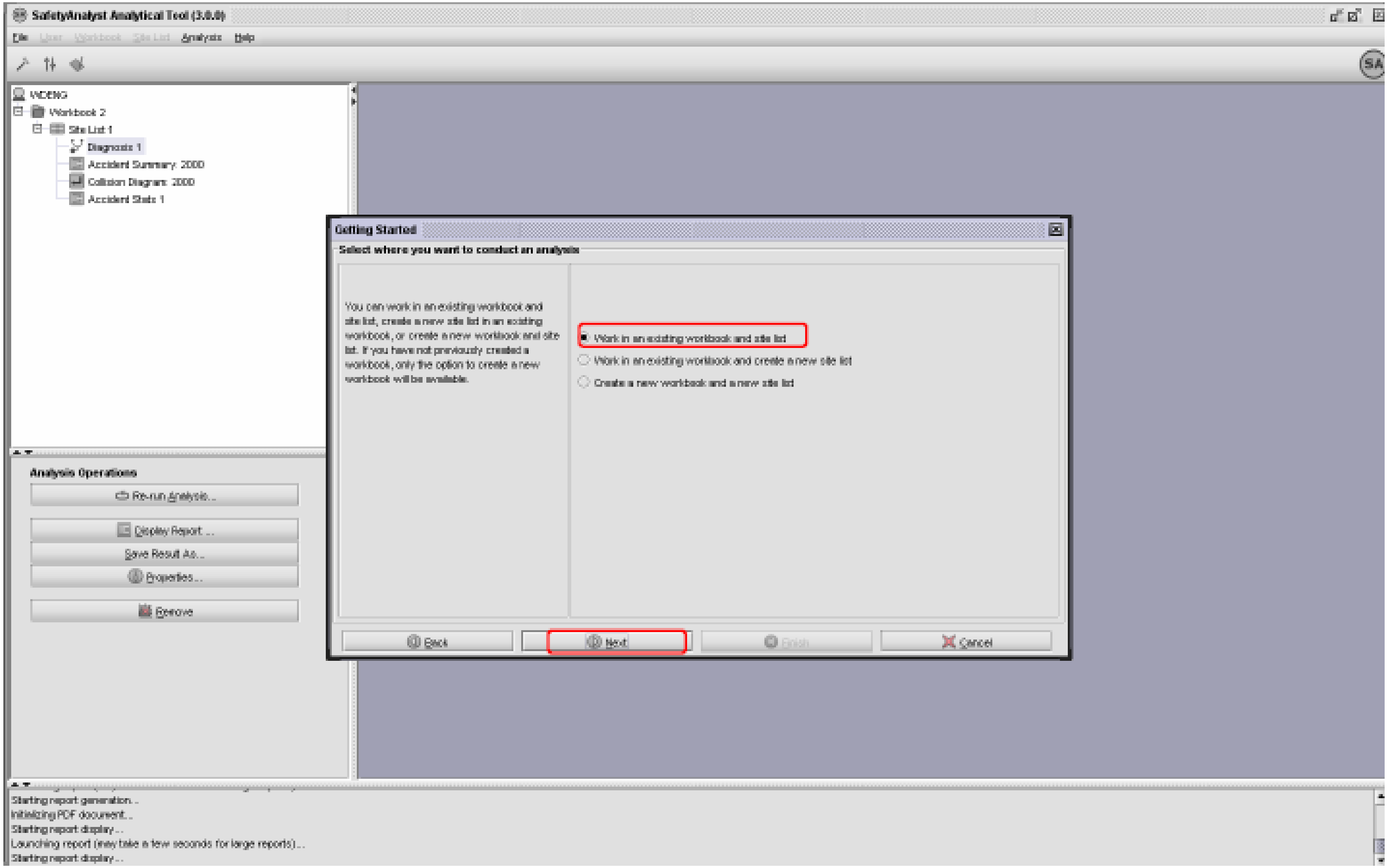

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
Diagnostics and Countermeasure Selection
Report
Site Description
Site Route No. County Start Location End Location Increasing MP Site Subtype
Use the buttons at the right to generate a report for the current Diagnosis and Countermeasure Selection analysis.
NOTE: A report, in the default format, will automatically be generated if default reporting is specified in the user preferences.
Report Generation
HTML Report
PDF Report
Display diagnosis report in PDF format
RTF Report
Analysis Operations
Display Report ...
Properties...
Dismiss
Launching report (may take a few seconds for large reports)...
Starting report generation...
Starting report display...

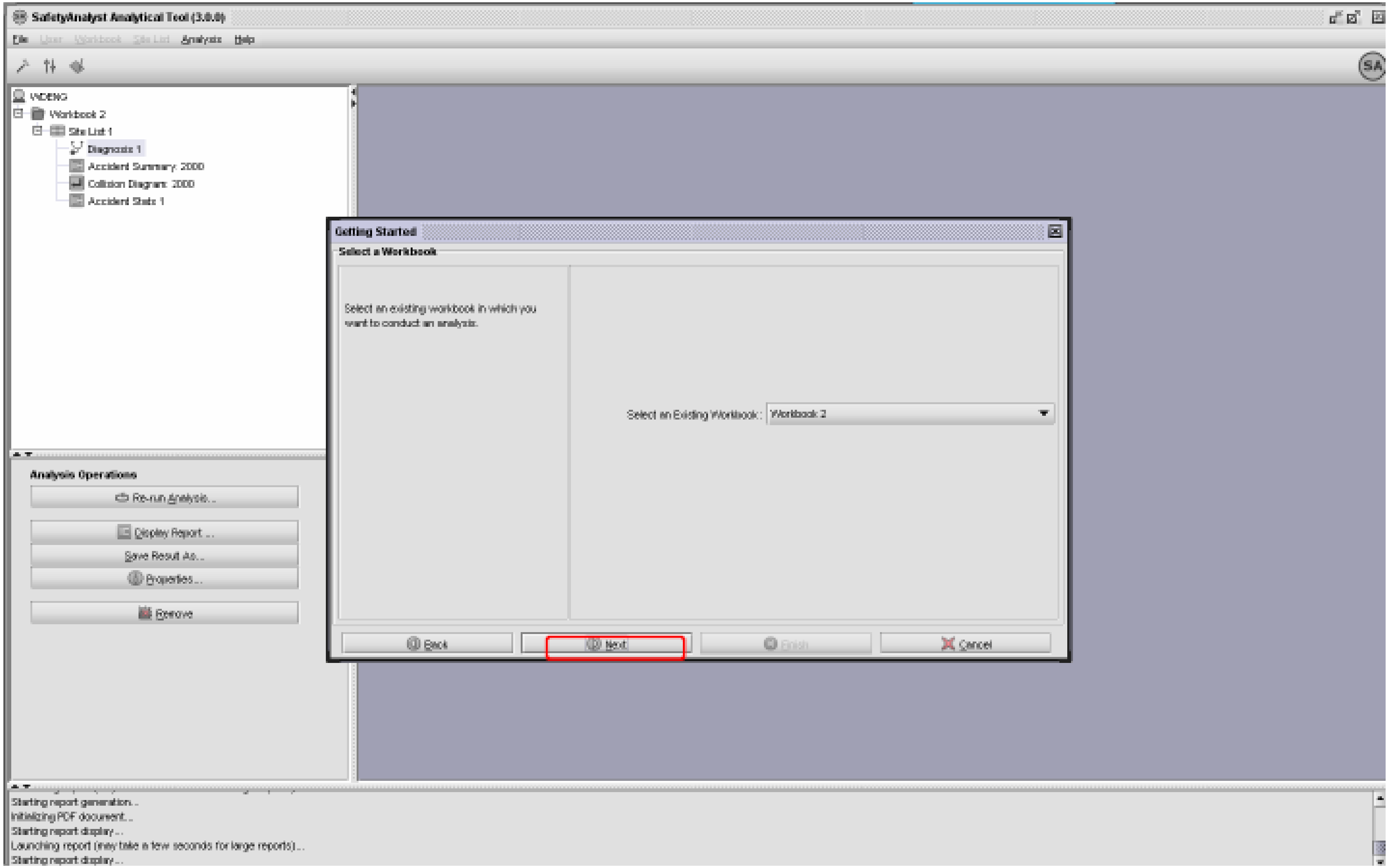

Diagnosis and Countermeasure Selection Report - Windows Internet Explorer
C:\Program Files\SafetyAnalyst\users\WDENG\w2\s1\p1.rpt.html
File Edit View Favorites Tools Help
Favorites
Diagnosis and Countermeasure Selection Re...
SafetyAnalyst
Diagnosis and Countermeasure Selection Report
Jul 15, 2009
Disclaimer
This document is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its content or use thereof. This document does not constitute a standard, specification, or regulation.
The United States Government does not endorse products or manufacturers. Trade and manufacturers' names may appear in this document only because they are considered essential to the objective of the document.
Limited Warranty and Limitations of Remedies
This software product is provided "as-is," without warranty of any kind-either expressed or implied (but not limited to the implied warranties of merchantability and fitness for a particular purpose). The FHWA and distributor do not warrant that the functions contained in the software will meet the end-user's requirements or that the operation of the software will be uninterrupted and error-free.
Under no circumstances will the FHWA or the distributor be liable to the end-user for any damages or claimed lost profits, lost savings, or other incidental or consequential damages rising out of the use or inability to use the software (even if these organizations have been advised of the possibility of such damages), or for any claim by any other party.
Notice
The use and testing of the SafetyAnalyst software is being done strictly on a voluntary basis. In exchange for provision of SafetyAnalyst, the user agrees that the Federal Highway Administration (FHWA), U.S. Department of Transportation and any other agency of the Federal Government shall not be responsible for any errors, damage or other liability that may result from any and all use of the software, including installation and testing of the software. The user further agrees to hold the FHWA and the Federal Government harmless from any resulting liability. The user agrees that this hold harmless provision shall flow to any person to whom or any entity to which the user provides the SafetyAnalyst software. It is the user's full responsibility to inform any person to whom or any entity to which it provides the SafetyAnalyst software of this hold harmless provision.
Table of Contents
1. Report for Segment 2000
1.1 Site Summary
1.2 Recommended Countermeasures
1.3 Potential Diagnoses
1.3.1 Diagnosis 218: Road Surface Condition/Drainage
1.3.2 Diagnosis 220: Speeds Too High / Unexpected Curvature / Poor Path Definition
2. Descriptions for Recommended Procedures
List of Tables
1. 2000 Annual Traffic
2. 2000 Directional Attributes
3. Recommended Countermeasures
My Computer
100%
start
Example
2.docx - Microsoft...
SafetyAnalyst Ana...
Diagnosis and Co...
Diagnosis and Co...
11:12 AM

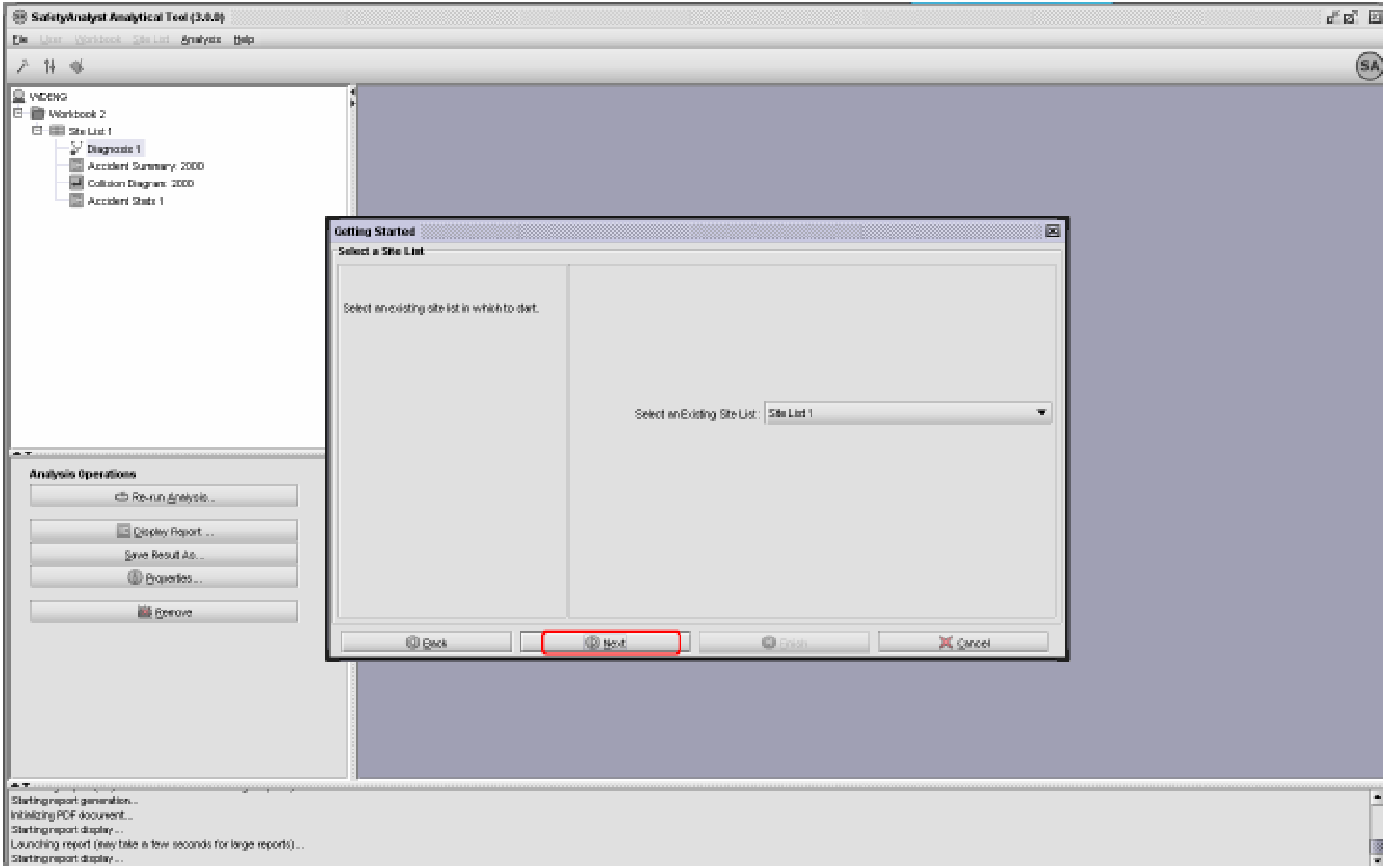

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
Workbook 2
Site List 1
Diagnosis 1
Accident Summary 2000
Collision Diagram 2000
Accident Stats 1
Analysis Operations
Re-run Analysis...
Display Report ...
Save Result As...
Properties...
Remove
Diagnostics and Countermeasure Selection
Report
Site Description
Site Route No. County Start Location End Location Increasing MP Site Subtype
2000 IS LK PARKER AV/US 98 16 0.204 0.229 Unknown Seg/Urb; Multilane divided
Use the buttons at the right to generate a report for the current Diagnosis and Countermeasure Selection analysis.
NOTE: A report, in the default format, will automatically be generated if default reporting is specified in the user preferences.
Report Generation
HTML Report
PDF Report
RTF Report
Back
Next
Finish
Dismiss
Starting report generation...
Initializing PDF document...
Starting report display...
Launching report (may take a few seconds for large reports)...
Starting report display...

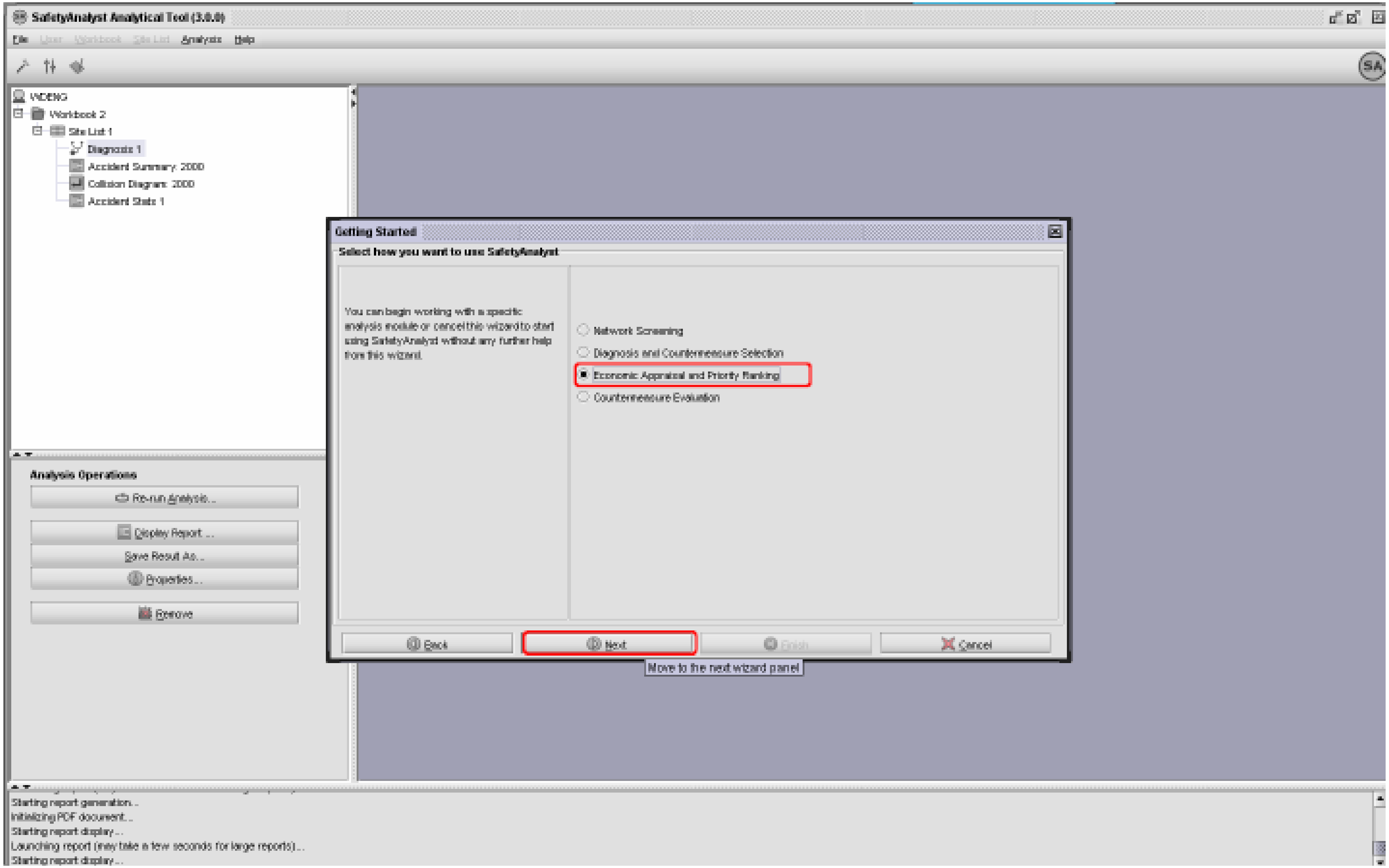

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
Getting Started Wizard...
Exit SafetyAnalyst
Run the Getting Started Wizard
Workbook 2
Site List 1
Diagnosis 1
Accident Summary: 2000
Collision Diagram: 2000
Accident Stats 1
Analysis Operations
Re-run Analysis...
Display Report ...
Save Result As...
Properties...
Remove
Starting report generation...
Initializing PDF document...
Starting report display...
Launching report (may take a few seconds for large reports)...
Starting report display...

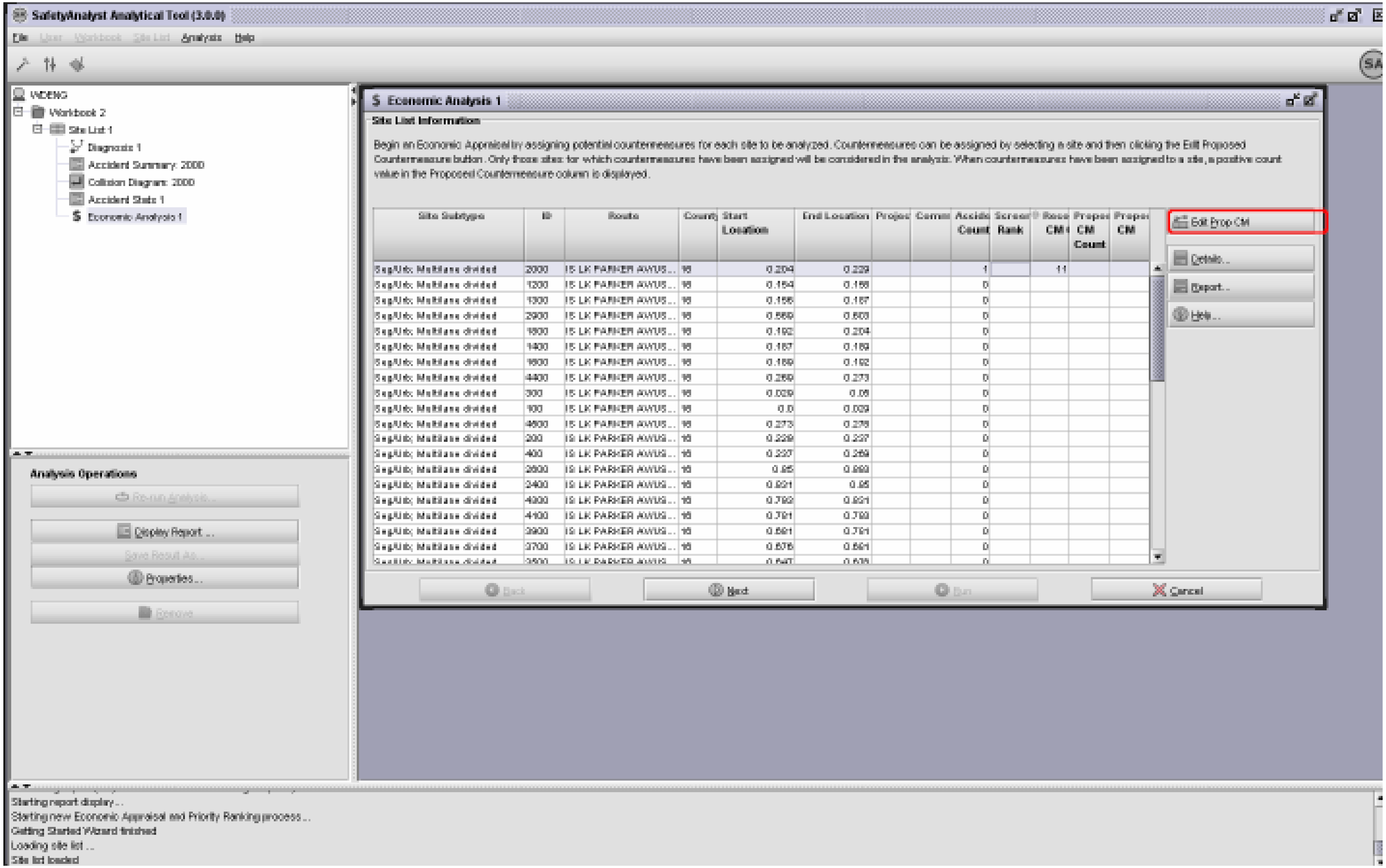

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
WDENG
Workbook 2
Site List 1
Diagnosis 1
Accident Summary: 2000
Collision Diagram: 2000
Accident Stats 1
Analysis Operations
Re-run Analysis...
Display Report ...
Save Result As...
Properties...
Remove
Getting Started
Welcome to SafetyAnalyst
This wizard will help you get started using SafetyAnalyst. After you become familiar with SafetyAnalyst, you can disable this wizard from automatically appearing at start up (use check box at the bottom of this page), or you can continue to use this wizard for conducting analyses.
To help organize your analyses, the SafetyAnalyst interface provides a tree control. The root (user node) of the tree represents your collection of data sets and corresponding analyses. Under the user node, analyses are grouped by workbooks. A workbook is associated with a single data set and contains one or more site lists, which appear as nodes under the workbook. A site list is a selection of one or more sites in the inventory (e.g., 2-lane rural roads in county 4) on which analyses can be conducted. Each time an analysis is performed, its run parameters and generated results are stored as a node under the site list. Newly created site lists are empty, but the site list table provides several methods that enable you to add sites to the list.
You can use this wizard to create new workbooks and site lists or choose from existing workbooks and site lists to conduct your analyses. Alternatively, you can use the menu bar, tree menus, and buttons in the main interface to create and maintain workbooks and site lists and conduct analyses.
After a workbook and site list have been selected you can choose a type of analysis. SafetyAnalyst consists of 4 primary modules with which you can perform safety analysis on a roadway inventory and its associated accident data (data set):
1. Network Screening - aids the analyst in identifying those sites that have promise as sites for potential safety improvements.
2. Diagnosis and Countermeasure Selection - guides the analyst in the diagnosis of safety problems and the selection of potential countermeasures for a specific site.
3. Economic Appraisal and Priority Ranking - provides the analyst with a means to conduct an economic analysis of implementing a countermeasure or combination of countermeasures at a site and for programming of safety countermeasures across a network.
4. Countermeasure Evaluation - enables the analyst to use available data to estimate the safety effect of projects implemented at specific
Show this wizard at start-up
Back
Next
Finish
Cancel
Move to the next wizard panel
Starting report generation...
Initializing PDF document...
Starting report display...
Launching report (may take a few seconds for large reports)...
Starting report display...

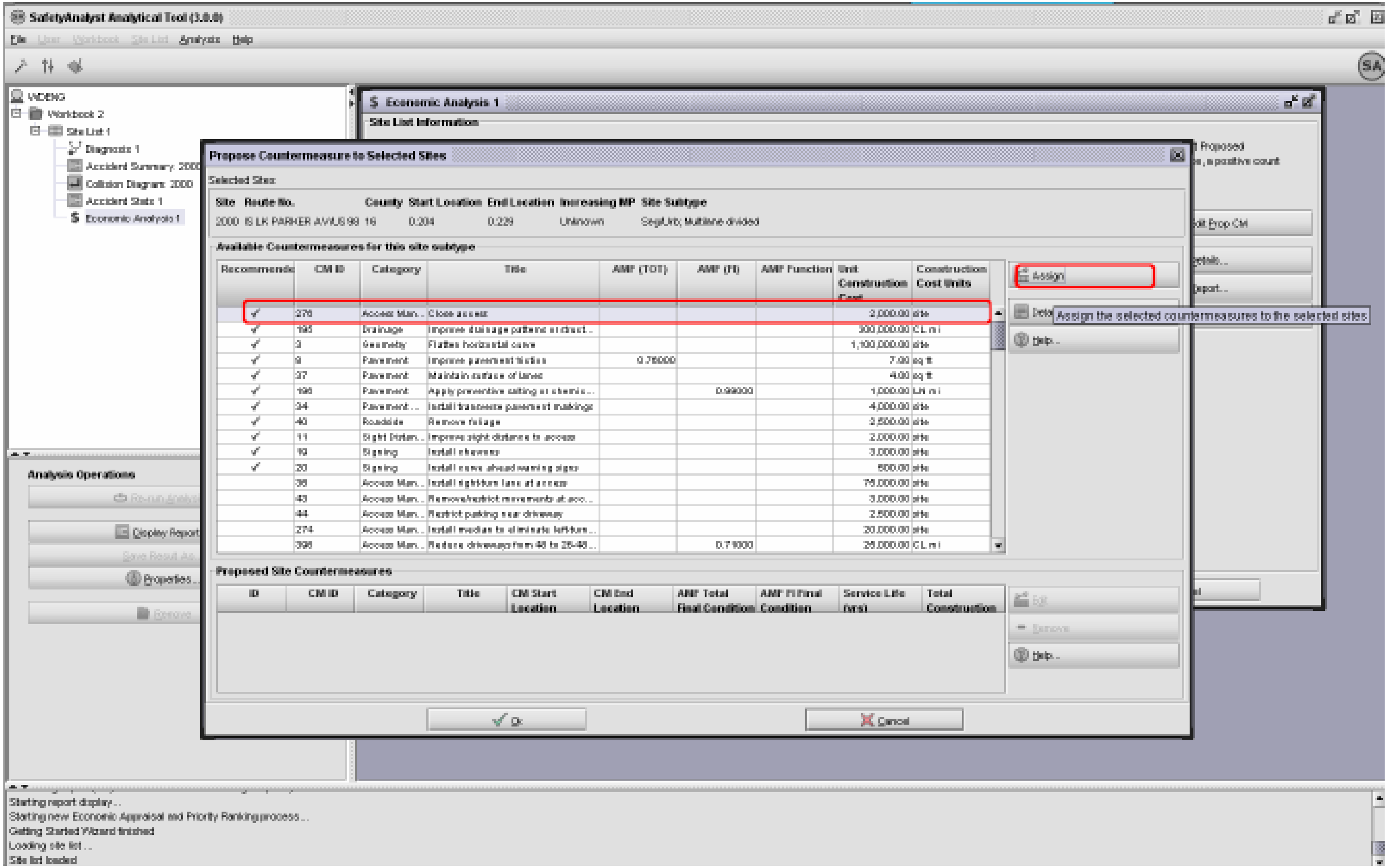

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
WDENG
Workbook 2
Site List 1
Diagnosis 1
Accident Summary: 2000
Collision Diagram: 2000
Accident Stats 1
Analysis Operations
Re-run Analysis...
Display Report ...
Save Result As...
Properties...
Remove
Getting Started
Select where you want to conduct an analysis
You can work in an existing workbook and site list, create a new site list in an existing workbook, or create a new workbook and site list. If you have not previously created a workbook, only the option to create a new workbook will be available.
Work in an existing workbook and site list
Work in an existing workbook and create a new site list
Create a new workbook and a new site list
Back
Next
Finish
Cancel
Starting report generation...
Initializing PDF document...
Starting report display...
Launching report (may take a few seconds for large reports)...
Starting report display...

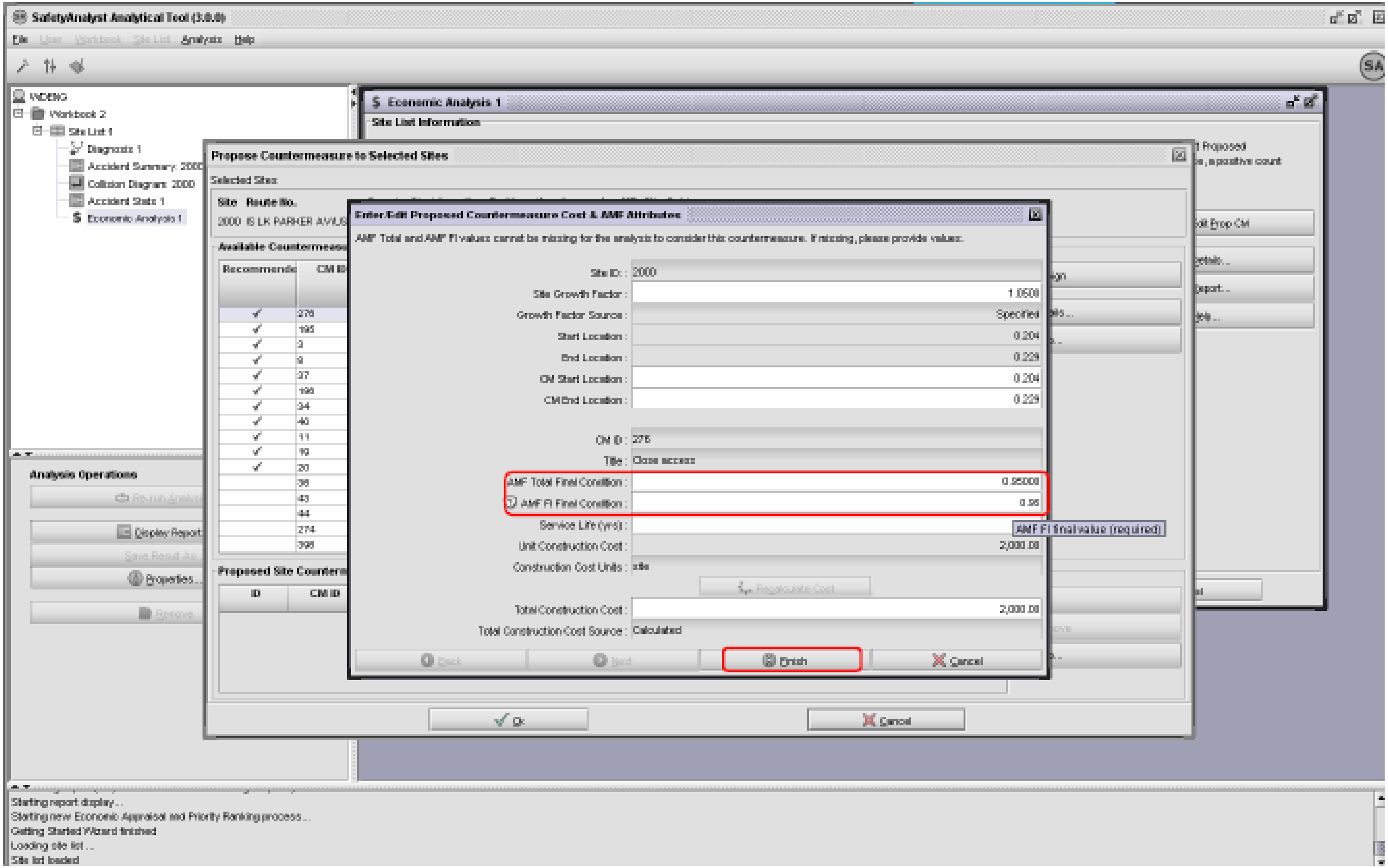

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
WDENG
Workbook 2
Site List 1
Diagnosis 1
Accident Summary: 2000
Collision Diagram: 2000
Accident Stats 1
Analysis Operations
Re-run Analysis...
Display Report ...
Save Result As...
Properties...
Remove
Getting Started
Select a Workbook
Select an existing workbook in which you want to conduct an analysis.
Select an Existing Workbook:
Workbook 2
Back
Next
Finish
Cancel
Starting report generation...
Initializing PDF document...
Starting report display...
Launching report (may take a few seconds for large reports)...
Starting report display...

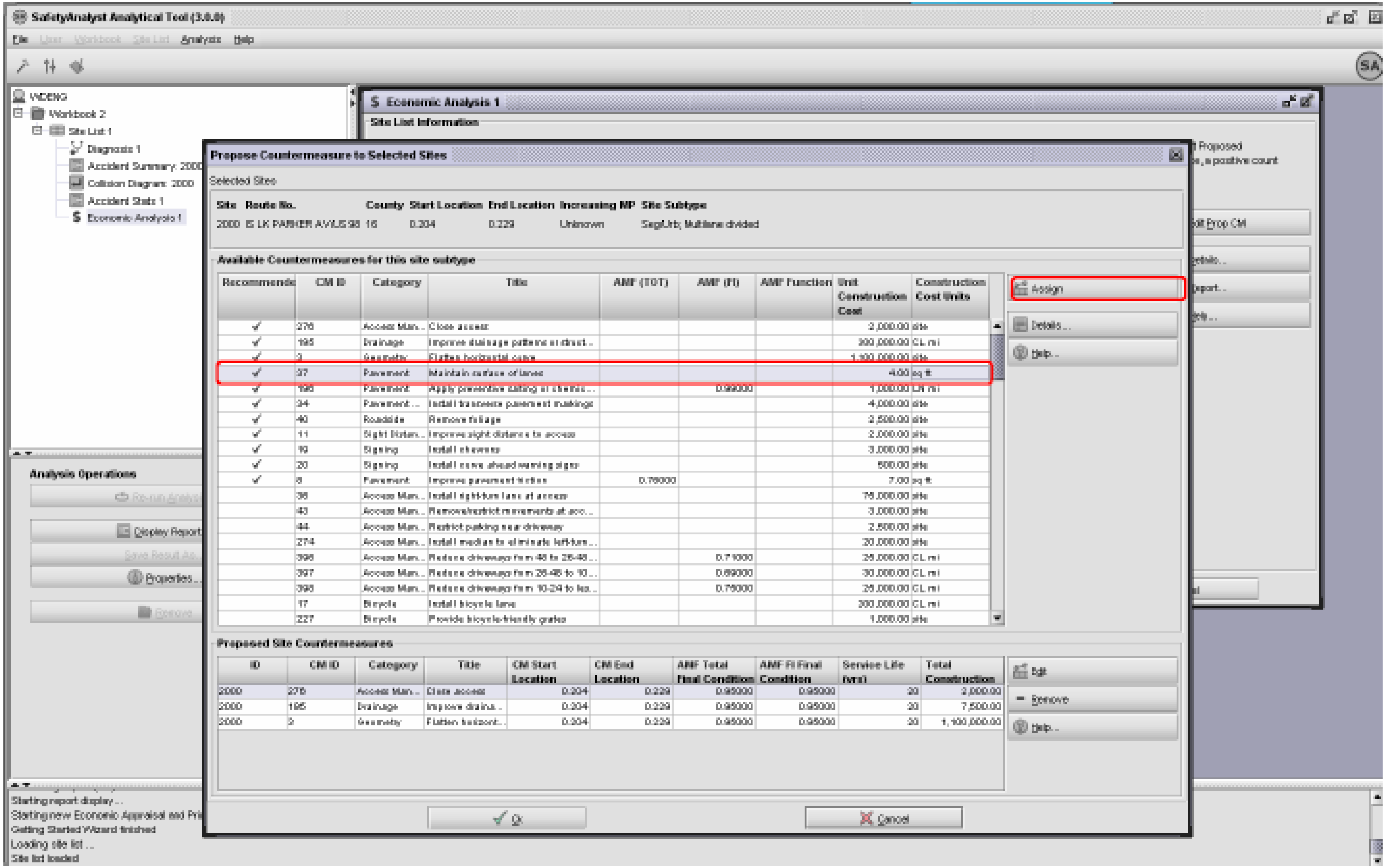

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
WDENG
Workbook 2
Site List 1
Diagnosis 1
Accident Summary 2000
Collision Diagram 2000
Accident Stats 1
Analysis Operations
Re-run Analysis...
Display Report ...
Save Result As...
Properties...
Remove
Getting Started
Select a Site List
Select an existing site list in which to start.
Select an Existing Site List :
Site List 1
Back
Next
Finish
Cancel
Starting report generation...
Initializing PDF document...
Starting report display...
Launching report (may take a few seconds for large reports)...
Starting report display...


SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
WDENG
Workbook 2
Site List 1
Diagnosis 1
Accident Summary 2000
Collision Diagram 2000
Accident Stats 1
Analysis Operations
Re-run Analysis...
Display Report ...
Save Result As...
Properties...
Remove
Getting Started
Select how you want to use SafetyAnalyst
You can begin working with a specific analysis module or cancel this wizard to start using SafetyAnalyst without any further help from this wizard.
Network Screening
Diagnosis and Countermeasure Selection
Economic Appraisal and Priority Ranking
Countermeasure Evaluation
Back
Next
Finish
Cancel
Move to the next wizard panel
Starting report generation...
Initializing PDF document...
Starting report display...
Launching report (may take a few seconds for large reports)...
Starting report display...

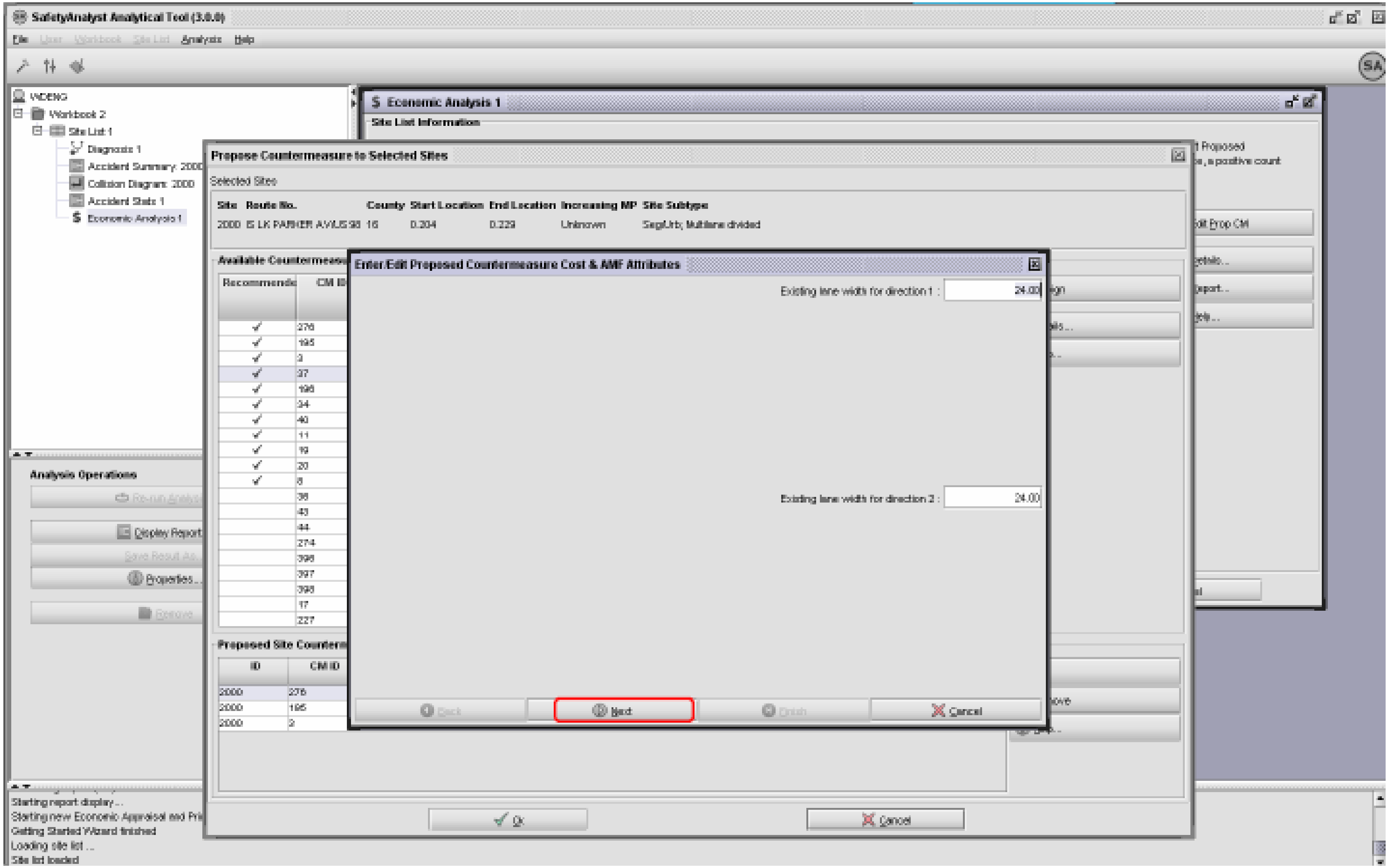

SafetyAnalyst Analytical Tool (3.0.0)
File
User
Workbook
Site List
Analysis
Help
WDENG
Workbook 2
Site List 1
Diagnosis 1
Accident Summary: 2000
Collision Diagram: 2000
Accident Stats 1
Economic Analysis 1
Analysis Operations
Re-run Analysis...
Display Report ...
Save Result As...
Properties...
Remove
Economic Analysis 1
Site List Information
Begin an Economic Appraisal by assigning potential countermeasures for each site to be analyzed. Countermeasures can be assigned by selecting a site and then clicking the Edit Proposed Countermeasure button. Only those sites for which countermeasures have been assigned will be considered in the analysis. When countermeasures have been assigned to a site, a positive count value in the Proposed Countermeasure column is displayed.
Site Subtype
ID
Route
County
Start Location
End Location
Accident Count
Screening Rank
Edit Prop CM
Details...
Report...
Help...
Back
Next
Run
Cancel
Starting report display...
Starting new Economic Appraisal and Priority Ranking process...
Getting Started Wizard finished
Loading site list ...
Site list loaded

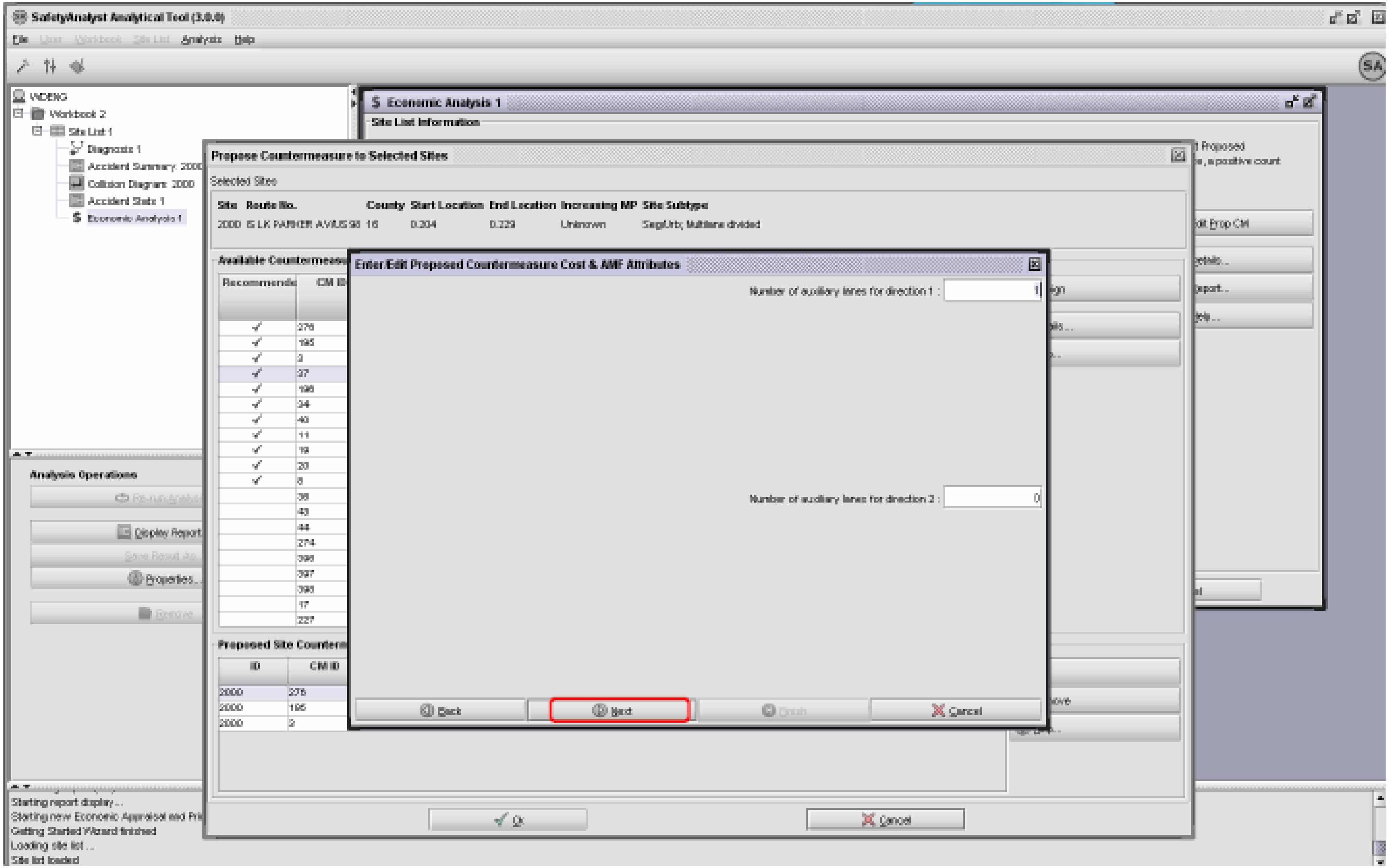


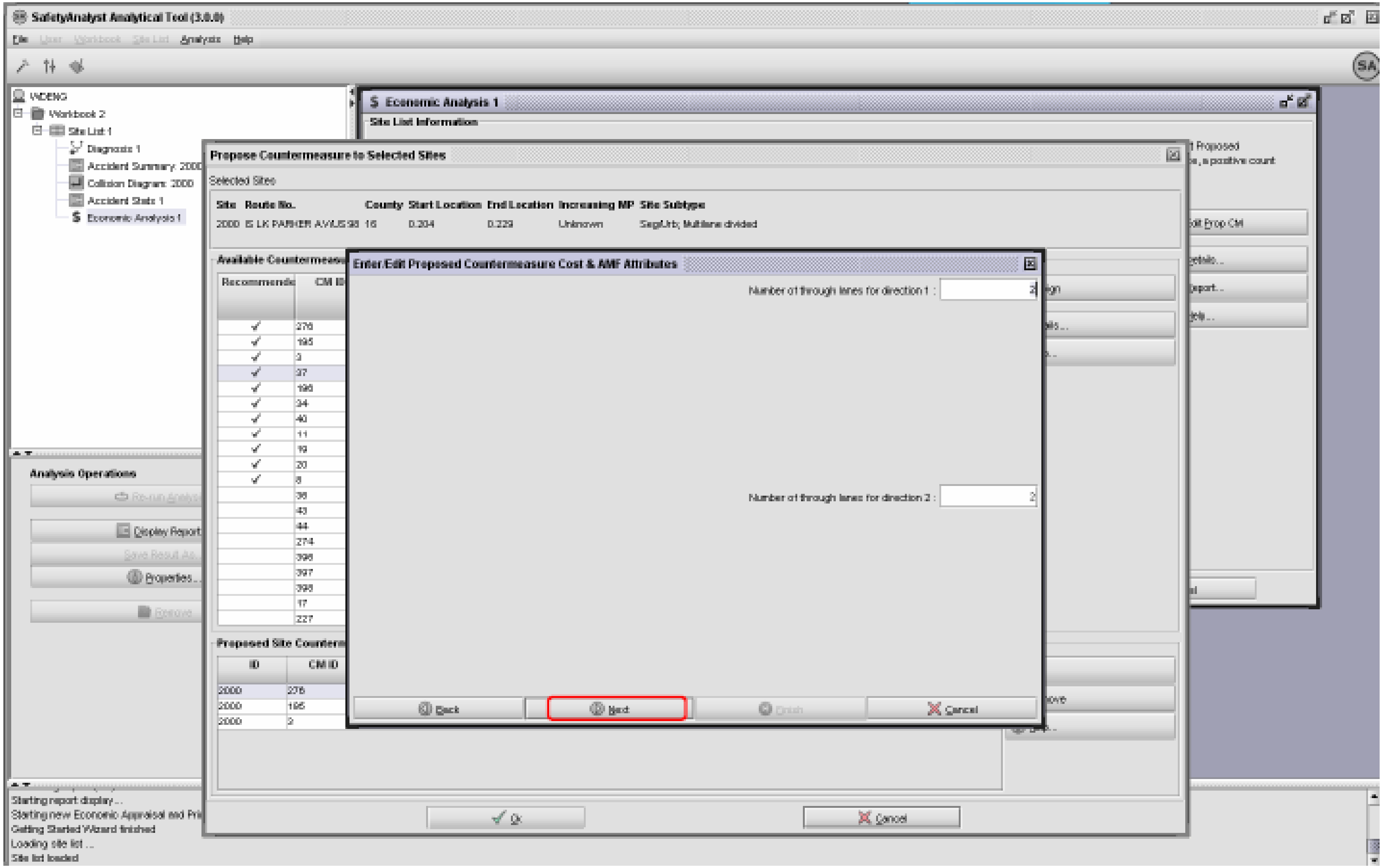

SafetyAnalyst Analytical Tool (3.0.0)
Propose Countermeasure to Selected Sites
Enter/Edit Proposed Countermeasure Cost & AMF Attributes
AMF Total and AMF FI values cannot be missing for the analysis to consider this countermeasure. If missing, please provide values.
Site ID : 2000
Site Growth Factor : 1.0500
Growth Factor Source : Specified
Start Location : 0.204
End Location : 0.229
CM Start Location : 0.204
CM End Location : 0.229
CM ID : 276
Title : Close access
AMF Total Final Condition : 0.95000
AMF FI Final Condition : 0.95
Service Life (yrs) :
AMF FI final value (required)
Unit Construction Cost : 2,000.00
Construction Cost Units : site
Total Construction Cost : 2,000.00
Total Construction Cost Source : Calculated
Finish
Cancel
Starting report display...
Starting new Economic Appraisal and Priority Ranking process...
Getting Started Wizard finished
Loading site list...
Site list loaded

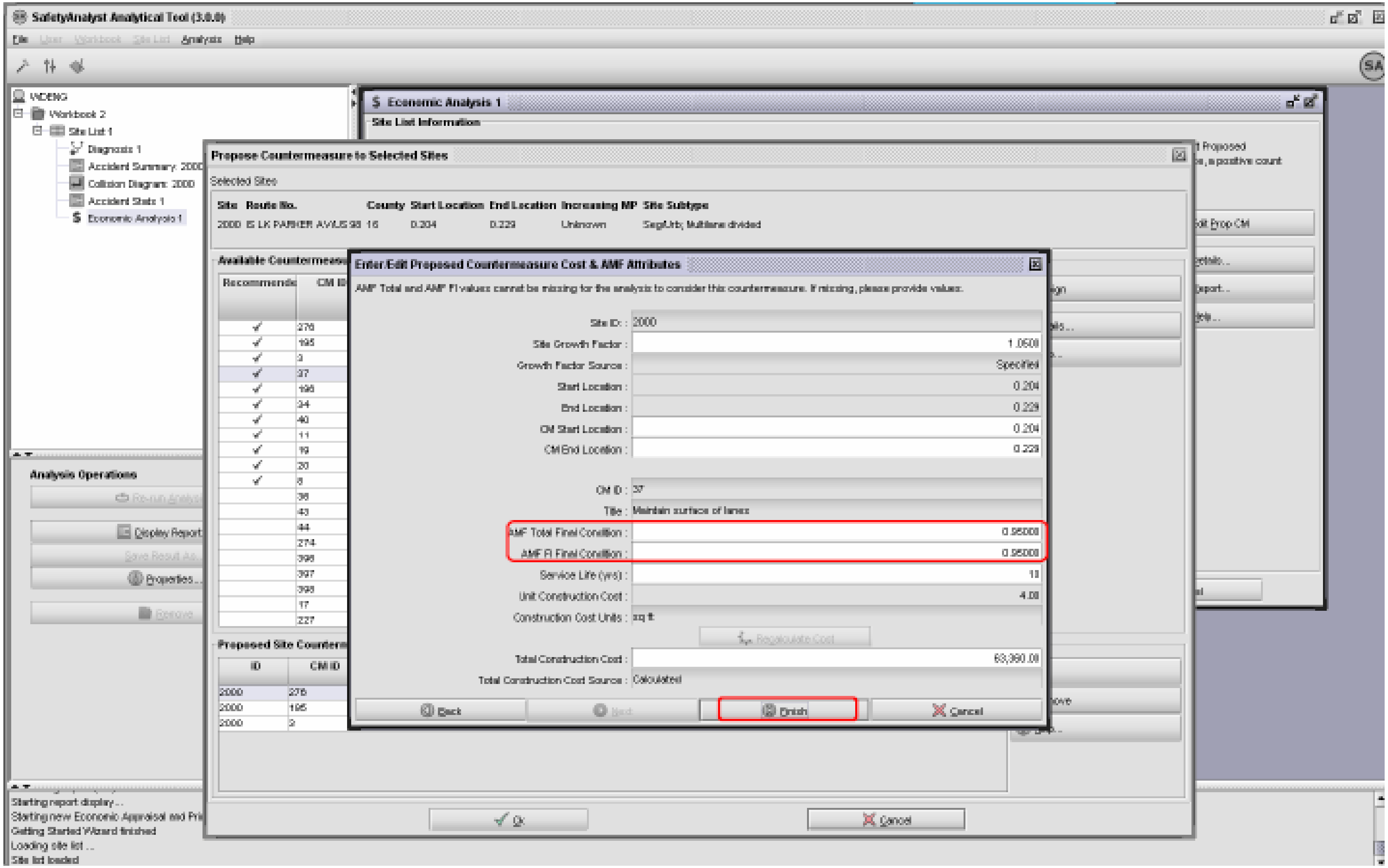


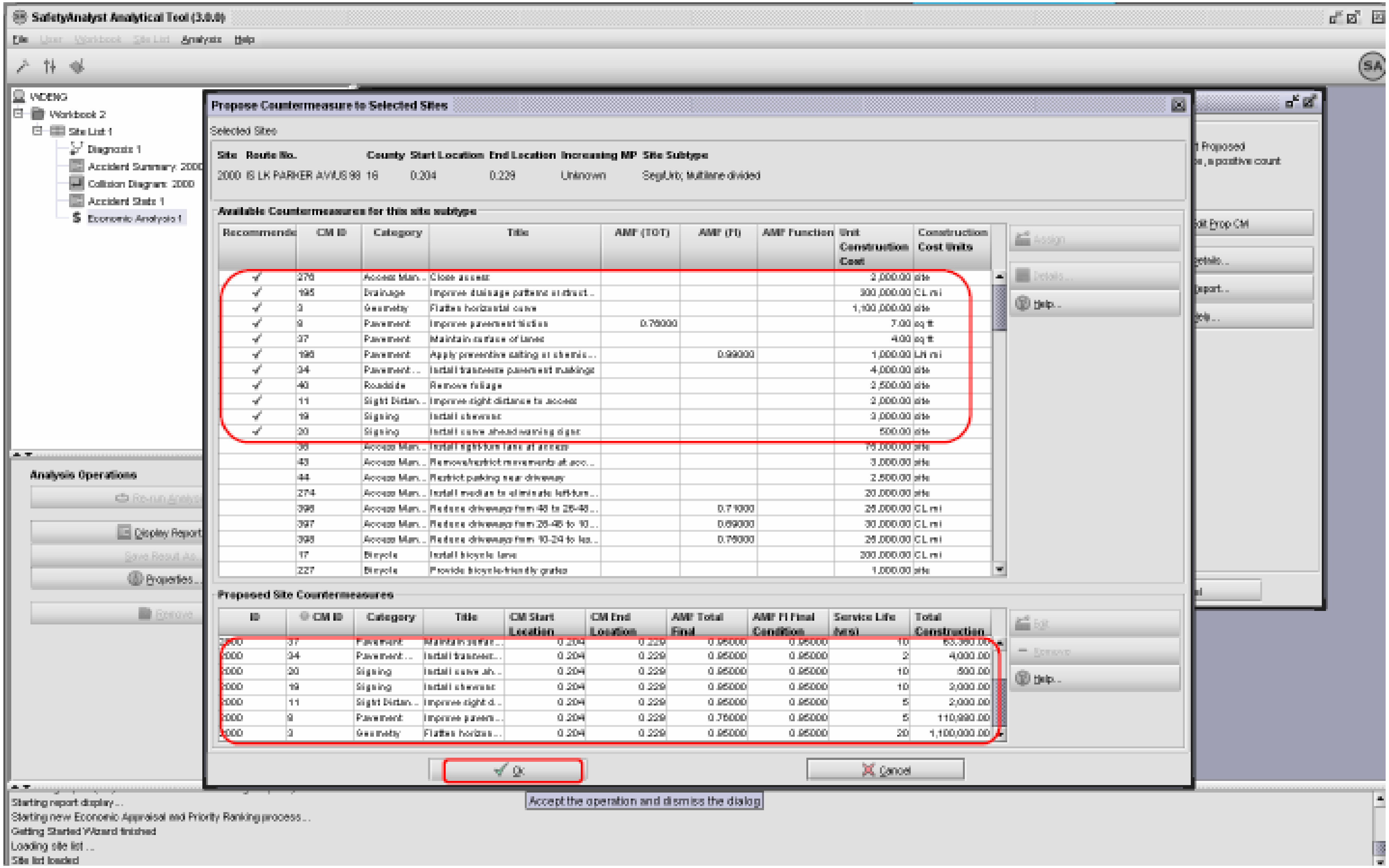
SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
Workbook 2
Site List 1
Diagnosis 1
Accident Summary: 2000
Collision Diagram: 2000
Accident Stats 1
Economic Analysis 1
Analysis Operations
Display Report
Properties...
Economic Analysis 1
Site List Information
Propose Countermeasure to Selected Sites
Selected Sites
Site Route No. County Start Location End Location Increasing MP Site Subtype
2000 IS LK PARKER AV/US98 16 0.204 0.229 Unknown Seg/Urb; Multilane divided
Available Countermeasures for this site subtype
Recommended CM ID Category Title AMF (TOT) AMF (FI) AMF Function Unit Construction Cost Construction Cost Units
276 Access Man... Close access 2,000.00 site
195 Drainage Improve drainage patterns at struct... 300,000.00 CL mi
37 Pavement Maintain surface of lanes 4.00 sq ft
34 Pavement... Install transverse pavement markings 4,000.00 site
40 Roadside Remove foliage 2,500.00 site
19 Signing Install chevrons 3,000.00 site
20 Signing Install curve ahead warning signs 500.00 site
8 Pavement Improve pavement friction 0.78000 7.00 sq ft
17 Bicycle Install bicycle lane 200,000.00 CL mi
227 Bicycle Provide bicycle-friendly grates 1,000.00 site
Assign
Details...
Help...
Proposed Site Countermeasures
ID CM ID Category Title CM Start Location CM End Location AMF Total Final Condition AMF FI Final Condition Service Life (yrs) Total Construction
2000 276 Access Man... Close access 0.204 0.229 0.95000 0.95000 20 2,000.00
2000 195 Drainage Improve draina... 0.204 0.229 0.95000 0.95000 20 7,500.00
2000 2 Geometry Flatten horizont... 0.204 0.229 0.95000 0.95000 20 1,100,000.00
Edit
Remove
Help...
Ok
Cancel
Starting report display...
Starting new Economic Appraisal and Pri
Getting Started Wizard finished
Loading site list ...
Site list loaded

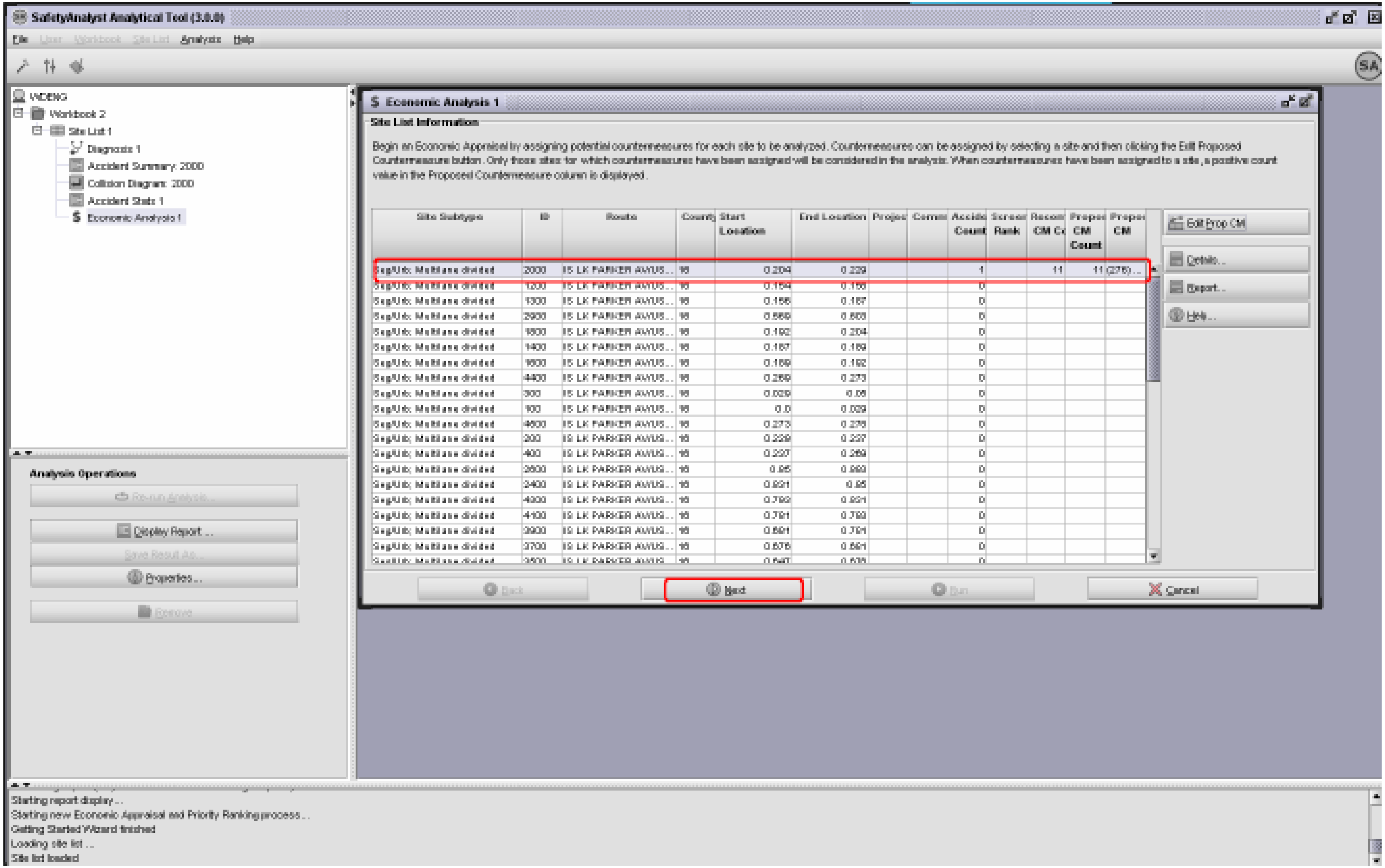


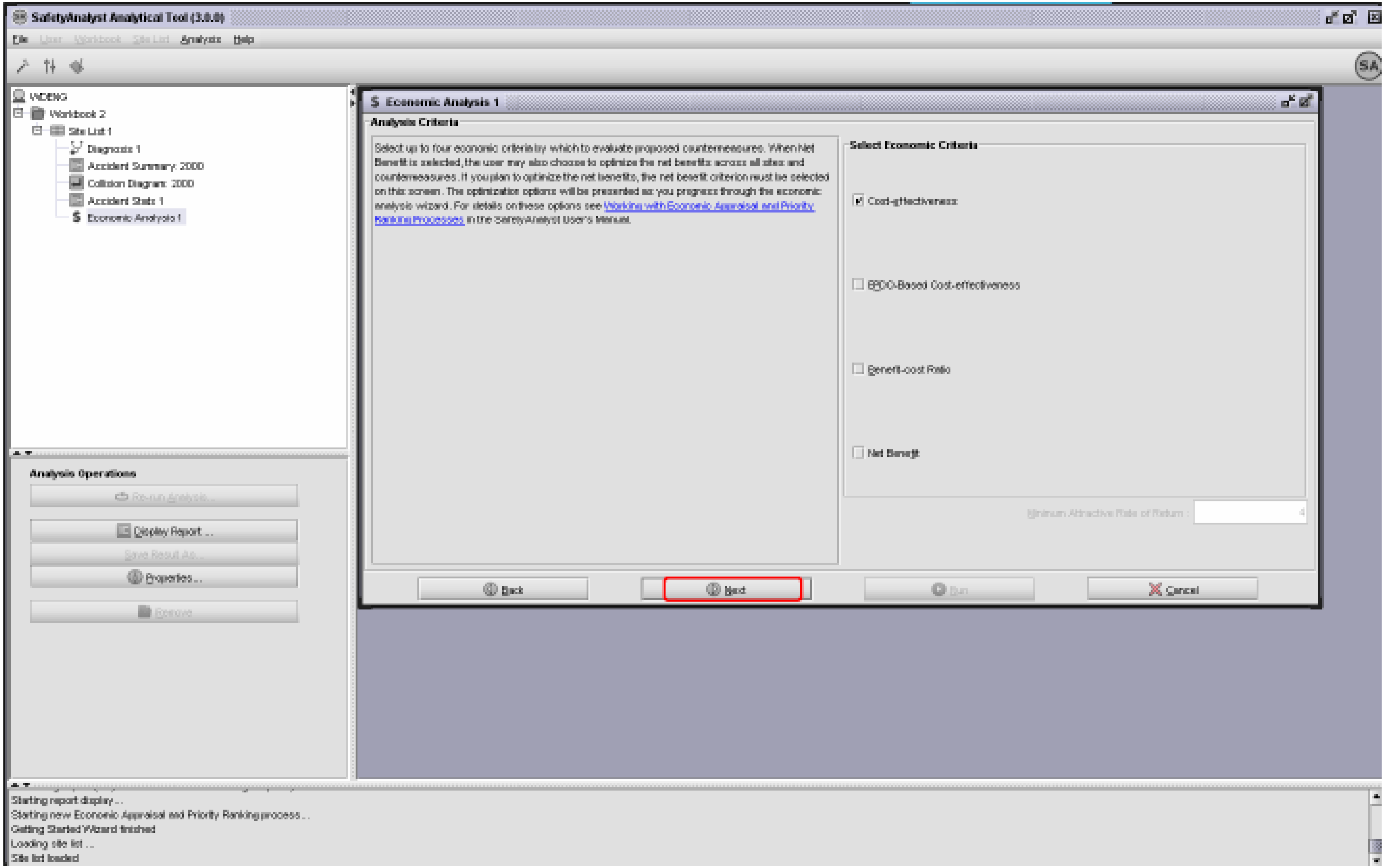

SafetyAnalyst Analytical Tool (3.0.0)
Economic Analysis 1
Propose Countermeasure to Selected Sites
Enter/Edit Proposed Countermeasure Cost & AMF Attributes
Number of auxiliary lanes for direction 1 :
Number of auxiliary lanes for direction 2 :
Back
Next
Finish
Cancel

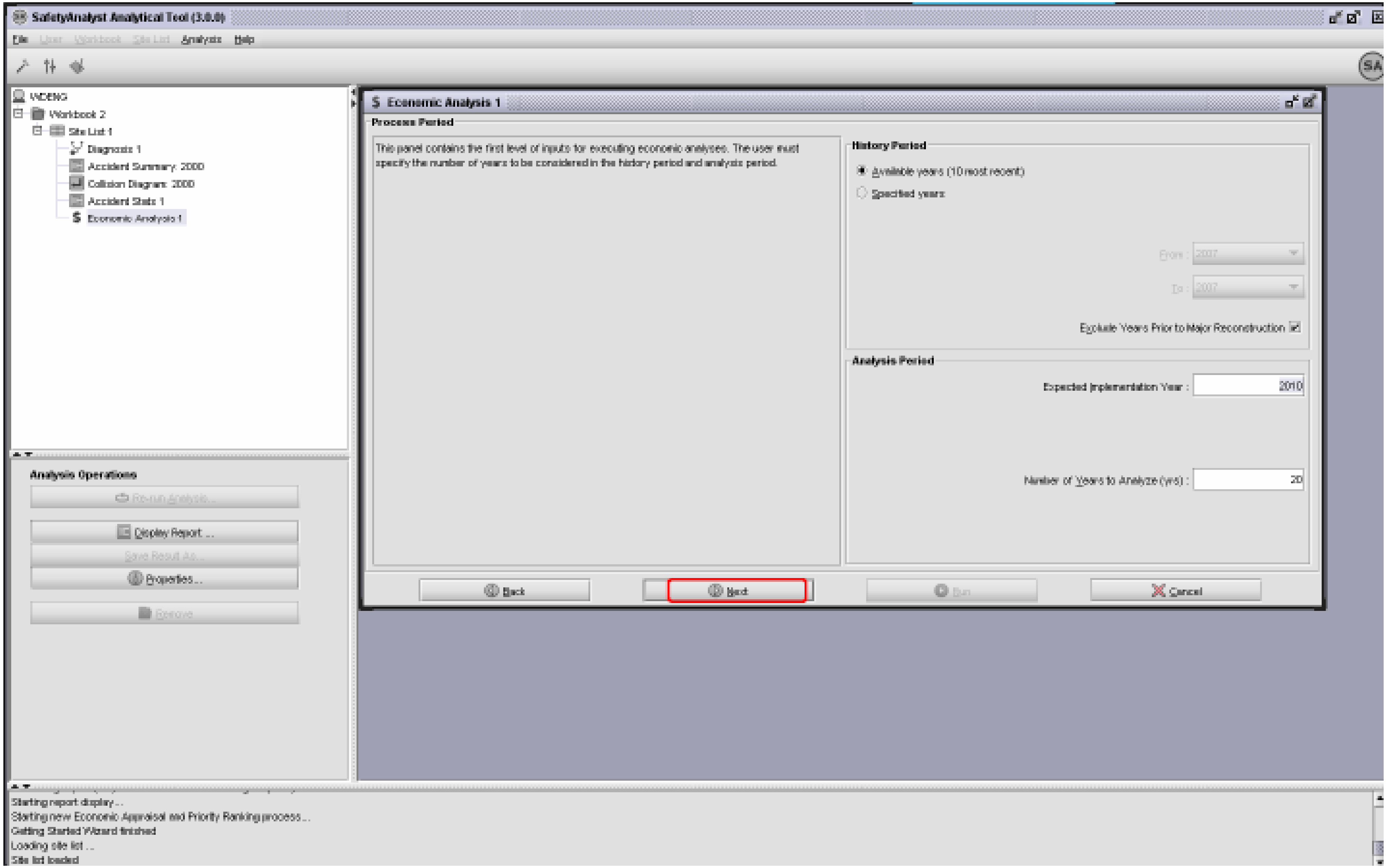

SafetyAnalyst Analytical Tool (3.0.0)
Economic Analysis 1
Propose Countermeasure to Selected Sites
Enter/Edit Proposed Countermeasure Cost & AMF Attributes
Number of through lanes for direction 1 :
Number of through lanes for direction 2 :
Back
Next
Finish
Cancel
Ok
Analysis Operations

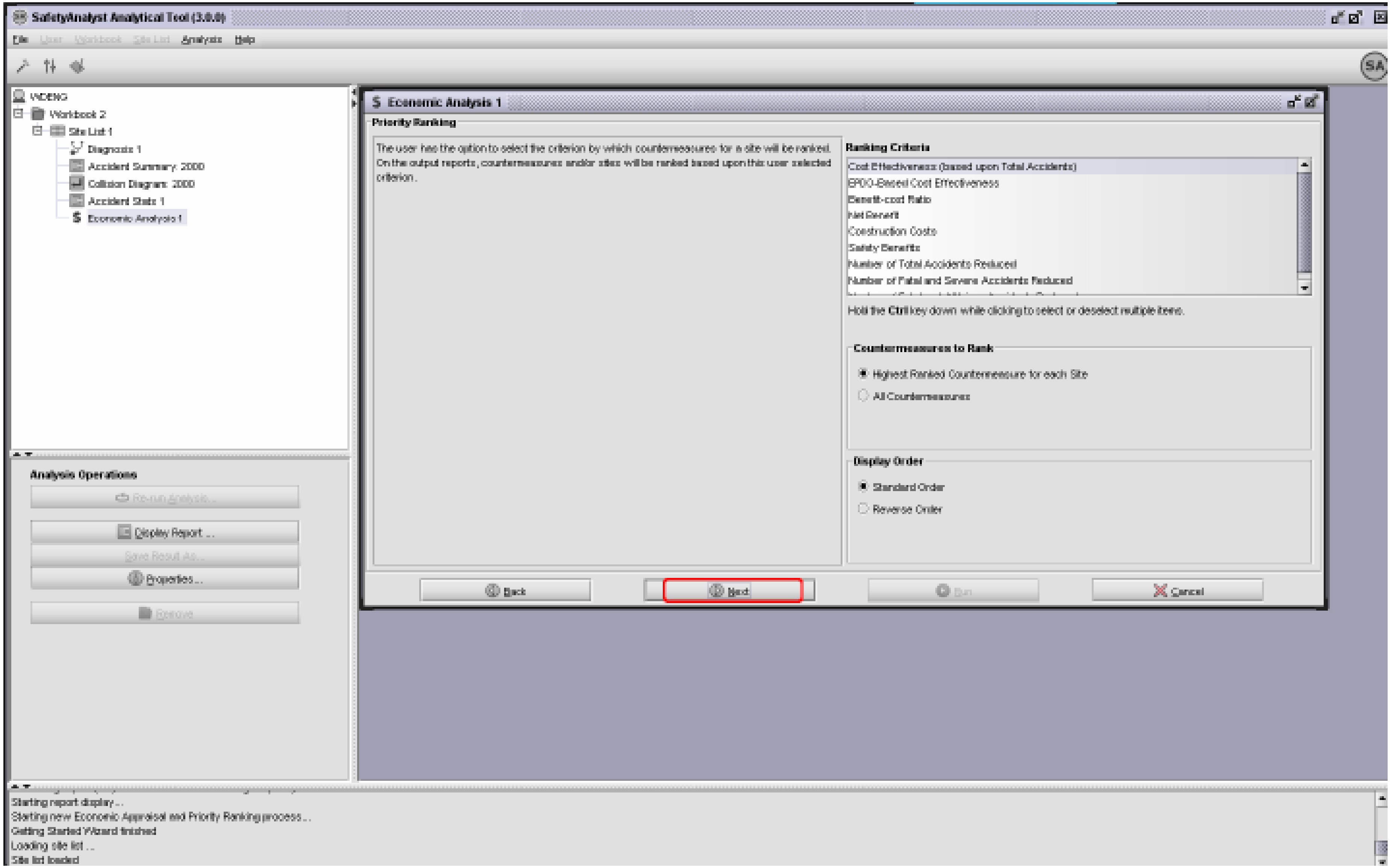

SafetyAnalyst Analytical Tool (3.0.0)
Economic Analysis 1
Propose Countermeasure to Selected Sites
Enter/Edit Proposed Countermeasure Cost & AMF Attributes
AMF Total and AMF FI values cannot be missing for the analysis to consider this countermeasure. If missing, please provide values.
Site ID : 2000
Site Growth Factor : 1.0500
Growth Factor Source : Specified
Start Location : 0.204
End Location : 0.229
CM Start Location : 0.204
CM End Location : 0.229
CM ID : 37
Title : Maintain surface of lanes
AMF Total Final Condition : 0.95000
AMF FI Final Condition : 0.95000
Service Life (yrs) : 10
Unit Construction Cost : 4.00
Construction Cost Units : sq ft
Total Construction Cost : 63,360.00
Total Construction Cost Source : Calculated
Back
Next
Finish
Cancel

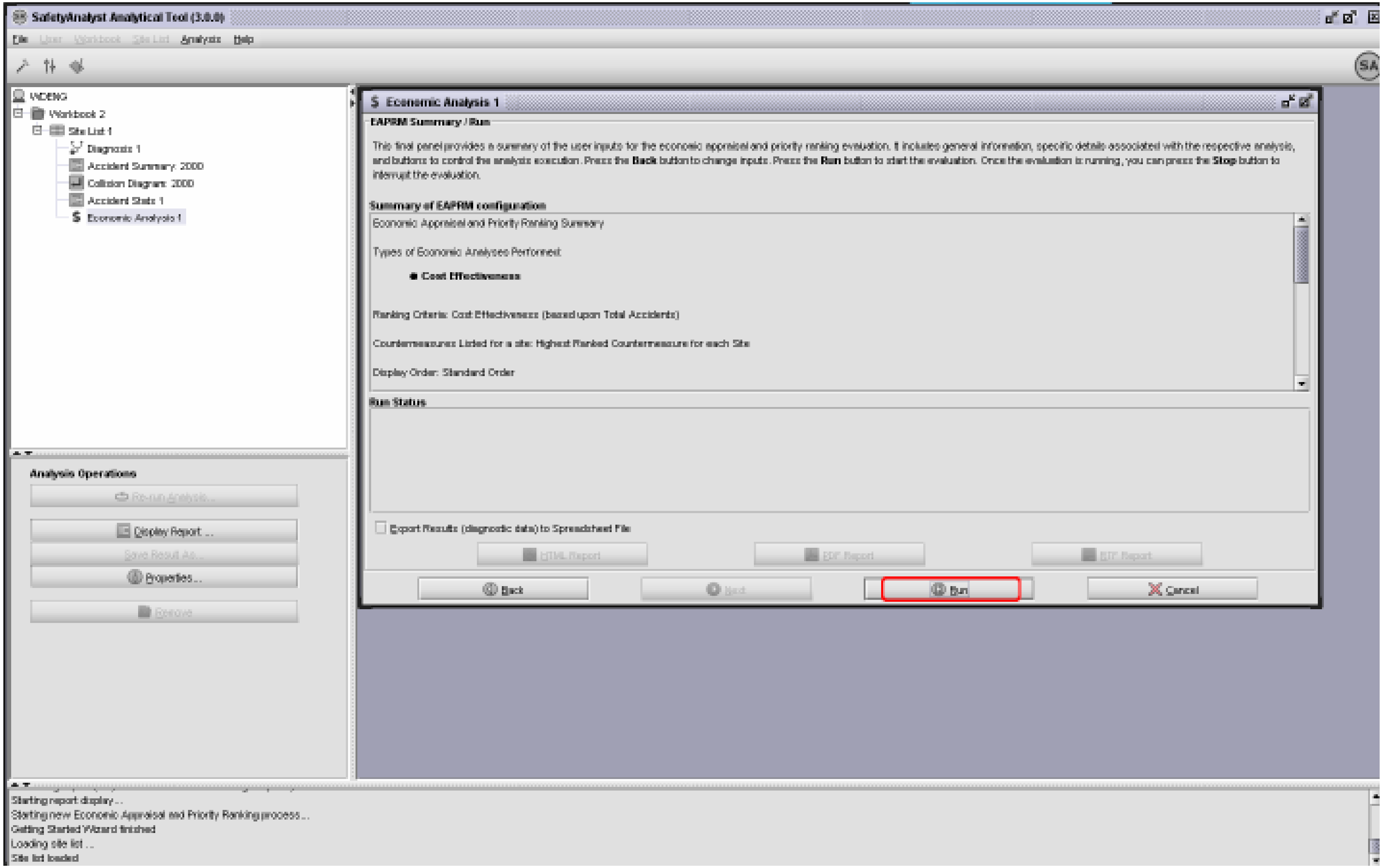

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
Propose Countermeasure to Selected Sites
Selected Sites
Available Countermeasures for this site subtype
Proposed Site Countermeasures
Analysis Operations
Accept the operation and dismiss the dialog
Starting report display...
Starting new Economic Appraisal and Priority Ranking process...
Getting Started Wizard finished
Loading site list...
Site list loaded

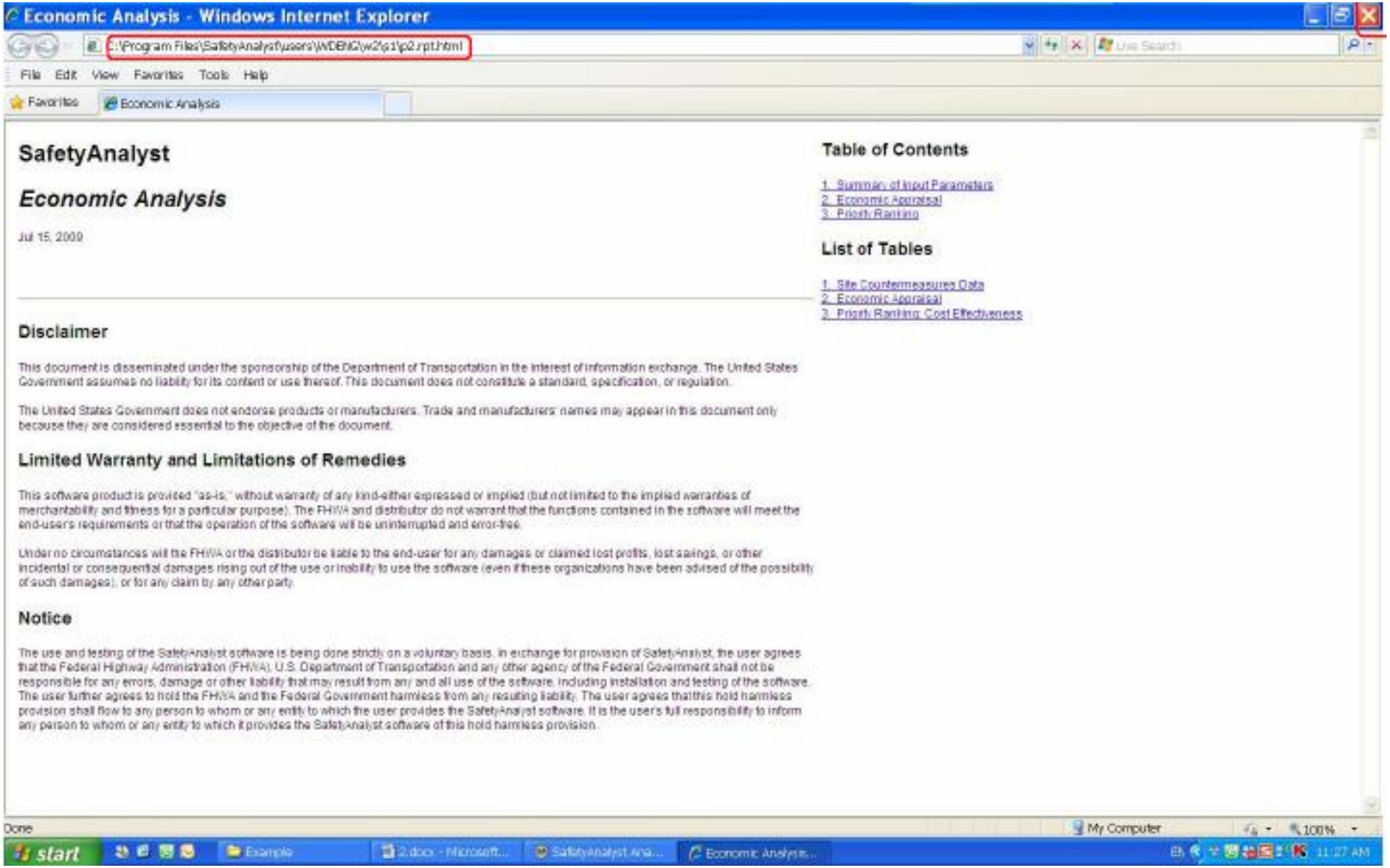

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
WDENG
Workbook 2
Site List 1
Diagnosis 1
Accident Summary 2000
Collision Diagram 2000
Accident Stats 1
Economic Analysis 1
Analysis Operations
Re-run Analysis...
Display Report ...
Save Result As...
Properties...
Remove
Economic Analysis 1
Site List Information
Begin an Economic Appraisal by assigning potential countermeasures for each site to be analyzed. Countermeasures can be assigned by selecting a site and then clicking the Edit Proposed Countermeasure button. Only those sites for which countermeasures have been assigned will be considered in the analysis. When countermeasures have been assigned to a site, a positive count value in the Proposed Countermeasure column is displayed.
Site Subtype
ID
Route
County
Start Location
End Location
Accident Count
Screen Rank
Edit Prop CM
Details...
Report...
Help...
Back
Next
Run
Cancel
Starting report display...
Starting new Economic Appraisal and Priority Ranking process...
Getting Started Wizard finished
Loading site list...
Site list loaded

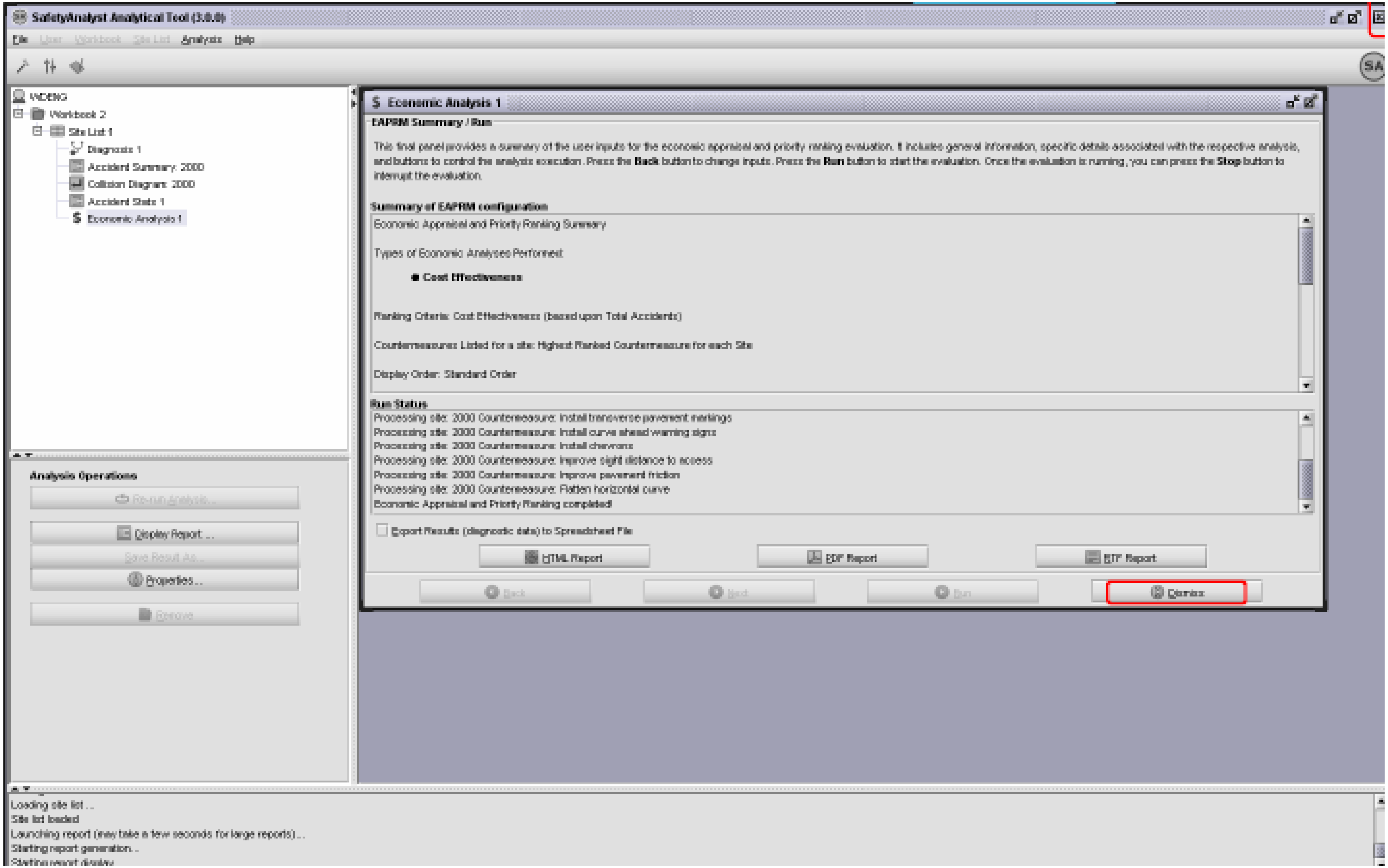

SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
Economic Analysis 1
Analysis Criteria
Select up to four economic criteria by which to evaluate proposed countermeasures. When Net Benefit is selected, the user may also choose to optimize the net benefits across all sites and countermeasures. If you plan to optimize the net benefits, the net benefit criterion must be selected on this screen. The optimization options will be presented as you progress through the economic analysis wizard. For details on these options see Working with Economic Appraisal and Priority Ranking Processes in the SafetyAnalyst User's Manual.
Select Economic Criteria
Cost-effectiveness
EPDO-Based Cost-effectiveness
Benefit-cost Ratio
Net Benefit
Back
Next
Run
Cancel
Workbook 2
Site List 1
Diagnosis 1
Accident Summary 2000
Collision Diagram 2000
Accident Stats 1
Economic Analysis 1
Analysis Operations
Display Report ...
Properties ...
Starting report display ...
Starting new Economic Appraisal and Priority Ranking process ...
Getting Started Wizard finished
Loading site list ...
Site list loaded


SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
WDENG
Workbook 2
Site List 1
Diagnosis 1
Accident Summary 2000
Collision Diagram 2000
Accident Stats 1
Economic Analysis 1
Analysis Operations
Re-run Analysis...
Display Report ...
Save Result As...
Properties...
Remove
Economic Analysis 1
Process Period
This panel contains the first level of inputs for executing economic analyses. The user must specify the number of years to be considered in the history period and analysis period.
History Period
Available years (10 most recent)
Specified years
From : 2007
To : 2007
Exclude Years Prior to Major Reconstruction
Analysis Period
Expected Implementation Year : 2010
Number of Years to Analyze (yrs) : 20
Back
Next
Run
Cancel
Starting report display...
Starting new Economic Appraisal and Priority Ranking process...
Getting Started Wizard finished
Loading site list...
Site list loaded


SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
Workbook 2
Site List 1
Diagnosis 1
Accident Summary 2000
Collision Diagram 2000
Accident Stats 1
Economic Analysis 1
Analysis Operations
Re-run Analysis...
Display Report ...
Save Result As...
Properties...
Remove
Economic Analysis 1
Priority Ranking
The user has the option to select the criterion by which countermeasures for a site will be ranked. On the output reports, countermeasures and/or sites will be ranked based upon this user selected criterion.
Ranking Criteria
Cost Effectiveness (based upon Total Accidents)
EPDO-Based Cost Effectiveness
Benefit-cost Ratio
Net Benefit
Construction Costs
Safety Benefits
Number of Total Accidents Reduced
Number of Fatal and Severe Accidents Reduced
Hold the Ctrl key down while clicking to select or deselect multiple items.
Countermeasures to Rank
Highest Ranked Countermeasure for each Site
All Countermeasures
Display Order
Standard Order
Reverse Order
Back
Next
Run
Cancel
Starting report display...
Starting new Economic Appraisal and Priority Ranking process...
Getting Started Wizard finished
Loading site list...
Site list loaded


SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
WDENG
Workbook 2
Site List 1
Diagnosis 1
Accident Summary: 2000
Collision Diagram: 2000
Accident Stats 1
Economic Analysis 1
Analysis Operations
Re-run Analysis...
Display Report ...
Save Result As...
Properties...
Remove
Economic Analysis 1
EAPRM Summary / Run
This final panel provides a summary of the user inputs for the economic appraisal and priority ranking evaluation. It includes general information, specific details associated with the respective analysis, and buttons to control the analysis execution. Press the Back button to change inputs. Press the Run button to start the evaluation. Once the evaluation is running, you can press the Stop button to interrupt the evaluation.
Summary of EAPRM configuration
Economic Appraisal and Priority Ranking Summary
Types of Economic Analyses Performed:
Cost Effectiveness
Ranking Criteria: Cost Effectiveness (based upon Total Accidents)
Countermeasures Listed for a site: Highest Ranked Countermeasure for each Site
Display Order: Standard Order
Run Status
Export Results (diagnostic data) to Spreadsheet File
HTML Report
PDF Report
RTF Report
Back
Next
Run
Cancel
Starting report display...
Starting new Economic Appraisal and Priority Ranking process...
Getting Started Wizard finished
Loading site list...
Site list loaded


Economic Analysis - Windows Internet Explorer
C:\Program Files\SafetyAnalyst\users\WDBNG\w2\s1\p2.rpt.html
File Edit View Favorites Tools Help
Favorites
Economic Analysis
SafetyAnalyst
Economic Analysis
Jul 15, 2009
Table of Contents
1. Summary of Input Parameters
2. Economic Appraisal
3. Priority Ranking
List of Tables
1. Site Countermeasures Data
2. Economic Appraisal
3. Priority Ranking Cost Effectiveness
Disclaimer
This document is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its content or use thereof. This document does not constitute a standard, specification, or regulation.
The United States Government does not endorse products or manufacturers. Trade and manufacturers' names may appear in this document only because they are considered essential to the objective of the document.
Limited Warranty and Limitations of Remedies
This software product is provided "as-is," without warranty of any kind-either expressed or implied (but not limited to the implied warranties of merchantability and fitness for a particular purpose). The FHWA and distributor do not warrant that the functions contained in the software will meet the end-user's requirements or that the operation of the software will be uninterrupted and error-free.
Under no circumstances will the FHWA or the distributor be liable to the end-user for any damages or claimed lost profits, lost savings, or other incidental or consequential damages rising out of the use or inability to use the software (even if these organizations have been advised of the possibility of such damages), or for any claim by any other party.
Notice
The use and testing of the SafetyAnalyst software is being done strictly on a voluntary basis. In exchange for provision of SafetyAnalyst, the user agrees that the Federal Highway Administration (FHWA), U.S. Department of Transportation and any other agency of the Federal Government shall not be responsible for any errors, damage or other liability that may result from any and all use of the software, including installation and testing of the software. The user further agrees to hold the FHWA and the Federal Government harmless from any resulting liability. The user agrees that this hold harmless provision shall flow to any person to whom or any entity to which the user provides the SafetyAnalyst software. It is the user's full responsibility to inform any person to whom or any entity to which it provides the SafetyAnalyst software of this hold harmless provision.
Done
My Computer
100%
start
Example
2.docx - Microsoft...
SafetyAnalyst Ana...
Economic Analysis...
11:27 AM


SafetyAnalyst Analytical Tool (3.0.0)
File User Workbook Site List Analysis Help
VDENG
Workbook 2
Site List 1
Diagnosis 1
Accident Summary: 2000
Collision Diagram: 2000
Accident Stats 1
Economic Analysis 1
Analysis Operations
Re-run Analysis...
Display Report...
Save Result As...
Properties...
Remove
Economic Analysis 1
EAPRM Summary / Run
This final panel provides a summary of the user inputs for the economic appraisal and priority ranking evaluation. It includes general information, specific details associated with the respective analysis, and buttons to control the analysis execution. Press the Back button to change inputs. Press the Run button to start the evaluation. Once the evaluation is running, you can press the Stop button to interrupt the evaluation.
Summary of EAPRM configuration
Economic Appraisal and Priority Ranking Summary
Types of Economic Analyses Performed:
Cost Effectiveness
Ranking Criteria: Cost Effectiveness (based upon Total Accidents)
Countermeasures Listed for a site: Highest Ranked Countermeasure for each Site
Display Order: Standard Order
Run Status
Processing site: 2000 Countermeasure: Install transverse pavement markings
Processing site: 2000 Countermeasure: Install curve ahead warning signs
Processing site: 2000 Countermeasure: Install chevrons
Processing site: 2000 Countermeasure: Improve sight distance to access
Processing site: 2000 Countermeasure: Improve pavement friction
Processing site: 2000 Countermeasure: Flatten horizontal curve
Economic Appraisal and Priority Ranking completed!
Export Results (diagnostic data) to Spreadsheet File
HTML Report
PDF Report
RTF Report
Back
Next
Run
Dismiss
Loading site list...
Site list loaded
Launching report (may take a few seconds for large reports)...
Starting report generation...
Starting report display

APENDIX E Example of SA Analytical Results

(This part is the PDF sectional drawing produced by Safety Analyst)

a. Route ISR 90-TAMIAMI TRAIL, Milepost 19.53 to 19.563 (Segment 8300)

Accident Summary

Accident Statistics Report

Collision Diagram Viewer

Diagnosis and Countermeasure Selection Report

Economic Analysis

b. Route ISR 90-TAMIAMI TRAIL, Milepost 6.409 to 6.626 (Segment 3600)

Accident Summary

Accident Statistics Report

Collision Diagram Viewer

Diagnosis and Countermeasure Selection Report

Economic Analysis

c. Route ISR 90-TAMIAMI TRAIL, Milepost 4.704 to 4.889 (Segment 2700)

Accident Summary for

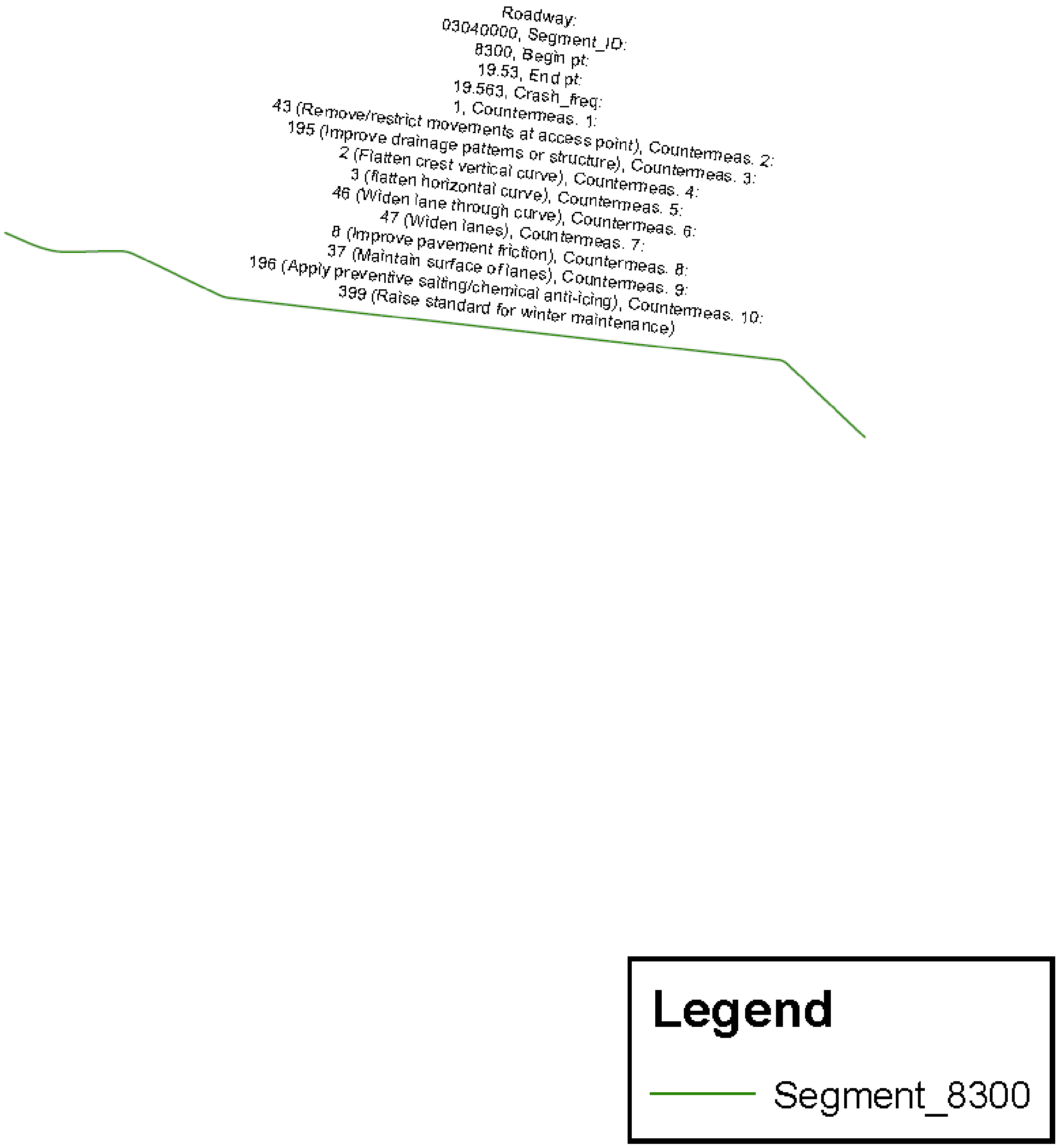
Accident Statistics Report

Collision Diagram Viewer

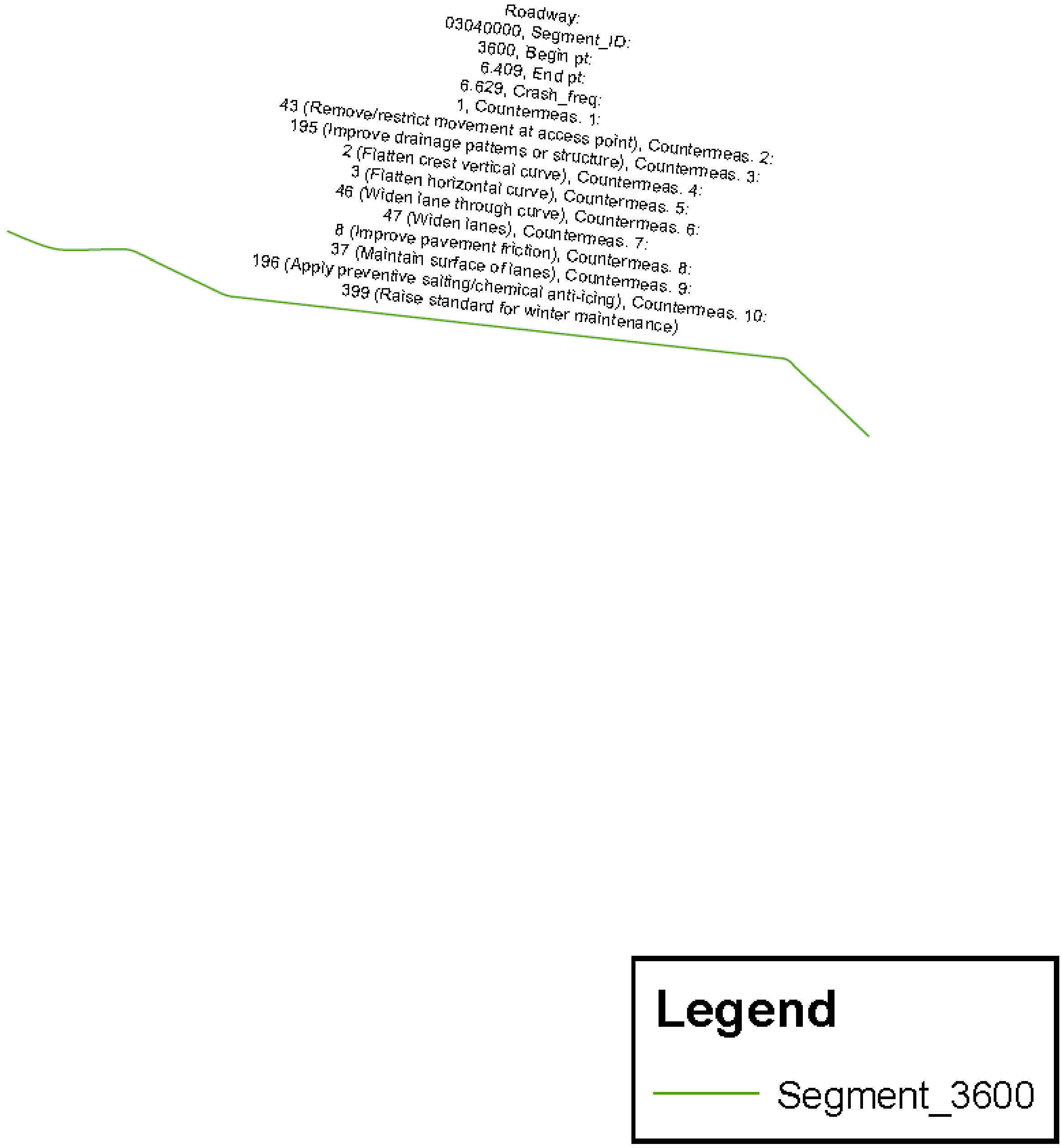
Diagnosis and Countermeasure Selection Report

Economic Analysis

Roadway ID 03040000, Segment 8300



Roadway ID 03040000, Segment 3600



Roadway ID 03040000, Segment 2700

SafetyAnalyst

Accident Summary for Route ISR 90-TAMIAMI TRAIL, Milepost 19.53 to 19.563 (Segment 8300)

Jul 23, 2009

Disclaimer

Limited Warranty and Limitations of Remedies

Notice

Table of Contents

List of Tables

[Previous: Accident Summary for Route ISR 90-TAMIAMI TRAIL, Milepost 19.53 to 19.563 (Segment 8300)]

[Table Of Contents]

[Next: Route ISR 90-TAMIAMI TRAIL, Milepost 19.53 to 19.563]

1. Accident Summary

This is a summary of the accident data associated with the following Segment from the **Kemi** data set, created on 2:23 AM:

Route ISR 90-TAMIAMI TRAIL, Milepost 19.53 to 19.563 (Segment 8300)

The details for this site are listed in the next section.

Notes:
The summary includes **1 Total Accidents** spanning the dates **1/1/2007** to **12/31/2007**.

Dates excluded from the summary period due to major reconstruction: **option not selected when specifying the analysis period.**

The summary includes accidents that occur at the site between locations **19.53** to **19.563** inclusive.

Generated by Diagnosis and Countermeasure Selection Module

1.1 Accident Month

The month in which the accident occurred.

Table 1. Accident Month

Description	2007	Total	Observed Percent	Average Percent
September	1	1	100	6
Total Accidents	1	1	100	100

1.2 Accident Severity Level 1

The severity of the accident based on the most severe injury to any person involved.

Table 2. Accident Severity Level 1

Description	2007	Total	Observed Percent	Average Percent
Property-Damage-Only	1	1	100	N/A
Total Accidents	1	1	100	N/A

1.3 Accident Time of Day

The time (hour and minute) at which the accident occurred.

Table 3. Accident Time of Day

Description	2007	Total	Observed Percent	Average Percent
9:00 am to 9:59 am	1	1	100	N/A
Total Accidents	1	1	100	N/A

1.4 Accident Type and Manner of Collision

The type of first harmful event in a single-vehicle accident or, in a multiple-vehicle collision, manner in which two vehicles in transport initially came together without regard to the direction of force, or the type of object with which a single vehicle collided.

Table 4. Accident Type and Manner of Collision

Description	2007	Total	Observed Percent	Average Percent
Other multiple-vehicle collision	1	1	100	1

Description	2007	Total	Observed Percent	Average Percent
Total Accidents	1	1	100	100

1.5 Alcohol/Drug Involvement

The investigating police officer's assessment of whether alcohol or drug use was suspected or demonstrated to be present by test for any vehicle driver or non-motorist in the accident.

Table 5. Alcohol/Drug Involvement

Description	2007	Total	Observed Percent	Average Percent
Neither alcohol nor other drugs	1	1	100	0
Total Accidents	1	1	100	100

1.6 Bicycle Indicator

Indicates whether a bicycle was involved in the accident.

Table 6. Bicycle Indicator

Description	2007	Total	Observed Percent	Average Percent
Unknown	1	1	100	N/A
Total Accidents	1	1	100	N/A

1.7 Contributing Circumstances, Environment

Apparent environmental conditions which contributed to the accident.

Table 7. Contributing Circumstances, Environment

Description	2007	Total	Observed Percent	Average Percent
Unknown	1	1	100	0
Total Accidents	1	1	100	100

1.8 Contributing Circumstances, Road

Apparent conditions of the road which contributed to the accident.

Table 8. Contributing Circumstances, Road

Description	2007	Total	Observed Percent	Average Percent
Unknown	1	1	100	71
Total Accidents	1	1	100	100

1.9 Day of Week

The day of the week on which the accident occurred.

Table 9. Day of Week

Description	2007	Total	Observed Percent	Average Percent
Saturday	1	1	100	15
Total Accidents	1	1	100	100

1.10 Driver Age

The value of this item is the driver age, in years, at the time of the accident. The value of this item is calculated during data set post processing.

Table 10. Driver Age in Years

Description	2007	Total	Observed Percent	Average Percent
Unknown	1	1	100	N/A
Total Vehicles	1	1	100	N/A

1.11 Driveway Indicator

1.12 First Harmful Event

The first injury or damage-producing event that characterizes the accident type.

Table 11. First Harmful Event

Description	2007	Total	Observed Percent	Average Percent
Guardrail face	1	1	50	N/A
Unknown	1	1	50	N/A
Total Vehicles	2	2	100	N/A

1.13 Initial Direction of Travel

The direction of a vehicle's normal, general travel on the roadway before the accident. Notice that this is not a compass direc but a direction consistent with the designated direction of the road. For example, the direction of a state designated north-sou highway must be either northbound or southbound even though a vehicle may have been traveling due east as a result of a s segment of the highway having an east-west orientation.

Table 12. Initial Direction of Travel

Description	2007	Total	Observed Percent	Average Percent
Eastbound	1	1	50	N/A
Unknown	1	1	50	N/A
Total Vehicles	2	2	100	N/A

1.14 Light Condition

The type/level of lighting that existed at the time of the accident.

Table 13. Light Condition

Description	2007	Total	Observed Percent	Average Percent
Daylight	1	1	100	44
Total Accidents	1	1	100	100

1.15 Number of Vehicles Involved

The count of motor vehicles (e.g., automobiles, single-unit trucks, truck combinations that are in motion or on a roadway) involved in the accident. (Note: Parked vehicles are not included in this vehicle count, nor are bicycles and pedestrians.)

Table 14. Number of Vehicles Involved

Description	2007	Total	Observed Percent	Average Percent
2 Vehicles	1	1	100	N/A
Total Accidents	1	1	100	N/A

1.16 Pedestrian Indicator

Indicates whether a pedestrian was involved in the accident.

Table 15. Pedestrian Indicator

Description	2007	Total	Observed Percent	Average Percent
Unknown	1	1	100	N/A
Total Accidents	1	1	100	N/A

Description	2007	Total	Observed Percent	Average Percent

1.17 Relationship to Junction

Identifies the type of related cross street to the accident site. Definitions vary across states. For compatibility with the structure o SafetyAnalyst, a recoding that differs from MMUCC is recommended. Some distinctions that MMUCC tries to make in this field will instead be made in site characteristics data in SafetyAnalyst.

Table 16. Relationship to Junction

Description	2007	Total	Observed Percent	Average Percent
Non-junction	1	1	100	N/A
Total Accidents	1	1	100	N/A

1.18 Roadway Surface Condition

The roadway surface condition at the time and place of the accident.

Table 17. Roadway Surface Condition

Description	2007	Total	Observed Percent	Average Percent
Dry	1	1	100	71
Total Accidents	1	1	100	100

1.19 Run-Off Road Indicator

Indicates whether any vehicle involved in the accident ran off the roadway.

Table 18. Run-Off Road Indicator

Description	2007	Total	Observed Percent	Average Percent
Unknown	1	1	100	N/A
Total Accidents	1	1	100	N/A

1.20 School Bus Related

Indicates if a school bus or vehicle functioning as a school bus for a school-related purpose was involved in the accident. The school bus, with or without a passenger on board, must be directly involved as a contact vehicle or indirectly involved as a non-contact vehicle.

Table 19. School Bus Related

Description	2007	Total	Observed Percent	Average Percent
Unknown	1	1	100	0
Total Accidents	1	1	100	100

1.21 Tow-Away Indicator

Indicates whether any vehicle involved in the accident was towed away from the scene.

Table 20. Tow-Away Indicator

Description	2007	Total	Observed Percent	Average Percent
No	1	1	100	0
Total Accidents	1	1	100	100

1.22 Vehicle Configuration

Indicates the general configuration of the vehicle.

Table 21. Vehicle Configuration

Description	2007	Total	Observed Percent	Average Percent
Passenger car	1	1	50	N/A
Unknown vehicle configuration	1	1	50	N/A
Total Vehicles	2	2	100	N/A

1.23 Vehicle Maneuver/Action

The controlled maneuver that the vehicle was doing prior to the first event in the sequence of events for this vehicle.

Table 22. Vehicle Maneuver/Action

Description	2007	Total	Observed Percent	Average Percent
Overtaking/passing	1	1	50	N/A
Unknown	1	1	50	N/A
Total Vehicles	2	2	100	N/A

1.24 Vehicle Turning Movement

Characterization of multiple vehicle accidents where any involved vehicle was performing a turning maneuver prior to impact. Any left turn maneuver or U-turn maneuver will take precedence over any right turn maneuver. For example, if Vehicle 1 made a left turn and Vehicle 2 made a right turn, then this data item will be classified as a left turn accident. Even though the first level of this data element is labeled Left turn, the left turn category also includes U-turn accidents.

Table 23. Vehicle Turning Movement

Description	2007	Total	Observed Percent	Average Percent
No-turn	1	1	100	98
Total Accidents	1	1	100	100

1.25 Weather Condition

The main prevailing atmospheric conditions that existed at the time of the accident.

Table 24. Weather Condition

Description	2007	Total	Observed Percent	Average Percent
Clear	1	1	100	0
Total Accidents	1	1	100	100

1.26 Work Zone Related

Indicates whether the accident occurred in or near a construction, maintenance, or utility work zone, whether workers were actually present at the time of the accident or not. Work zone related accidents include those involving vehicles slowed or stopped because of the work zone, even if the first harmful event was before the first warning sign. MMUCC has additional subfields related to this data item that are not included in this format.

Table 25. Work Zone Related

Description	2007	Total	Observed Percent	Average Percent
No	1	1	100	0
Total Accidents	1	1	100	100

[Previous: Accident Summary for Route ISR 90-TAMIAMI TRAIL, Milepost 19.53 to 19.563 (Segment 8300)] [Top] [Next: Route ISR 90-TAMIAMI TRAIL, Milepost 19.53 to 19.563]

SafetyAnalyst

Accident Statistics Report

Jul 23, 2009

Table of Contents

List of Tables

[Previous: Accident Statistics Report] [Table Of Contents]

1. Accident Statistics

This is a summary of the accident statistics associated with **Segment 8300**.
The dataset comment is "null".
The data set was created 2:23 AM.

Notes:
The summary includes a total of **1 Total Accidents** accidents spanning the years **2007** to **2007**.

The summary includes accidents that occur at the site between locations **19.53** to **19.563** inclusive.

The site subtype: **Seg/Rur; 2-lane**

The minimum accident frequency: **5.0**

The p-value: **0.1**

1.1 Accident Pattern Identification

Table 1. Accident Pattern Identification

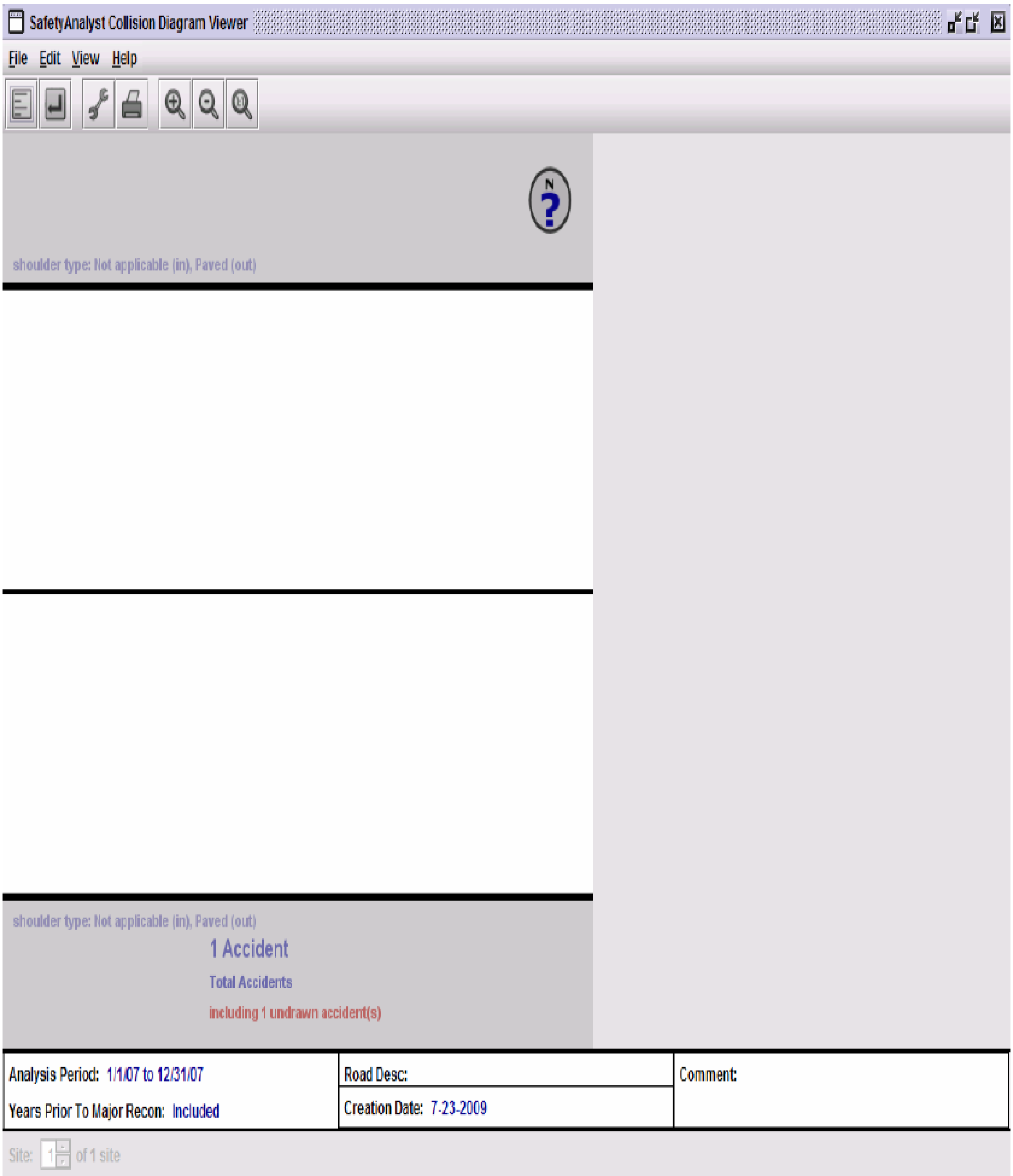
	Average Observed Accident Frequency	Average EB-Adjusted Accident Frequency	Observed Proportion (%)	Limiting Proportion (%)	Probability Observed Proportion Exceeds Limiting Proportion
All Accident Attributes					
Accident Month					
September	***30.30***	0.00	100.0	6.4	0.74
Accident Month TOTAL	***30.30***	0.00	100.0		
Accident Type and Manner of Collision					
Other multiple-vehicle collision	***30.30***	0.00	100.0	0.7	***0.94***
Accident Type and Manner of Collision TOTAL	***30.30***	0.00	100.0		
Day of Week					
Saturday	***30.30***	0.00	100.0	15.2	0.64
Day of Week TOTAL	***30.30***	0.00	100.0		
Vehicle Turning Movement					
No-turn	***30.30***	0.00	100.0	97.9	0.60
Vehicle Turning Movement TOTAL	***30.30***	0.00	100.0		

1.2 Summary Accident Data

Table 2. Summary Accident Data Used for Accident Pattern Identification

Accident Attribute	2007	Total	P(CT/TOT) %
Accident Month			
September	1	1	100.0
Accident Month TOTALS	1	1	100.0
Accident Type and Manner of Collision			
Other multiple-vehicle collision	1	1	100.0
Accident Type and Manner of Collision TOTALS	1	1	100.0
Day of Week			
Saturday	1	1	100.0
Day of Week TOTALS	1	1	100.0
Vehicle Turning Movement			
No-turn	1	1	100.0
Vehicle Turning Movement TOTALS	1	1	100.0

[Previous: Accident Statistics Report] [Top]


SafetyAnalyst Collision Diagram Viewer
File Edit View Help
N
shoulder type: Not applicable (in), Paved (out)
shoulder type: Not applicable (in), Paved (out)
1 Accident
Total Accidents
including 1 undrawn accident(s)
Analysis Period: 1/1/07 to 12/31/07
Years Prior To Major Recon: Included
Road Desc:
Creation Date: 7-23-2009
Comment:
Site: 1 of 1 site

SafetyAnalyst

Diagnosis and Countermeasure Selection Report

Jul 23, 2009

Disclaimer

This document is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its content or use thereof. This document does not constitute a standard, specification, or regulation.

The United States Government does not endorse products or manufacturers. Trade and manufacturers' names may appear in this document only because they are considered essential to the objective of the document.

Limited Warranty and Limitations of Remedies

This software product is provided "as-is," without warranty of any kind-either expressed or implied (but not limited to the implied warranties of merchantability and fitness for a particular purpose). The FHWA and distributor do not warrant that the functions contained in the software will meet the end-user's requirements or that the operation of the software will be uninterrupted and error-free.

Under no circumstances will the FHWA or the distributor be liable to the end-user for any damages or claimed lost profits, lost savings, or other incidental or consequential damages rising out of the use or inability to use the software (even if these organizations have been advised of the possibility of such damages), or for any claim by any other party.

Notice

The use and testing of the SafetyAnalyst software is being done strictly on a voluntary basis. In exchange for provision of SafetyAnalyst, the user agrees that the Federal Highway Administration (FHWA), U.S. Department of Transportation and any other agency of the Federal Government shall not be responsible for any errors, damage or other liability that may result from any and all use of the software, including installation and testing of the software. The user further agrees to hold the FHWA and the Federal Government harmless from any resulting liability. The user agrees that this hold harmless provision shall flow to any person to whom or any entity to which the user provides the SafetyAnalyst software. It is the user's full responsibility to inform any person to whom or any entity to which it provides the SafetyAnalyst software of this hold harmless provision.

Table of Contents

List of Tables

1. Report for Segment 8300

1.1 Site Summary

Roadway Segment
Segment ID: 8300
Internal Segment ID: S81
Route Number Display Value: ISR 90-TAMIAMI TRAIL
Site Subtype: Seg/Rur; 2-lane
Start Location: 19.53
End Location: 19.563
Next Roadway Segment ID: S82
Previous Roadway Segment ID: S80
Segment Length: 0.0330 miles
Terrain: Unknown
Roadway Class Level 1: Principal arterial-other
Roadway Class Level 2: Principal arterial-other rural
Roadway Class Level 3: Rural two-lane
Number of Through Lanes - Combined: 2
Median Type Level 1: Unknown
Median Type Level 2: Unknown
Access Control: No Access Control
Driveway Density: 550.0 driveways per mile
Growth Factor: 1.0500
Maximum AADT: 9 vehicles per day
Speed Limit: 60 miles per hour
Two-Way vs. One-Way Operation: Unknown
Direction of Travel: Unknown
Direction of Increasing Mileposts or Distances: Unknown
Interchange Influence Area on Mainline Freeway: Unknown
Discontinuity: No
Number of Accidents: 1

Geographic Description
Identifier: G1
Route Name: SR 90-TAMIAMI TRAIL
Route Type: Interstate
County: 3
Jurisdiction: Unknown
Area Type: Rural

Table 1. 8300 Annual Traffic

Year	AADT	Heavy Vehicles	Peak or Design Volume	Volume Source	Comment
2005	8			Interpolated (Years)	
2006	9			Interpolated (Years)	
2007	9			Interpolated (Years)	

Table 2. 8300 Directional Attributes

Direction	Number of Through Lanes	Average Lane Width	Shoulder Type - Outside	Shoulder Type - Inside	Average Shoulder Width - Outside	Average Shoulder Width - Inside	Bikeway	Comment
Direction 1	1	12.00	Paved	Not applicable	2.00		Unknown	
Direction 2	1	12.00	Paved	Not applicable	2.00		Unknown	

1.2 Recommended Countermeasures

This section presents the countermeasures that were recommended in the evaluation of the scenarios for this site.

Table 3. Recommended Countermeasures

Countermeasure	Contraindication	Recommended By *	Accident Pattern(s)	Implemented
Improve pavement friction	Possibility of increased pavement deterioration; May increase dry road crashes	5, 62	All single-vehicle types	no
Maintain surface of lanes		5, 62	All single-vehicle types	no
Improve drainage patterns or structures		5, 62	All single-vehicle types	no
Raise standard for winter maintenance		62	All single-vehicle types	no
Apply preventive salting or chemical anti-icing		62	All single-vehicle types	no
Remove shoulder-edge drop-offs		3, 2, 1, 5, 4	All single-vehicle types	no
Widen clear zone		4	All single-vehicle types	no
Improve traversability of object		2, 4	All single-vehicle types	no
Flatten side slopes		2, 4	All single-vehicle types	no
Install continuous milled-in shoulder (or edgeline) rumble strips	Noise - should not be placed in vicinity of residences	3, 1	All single-vehicle types	no
Install centerline rumble strips	Noise - should not be placed in vicinity of residences	3, 1	All single-vehicle types	no
Install raised pavement markers (on roads with radius > 1640 and ADT between 15,001 to 20,000 vpd)		3, 1	All single-vehicle types	no
Flatten horizontal curve		3	All single-vehicle types	no
Install curve ahead warning signs		3	All single-vehicle types	no
Widen lane through curve		3	All single-vehicle types	no
Install transverse rumble strips	Noise - should not be placed in vicinity of residences	3	All single-vehicle types	no
Install transverse pavement markings	More effective for unfamiliar drivers	3	All single-vehicle types	no
Install chevrons		3	All single-vehicle types	no
Flatten crest vertical curve	May increase operating speeds	3	All single-vehicle types	no
Remove/restrict movements at access points		3	All single-vehicle types	no
Remove foliage		3	All single-vehicle types	no
Improve sight distance to access		3	All single-vehicle types	no
Obstruct line of sight to the former tangential alignment		3	All single-vehicle types	no
Widen lanes	Increase of lane width beyond 12 ft may increase crashes	1	All single-vehicle types	no
Improve visibility/retroreflectivity of pavement markings		1	All single-vehicle types	no

* A scenario ID ending in 'u' indicates the countermeasure was user-selected and is not a result of the diagnosis.

1.3 Potential Diagnoses

1.3.1 Diagnosis 1: Driver Inattention / Impairment

Accident Pattern: All single-vehicle types

Evaluation Status: Complete

Statement:
Single vehicle crashes, which are mostly run-off-road crashes, can occur due to driver inattention or impairment.

Rationale:
For experienced drivers, driving is a highly automated task which can lead to drivers being inattentive or allowing themselves to be distracted from the driving task. Inattention may occur due to drivers' preoccupation with internal thoughts, driver distraction due to the handling of food or drinks in the vehicle, due to cell phone use (whether hands-free or hand-held, the attentional distraction is the same), due to use of the radio or CD player, or due to being distracted by people, animals or other objects in the vehicle or along the roadside. While drivers' attention is elsewhere, inadvertent steering movements or lack of attention to the road path can lead to a run-off-road event. While distraction can occur anytime, sleepiness is very closely related to time of day. It is most prevalent between the hours of 2 am and 6 am, when risk of single vehicle crashes/mile driven increase dramatically. There is a secondary period of increased sleepiness, known as the post-lunch dip, between about 2 and 4 pm. If drivers have had insufficient sleep the previous night, whether due to shift work, or medical problems such as sleep apnea (affecting about 5% of the male population), they are more likely to fall asleep while driving at these times of the day and night. The use of alcohol, which is a sedative, can also contribute to impairment, as can many prescription and over-the-counter drugs.

Question:
Are run-off-road crashes widely distributed throughout the road section?
Answer:
Yes
Recommended CM:
Install continuous milled-in shoulder (or edgeline) rumble strips
Install centerline rumble strips

Question:
Are crashes occurring in sections where there are shoulder-edge drop-offs greater than 2 inches (5 cm)?
Answer:
Yes
Recommended CM:
Remove shoulder-edge drop-offs

Question:
Are the travel lanes less than 11 ft (3.4 m) wide?
Answer:
Yes
Recommended CM:
Widen lanes

Question:
Are traffic volumes greater than 5,000 veh/day?
Answer:
Yes
Recommended CM:
None

Question:
Do most curves have a radius more than 1640 ft (500 m)?
Answer:
Yes
Recommended CM:
Install raised pavement markers (on roads with radius > 1640 and ADT between 15,001 to 20,000 vpd)

Question:
Are crashes occurring at night darkness when the roadway surface is wet?
Answer:
Yes
Recommended CM:
Improve visibility/retroreflectivity of pavement markings

1.3.2 Diagnosis 2: Roadside Design

Accident Pattern: All single-vehicle types

Evaluation Status: Complete

Statement:
Single vehicle crashes, which are mostly run-off-road crashes, can occur when drivers leave their travel lane due to: driver fatigue or inattention, excessive speed, driving under the influence of drugs or alcohol, crash avoidance, roadway conditions, vehicle failure, and/or poor visibility, and encounter a roadside that is not clear from obstacles or forgiving to the errant vehicle.

Rationale:
For experienced drivers, driving is a highly automated task which can lead to drivers being inattentive or allowing themselves to be distracted from the driving task. While drivers' attention is elsewhere, inadvertent steering movements or lack of attention to the road path can lead to a run-off-road event. Avoidance maneuvers, poor road conditions, vehicle failure, unfamiliar road alignment, and weather conditions like snow, rain, or fog can also contribute to drivers unintentionally leaving the roadway. Once the vehicle has left the travel lane, a more forgiving roadside with a clear zone free of obstacles will minimize the possibility of crashing or overturning by providing the opportunity to recover control and return to the travel lane. If a roadside obstacle cannot be moved away from the roadside or be made to break away under the impact of a vehicle, the implementation of a barrier or crash attenuating system could be implemented to reduce the crash severity.

Question:
Are crashes occurring in sections where there are shoulder-edge drop-offs greater than 2 inches (5 cm)?
Answer:
Yes
Recommended CM:
Remove shoulder-edge drop-offs

Question:
Is the shoulder surface in a well-maintained state?
Answer:
Yes
Recommended CM:
None

Question:
Is the shoulder width consistent with design standards?
Answer:
Yes
Recommended CM:
None

Question:
Are there fixed objects located within the clear zone?
Answer:
Yes
Recommended CM:
None

Question:
Can the object be redesigned so that it can be safely traversed?
Answer:
Yes
Recommended CM:
Improve traversability of object

Question:
Do fill height and foreslope warrant barrier protection?
Answer:
Yes
Recommended CM:
None

Question:
Can the foreslopes be upgraded to eliminate the need for barrier?
Answer:
Yes
Recommended CM:
Flatten side slopes

1.3.3 Diagnosis 3: Speeds Too High / Unexpected Curvature / Poor Path Definition

Accident Pattern: All single-vehicle types

Attribute: Horizontal curve

Evaluation Status: Complete

Statement:
Single vehicle crashes, which are mostly run-off-road crashes, can occur when drivers are unprepared for a curve, whether due to inappropriately high approach speeds, or driver impairment and inattention, or the driver's expectation of the alignment based on the prior horizontal alignment on this roadway, or poor curve path definition.

Rationale:
Studies show that run-off-road crashes are four times more likely on curves than on tangents. A driver's mental and visual workload is greater in curves than on tangents, and the workload increases for sharper curves. Drivers sometimes fail to compensate for low friction road surfaces such as wet or icy pavement. Furthermore, drivers develop expectations about the upcoming horizontal alignment based on their recent experience with the roadway. Studies show that when a curve is unusually sharp for a given roadway, more crashes occur than when the same radius curve is encountered on a roadway where there are many such sharp curves and drivers are expecting them. Run-off-road crashes may also occur if the road path is poorly defined, especially at night and in poor weather.

Question:
Are run-off-road crashes widely distributed throughout the road section?
Answer:
Yes
Recommended CM:
Install continuous milled-in shoulder (or edgeline) rumble strips
Install centerline rumble strips

Question:
Are crashes occurring in sections where there are shoulder-edge drop-offs greater than 2 inches (5 cm)?
Answer:
Yes
Recommended CM:
Remove shoulder-edge drop-offs

Question:
Are traffic volumes greater than 5,000 veh/day?
Answer:
Yes
Recommended CM:
None

Question:
Do most curves have a radius more than 1640 ft (500 m)?
Answer:
Yes
Recommended CM:
Install raised pavement markers (on roads with radius > 1640 and ADT between 15,001 to 20,000 vpd)

Question:
Are run-off-road crashes clustered around particular curves?
Answer:
Yes
Recommended CM:
Flatten horizontal curve
Install curve ahead warning signs

Widen lane through curve
Install transverse rumble strips
Install transverse pavement markings

Question:
Do the curves in question have a deflection angle greater than 7 degrees?
Answer:
Yes
Recommended CM:
Install chevrons

Question:
Are crashes related to poor sight distance to accesses beyond the curves?
Answer:
Yes
Recommended CM:
Flatten horizontal curve
Flatten crest vertical curve
Remove/restrict movements at access points
Remove foliage
Improve sight distance to access

Question:
Is the curve at a location where there is evidence (i.e., a road with streetlights, telephone poles, signs, etc.) of a former tangential continuation, leading to drivers being surprised that the main road curves?
Answer:
Yes
Recommended CM:
Install curve ahead warning signs
Obstruct line of sight to the former tangential alignment
Install chevrons

1.3.4 Diagnosis 4: Roadside Design

Accident Pattern: All single-vehicle types

Attribute: Horizontal curve

Evaluation Status: Complete

Statement:
Single vehicle crashes, which are mostly run-off-road crashes, can occur when drivers are unprepared for a curve due to inappropriately high approach speeds (especially in wet or icy conditions), or driver impairment and inattention, or the driver's expectation of the alignment based on the prior horizontal alignment on this roadway, or poor curve path definition. Drivers who are unable to negotiate a horizontal curve will encroach onto the roadside where impacts with objects or features may occur. Studies show that run-off-road crashes are four times more likely on curves than on tangents. Roadsides along curves should be forgiving in nature so that errant vehicles have an opportunity to correct the errant maneuver in sufficient time to, ideally, regain control and avoid the crash, or at a minimum, reduce the severity of the crash.

Rationale:
For experienced drivers, driving is a highly automated task which can lead to drivers being inattentive or allowing themselves to be distracted from the driving task. While drivers' attention is elsewhere, inadvertent steering movements or lack of attention to the road path can lead to a run-off-road event. Avoidance maneuvers, poor road conditions, vehicle failure, unfamiliar road alignment, and weather conditions like snow, rain, or fog can also contribute to drivers unintentionally leaving the roadway. Once the vehicle has left the travel lane, a more forgiving roadside with a clear zone free of obstacles will minimize the possibility of crashing or overturning by providing the opportunity to recover control and return to the travel lane. If a roadside obstacle cannot be moved away from the roadside or be made to break away under the impact of a vehicle, the implementation of a barrier or crash attenuating system could be implemented to reduce the crash severity.

Question:
Are crashes occurring in sections where there are shoulder-edge drop-offs greater than 2 inches (5 cm)?
Answer:
Yes
Recommended CM:
Remove shoulder-edge drop-offs

Question:
Is the shoulder surface in a well-maintained state?
Answer:
Yes
Recommended CM:
None

Question:
Is the shoulder width consistent with design standards?
Answer:
Yes
Recommended CM:
None

Question:
Are there fixed objects located within the clear zone?
Answer:
Yes
Recommended CM:
Widen clear zone

Question:
Can the object be redesigned so that it can be safely traversed?
Answer:
Yes
Recommended CM:
Improve traversability of object

Question:
Do fill height and foreslope warrant barrier protection?
Answer:
Yes
Recommended CM:
None

Question:
Can the foreslopes be upgraded to eliminate the need for barrier?
Answer:
Yes
Recommended CM:
Flatten side slopes

1.3.5 Diagnosis 5: Road Surface Condition / Superelevation

Accident Pattern: All single-vehicle types

Attribute: Horizontal curve

Evaluation Status: Complete

Statement:
Single vehicle crashes, which are mostly run-off-road crashes, can occur when drivers are unable to negotiate a curve as intended due to low pavement skid resistance and roughness and/or insufficient superelevation. The reduced lateral friction between the vehicle tire and the road surface may cause the vehicle to skid or slide and leave the intended travel lane. Drivers who are unable to negotiate a horizontal curve will encroach onto the roadside where impacts with objects or features may occur.

Rationale:
Pavement that has deteriorated and no longer provides adequate lateral friction as a vehicle negotiates a turn can lead to an increase in single vehicle crashes. If sufficient superelevation is not provided, there is less force due to friction counteracting the effects of centripetal force as a vehicle begins to turn, thus leading to a higher potential of leaving the travel lane. Studies show that run-off-road crashes are four times more likely on curves than on tangents. A driver's mental and visual workload is greater on curves than on tangents, and the workload increases for sharper curves. When low pavement friction or insufficient

superelevation is combined with wet or icy conditions, high speeds, driver inattention or impairment, the risk for leaving the roadway along a curve increases.

Question:
Does the asphalt at the curve, where the target crashes were recorded, show noticeable signs of deterioration, water ponding, ice build-up, or look "polished" in appearance?
Answer:
Yes
Recommended CM:
Improve drainage patterns or structures
Improve pavement friction
Maintain surface of lanes

Question:
Are crashes occurring in sections where there are shoulder-edge drop-offs greater than 2 inches (5 cm)?
Answer:
Yes
Recommended CM:
Remove shoulder-edge drop-offs

Question:
Is the superelevation along the curve in accordance to design standards?
Answer:
Yes
Recommended CM:
None

1.3.6 Diagnosis 62: Road Surface Condition/Drainage

Accident Pattern: All single-vehicle types

Attribute: Wet weather

Evaluation Status: Complete

Statement:
Single-vehicle crashes can occur when drivers are unable to maneuver, slow or stop as intended due to poor pavement surface condition and/or water ponding on the roadway.

Rationale:
A pavement in poor condition may have reduced surface friction which can cause a vehicle to skid, slide, or require a longer stopping distance. Water accumulating or ponding on a roadway, particularly in the wheel path, may result in a vehicle hydroplaning (i.e., tires lose contact with road surface). If a driver fails to adjust their speed appropriately due to poor road surface conditions (e.g., if the surface is worn or rutted, particularly when wet or icy), the risk for leaving the roadway increases.

Question:
Does the asphalt on the segment show noticeable signs of deterioration or look "polished" in appearance?
Answer:
Yes
Recommended CM:
Improve pavement friction
Maintain surface of lanes

Question:
Is there water ponding or ice-buildup on the roadway or in the area of catch basins, culverts, or other drainage structures, which may be related to the crash type?
Answer:
Yes
Recommended CM:
Improve drainage patterns or structures
Raise standard for winter maintenance
Apply preventive salting or chemical anti-icing

Question:
Is the cross-fall a minimum of 2%?

Answer:
Yes
Recommended CM:
None

Question:
Is a minimum longitudinal grade of 0.5% provided?
Answer:
Yes
Recommended CM:
None

[Previous: Diagnosis and Countermeasure Selection Report] [Top] [Next: Descriptions for Recommended Procedures]

SafetyAnalyst

Economic Analysis

Jul 23, 2009

Table of Contents

List of Tables

[Previous: Economic Analysis] [Table Of Contents] [Next: Economic Appraisal]

1. Summary of Input Parameters

SafetyAnalyst: v3.0.0, packaged: Jun 30, 2009 3:37 PM on sa_dev.ittsystems.com
Data set title: Kemi
Data set comment: null
Data set created: Jul 23, 2009 2:23 AM

Economic Analyses and Priority Ranking started: Jul 23, 2009 3:23 AM.

Processing Parameters

Types of Economic Analyses Performed:
Cost-effectiveness

Ranking Criteria: Cost Effectiveness (based upon Total Accidents)
Countermeasures Listed for a Site by: Highest Ranked Countermeasure for each Site
Display Order: Standard Order

Years of Data Considered:
History Period: Available years (2007 - 2007)
Major Reconstruction: No major reconstruction occurred at any sites during the history period

Analysis Period:
Implementation Year: 2010
Years To Analyze: 20

Minimum Attractive Rate of Return (Percent): 4

Table 1. Site Countermeasures Data

ID	Site ID	Site Type	County	Route	Beginning Location	Ending Location	CM ID	CM Title	CM Start Location	CM End Location
1	8300	Segment	3	SR 90-TAMIAMI TRAIL	19.53	19.563	43	Remove/restrict movements at access points	19.53	19.563
2	8300	Segment	3	SR 90-TAMIAMI TRAIL	19.53	19.563	195	Improve drainage patterns or structures	19.53	19.563
3	8300	Segment	3	SR 90-TAMIAMI TRAIL	19.53	19.563	2	Flatten crest vertical curve	19.53	19.563
4	8300	Segment	3	SR 90-TAMIAMI TRAIL	19.53	19.563	3	Flatten horizontal curve	19.53	19.563
5	8300	Segment	3	SR 90-TAMIAMI TRAIL	19.53	19.563	46	Widen lane through curve	19.53	19.563
6	8300	Segment	3	SR 90-TAMIAMI TRAIL	19.53	19.563	47	Widen lanes	19.53	19.563
7	8300	Segment	3	SR 90-TAMIAMI TRAIL	19.53	19.563	8	Improve pavement friction	19.53	19.563
8	8300	Segment	3	SR 90-TAMIAMI TRAIL	19.53	19.563	37	Maintain surface of lanes	19.53	19.563
9	8300	Segment	3	SR 90-TAMIAMI TRAIL	19.53	19.563	196	Apply preventive salting or chemical anti-icing	19.53	19.563
10	8300	Segment	3	SR 90-TAMIAMI TRAIL	19.53	19.563	399	Raise standard for winter maintenance	19.53	19.563

User Input:
(1) Site ID= 8300; CM ID = 43; Category = access: Access Management; Title = Remove/restrict movements at access points; Service Life = 10; Unit Construction Cost = 2000.000; Construction Cost Units = site; Construction Cost Function = 1: Cost Per Site; Site ID = S81; ID = 8300; Start Location = A|I|SR 90-TAMIAMI TRAIL|19.53|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|19.53|; End Location = A|I|SR 90-TAMIAMI TRAIL|19.563|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|19.563|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 2000.000; Total Construction Cost Source = C: Calculated; AMF Total Before Condition = 0.000000; AMF Total After Condition = 0.000000; AMF FI Before Condition = 0.000000; AMF FI After Condition = 0.000000; AMF Total Final Condition = 0.950000; AMF FI Final Condition =

0.950000;

(2) Site ID= 8300; CM ID = 195; Category = drainage: Drainage; Title = Improve drainage patterns or structures; Service Life = 20; Unit Construction Cost = 300000.000; Construction Cost Units = CL mi; Construction Cost Function = 2: Cost Per Centerline Mile of Roadway; Site ID = S81; ID = 8300; Start Location = A|I|SR 90-TAMIAMI TRAIL|19.53|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|19.53|; End Location = A|I|SR 90-TAMIAMI TRAIL|19.563|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|19.563|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 9900.000; Total Construction Cost Source = C: Calculated; AMF Total Before Condition = 0.000000; AMF Total After Condition = 0.000000; AMF FI Before Condition = 0.000000; AMF FI After Condition = 0.000000; AMF Total Final Condition = 0.950000; AMF FI Final Condition = 0.950000;

(3) Site ID= 8300; CM ID = 2; Category = geometry: Geometry; Title = Flatten crest vertical curve; Service Life = 20; Unit Construction Cost = 700000.000; Construction Cost Units = site; Construction Cost Function = 1: Cost Per Site; Site ID = S81; ID = 8300; Start Location = A|I|SR 90-TAMIAMI TRAIL|19.53|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|19.53|; End Location = A|I|SR 90-TAMIAMI TRAIL|19.563|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|19.563|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 700000.000; Total Construction Cost Source = C: Calculated; AMF Total Before Condition = 0.000000; AMF Total After Condition = 0.000000; AMF FI Before Condition = 0.000000; AMF FI After Condition = 0.000000; AMF Total Final Condition = 0.950000; AMF FI Final Condition = 0.950000;

(4) Site ID= 8300; CM ID = 3; Category = geometry: Geometry; Title = Flatten horizontal curve; AMF Function = 5: Flatten Horizontal Curve; Service Life = 20; Unit Construction Cost = 700000.000; Construction Cost Units = site; Construction Cost Function = 1: Cost Per Site; Site ID = S81; ID = 8300; Start Location = A|I|SR 90-TAMIAMI TRAIL|19.53|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|19.53|; End Location = A|I|SR 90-TAMIAMI TRAIL|19.563|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|19.563|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 700000.000; Total Construction Cost Source = C: Calculated; AMF Total Final Condition = 0.950000; AMF Total Before Condition = 1.517419; AMF Total After Condition = 1.517419; AMF FI Final Condition = 0.950000; AMF FI Before Condition = 1.517419; AMF FI After Condition = 1.517419; Radius of existing curve (ft) = 100.000; Length of existing curve (mi) = 1.000; Is the existing curve a Spiral? = false; Radius of proposed curve (ft) = 100.000; Length of proposed curve (mi) = 1.000; Is the proposed curve a Spiral? = false;

(5) Site ID= 8300; CM ID = 46; Category = geometry: Geometry; Title = Widen lane through curve; Service Life = 20; Unit Construction Cost = 15000.000; Construction Cost Units = site; Construction Cost Function = 1: Cost Per Site; Site ID = S81; ID = 8300; Start Location = A|I|SR 90-TAMIAMI TRAIL|19.53|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|19.53|; End Location = A|I|SR 90-TAMIAMI TRAIL|19.563|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|19.563|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 15000.000; Total Construction Cost Source = C: Calculated; AMF Total Before Condition = 0.000000; AMF Total After Condition = 0.000000; AMF FI Before Condition = 0.000000; AMF FI After Condition = 0.000000; AMF Total Final Condition = 0.950000; AMF FI Final Condition = 0.950000;

(6) Site ID= 8300; CM ID = 47; Category = geometry: Geometry; Title = Widen lanes; Site Subtype Factor (TOT) = 1.000; Site Subtype Factor (FI) = 1.000; AMF Function = 2: Widen Lanes; Service Life = 20; Unit Construction Cost = 10.000; Construction Cost Units = sq ft; Construction Cost Function = 6: Cost Per Square Foot of Lane Widening; Site ID = S81; ID = 8300; Start Location = A|I|SR 90-TAMIAMI TRAIL|19.53|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|19.53|; End Location = A|I|SR 90-TAMIAMI TRAIL|19.563|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|19.563|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 0.000; Total Construction Cost Source = C: Calculated; AMF Total Final Condition = 0.950000; AMF Total Before Condition = 1.000000; AMF Total After Condition = 1.000000; AMF FI Final Condition = 0.950000; AMF FI Before Condition = 1.000000; AMF FI After Condition = 1.000000; Enable existing lane width for direction 1 = true; Enable existing lane width for direction 2 = true; Existing lane width for direction 1 = 12.000; Existing lane width for direction 2 = 12.000; Lane width of proposed improvement = 12.000; Enable the number of through lanes for direction 1 = true; Enable the number of through lanes for direction 2 = true; Number of through lanes for direction 1 = 1; Number of through lanes for direction 2 = 1; Collision Type = head_on: Head-on; Collision Type Severity = FI: Fatal and Injury; Collision Type = object: Collision with fixed object; Collision Type Severity = FI: Fatal and Injury; Collision Type = other_single_noncollision: Other single-vehicle non-collision; Collision Type Severity = FI: Fatal and Injury; Collision Type = overturn: Overturn; Collision Type Severity = FI: Fatal and Injury; Collision Type = sideswipe_opp_dir: Sideswipe, opposite direction; Collision Type Severity = FI: Fatal and Injury; Collision Type = sideswipe_same_dir: Sideswipe, same direction; Collision Type Severity = FI: Fatal and Injury; Collision Type = head_on: Head-on; Collision Type Severity = TOT: Total; Collision Type = object: Collision with fixed object; Collision Type Severity = TOT: Total; Collision Type = other_single_noncollision: Other single-vehicle non-collision; Collision Type Severity = TOT: Total; Collision Type = overturn: Overturn; Collision Type Severity = TOT: Total; Collision Type = sideswipe_opp_dir: Sideswipe, opposite direction; Collision Type Severity = TOT: Total; Collision Type = sideswipe_same_dir: Sideswipe, same direction; Collision Type Severity = TOT: Total;

(7) Site ID= 8300; CM ID = 8; Category = pavement: Pavement; Title = Improve pavement friction; AMF (TOT) = 0.760000; Service Life = 5; Unit Construction Cost = 5.000; Construction Cost Units = sq ft; Construction Cost Function = 4: Cost Per Square Foot of Traveled Way; Site ID = S81; ID = 8300; Start Location = A|I|SR 90-TAMIAMI TRAIL|19.53|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|19.53|; End Location = A|I|SR 90-TAMIAMI TRAIL|19.563|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|19.563|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 20908.800; Total Construction Cost Source = C: Calculated; AMF Total Final Condition = 0.950000; AMF Total Before Condition = 0.000000; AMF Total After Condition = 0.000000; AMF FI Before Condition = 0.000000; AMF FI After Condition = 0.000000; AMF FI Final Condition = 0.950000; Enable the number of auxiliary lanes for direction 1 = true; Enable the number of auxiliary lanes for direction 2 = true; Number of auxiliary lanes for direction 1 = 0; Number of auxiliary lanes for direction 2 = 0; Enable the number

of through lanes for direction 1 = true; Enable the number of through lanes for direction 2 = true; Number of through lanes for direction 1 = 1; Number of through lanes for direction 2 = 1; Enable existing lane width for direction 1 = true; Enable existing lane width for direction 2 = true; Existing lane width for direction 1 = 12.000; Existing lane width for direction 2 = 12.000;

(8) Site ID= 8300; CM ID = 37; Category = pavement: Pavement; Title = Maintain surface of lanes; Service Life = 10; Unit Construction Cost = 3.000; Construction Cost Units = sq ft; Construction Cost Function = 4: Cost Per Square Foot of Traveled Way; Site ID = S81; ID = 8300; Start Location = A|I|SR 90-TAMIAMI TRAIL|19.53|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|19.53|; End Location = A|I|SR 90-TAMIAMI TRAIL|19.563|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|19.563|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 12545.280; Total Construction Cost Source = C: Calculated; AMF Total Before Condition = 0.000000; AMF Total After Condition = 0.000000; AMF FI Before Condition = 0.000000; AMF FI After Condition = 0.000000; AMF Total Final Condition = 0.950000; AMF FI Final Condition = 0.950000; Enable the number of auxiliary lanes for direction 1 = true; Enable the number of auxiliary lanes for direction 2 = true; Number of auxiliary lanes for direction 1 = 0; Number of auxiliary lanes for direction 2 = 0; Enable the number of through lanes for direction 1 = true; Enable the number of through lanes for direction 2 = true; Number of through lanes for direction 1 = 1; Number of through lanes for direction 2 = 1; Enable existing lane width for direction 1 = true; Enable existing lane width for direction 2 = true; Existing lane width for direction 1 = 12.000; Existing lane width for direction 2 = 12.000;

(9) Site ID= 8300; CM ID = 196; Category = pavement: Pavement; Title = Apply preventive salting or chemical anti-icing; AMF (FI) = 0.980000; Service Life = 1; Unit Construction Cost = 1000.000; Construction Cost Units = LN mi; Construction Cost Function = 3: Cost Per Lane Mile of TraveledWay; Site ID = S81; ID = 8300; Start Location = A|I|SR 90-TAMIAMI TRAIL|19.53|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|19.53|; End Location = A|I|SR 90-TAMIAMI TRAIL|19.563|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|19.563|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 66.000; Total Construction Cost Source = C: Calculated; AMF Total Before Condition = 0.000000; AMF Total After Condition = 0.000000; AMF FI Final Condition = 0.950000; AMF FI Before Condition = 0.000000; AMF FI After Condition = 0.000000; AMF Total Final Condition = 0.950000; Enable the number of auxiliary lanes for direction 1 = true; Enable the number of auxiliary lanes for direction 2 = true; Number of auxiliary lanes for direction 1 = 0; Number of auxiliary lanes for direction 2 = 0; Enable the number of through lanes for direction 1 = true; Enable the number of through lanes for direction 2 = true; Number of through lanes for direction 1 = 1; Number of through lanes for direction 2 = 1;

(10) Site ID= 8300; CM ID = 399; Category = pavement: Pavement; Title = Raise standard for winter maintenance; AMF (FI) = 0.990000; Service Life = 1; Unit Construction Cost = 1000.000; Construction Cost Units = CL mi; Construction Cost Function = 2: Cost Per Centerline Mile of Roadway; Site ID = S81; ID = 8300; Start Location = A|I|SR 90-TAMIAMI TRAIL|19.53|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|19.53|; End Location = A|I|SR 90-TAMIAMI TRAIL|19.563|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|19.563|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 33.000; Total Construction Cost Source = C: Calculated; AMF Total Before Condition = 0.000000; AMF Total After Condition = 0.000000; AMF FI Final Condition = 0.950000; AMF FI Before Condition = 0.000000; AMF FI After Condition = 0.000000; AMF Total Final Condition = 0.950000;

[Previous: Economic Analysis] [Top] [Next: Economic Appraisal]

SafetyAnalyst

Accident Summary for Route ISR 90-TAMIAMI TRAIL, Milepost 6.409 to 6.626 (Segment 3600)

Jul 23, 2009

Disclaimer

Limited Warranty and Limitations of Remedies

Notice

Table of Contents

List of Tables

[Previous: Accident Summary for Route ISR 90-TAMIAMI TRAIL, Milepost 6.409 to 6.626 (Segment 3600)] [Table Of Contents] [Next: Route ISR 90-TAMIAMI TRAIL, Milepost 6.409 to 6.626]

1. Accident Summary

This is a summary of the accident data associated with the following Segment from the **Kemi** data set, created on 2:23 AM:

Route ISR 90-TAMIAMI TRAIL, Milepost 6.409 to 6.626 (Segment 3600)

The details for this site are listed in the next section.

Notes:
The summary includes **1 Total Accidents** spanning the dates **1/1/2007** to **12/31/2007**.

Dates excluded from the summary period due to major reconstruction: **option not selected when specifying the analysis period.**

The summary includes accidents that occur at the site between locations **6.409** to **6.626** inclusive.

Generated by Diagnosis and Countermeasure Selection Module

1.1 Accident Month

The month in which the accident occurred.

Table 1. Accident Month

Description	2007	Total	Observed Percent	Average Percent
August	1	1	100	6
Total Accidents	1	1	100	100

1.2 Accident Severity Level 1

The severity of the accident based on the most severe injury to any person involved.

Table 2. Accident Severity Level 1

Description	2007	Total	Observed Percent	Average Percent
Property-Damage-Only	1	1	100	N/A
Total Accidents	1	1	100	N/A

1.3 Accident Time of Day

The time (hour and minute) at which the accident occurred.

Table 3. Accident Time of Day

Description	2007	Total	Observed Percent	Average Percent
3:00 pm to 3:59 pm	1	1	100	N/A
Total Accidents	1	1	100	N/A

1.4 Accident Type and Manner of Collision

The type of first harmful event in a single-vehicle accident or, in a multiple-vehicle collision, manner in which two vehicles in transport initially came together without regard to the direction of force, or the type of object with which a single vehicle collided.

Table 4. Accident Type and Manner of Collision

Description	2007	Total	Observed Percent	Average Percent
Other multiple-vehicle collision	1	1	100	1

Description	2007	Total	Observed Percent	Average Percent
Total Accidents	1	1	100	100

1.5 Alcohol/Drug Involvement

The investigating police officer's assessment of whether alcohol or drug use was suspected or demonstrated to be present by test for any vehicle driver or non-motorist in the accident.

Table 5. Alcohol/Drug Involvement

Description	2007	Total	Observed Percent	Average Percent
Neither alcohol nor other drugs	1	1	100	0
Total Accidents	1	1	100	100

1.6 Bicycle Indicator

Indicates whether a bicycle was involved in the accident.

Table 6. Bicycle Indicator

Description	2007	Total	Observed Percent	Average Percent
Unknown	1	1	100	N/A
Total Accidents	1	1	100	N/A

1.7 Contributing Circumstances, Environment

Apparent environmental conditions which contributed to the accident.

Table 7. Contributing Circumstances, Environment

Description	2007	Total	Observed Percent	Average Percent
Unknown	1	1	100	0
Total Accidents	1	1	100	100

1.8 Contributing Circumstances, Road

Apparent conditions of the road which contributed to the accident.

Table 8. Contributing Circumstances, Road

Description	2007	Total	Observed Percent	Average Percent
Unknown	1	1	100	71
Total Accidents	1	1	100	100

1.9 Day of Week

The day of the week on which the accident occurred.

Table 9. Day of Week

Description	2007	Total	Observed Percent	Average Percent
Sunday	1	1	100	12
Total Accidents	1	1	100	100

1.10 Driver Age

The value of this item is the driver age, in years, at the time of the accident. The value of this item is calculated during data set post processing.

Table 10. Driver Age in Years

Description	2007	Total	Observed Percent	Average Percent
Unknown	1	1	100	N/A
Total Vehicles	1	1	100	N/A

1.11 Driveway Indicator

Indicates if the accident occurred at or near a driveway junction.

Table 11. Driveway Indicator

Description	2007	Total	Observed Percent	Average Percent
Yes, at driveway	1	1	100	0
Total Accidents	1	1	100	100

1.12 First Harmful Event

The first injury or damage-producing event that characterizes the accident type.

Table 12. First Harmful Event

Description	2007	Total	Observed Percent	Average Percent
Guardrail face	1	1	50	N/A
Unknown	1	1	50	N/A
Total Vehicles	2	2	100	N/A

1.13 Initial Direction of Travel

The direction of a vehicle's normal, general travel on the roadway before the accident. Notice that this is not a compass direction but a direction consistent with the designated direction of the road. For example, the direction of a state designated north-south highway must be either northbound or southbound even though a vehicle may have been traveling due east as a result of a short segment of the highway having an east-west orientation.

Table 13. Initial Direction of Travel

Description	2007	Total	Observed Percent	Average Percent
Eastbound	1	1	50	N/A
Unknown	1	1	50	N/A
Total Vehicles	2	2	100	N/A

1.14 Light Condition

The type/level of lighting that existed at the time of the accident.

Table 14. Light Condition

Description	2007	Total	Observed Percent	Average Percent
Daylight	1	1	100	44
Total Accidents	1	1	100	100

1.15 Number of Vehicles Involved

The count of motor vehicles (e.g., automobiles, single-unit trucks, truck combinations that are in motion or on a roadway) involved in the accident. (Note: Parked vehicles are not included in this vehicle count, nor are bicycles and pedestrians.)

Table 15. Number of Vehicles Involved

Description	2007	Total	Observed Percent	Average Percent
2 Vehicles	1	1	100	N/A
Total Accidents	1	1	100	N/A

1.16 Pedestrian Indicator

Indicates whether a pedestrian was involved in the accident.

Table 16. Pedestrian Indicator

Description	2007	Total	Observed Percent	Average Percent
Unknown	1	1	100	N/A
Total Accidents	1	1	100	N/A

1.17 Relationship to Junction

Identifies the type of related cross street to the accident site. Definitions vary across states. For compatibility with the structure of SafetyAnalyst, a recoding that differs from MMUCC is recommended. Some distinctions that MMUCC tries to make in this field will instead be made in site characteristics data in SafetyAnalyst.

Table 17. Relationship to Junction

Description	2007	Total	Observed Percent	Average Percent
Non-junction	1	1	100	N/A
Total Accidents	1	1	100	N/A

1.18 Roadway Surface Condition

The roadway surface condition at the time and place of the accident.

Table 18. Roadway Surface Condition

Description	2007	Total	Observed Percent	Average Percent
Dry	1	1	100	71
Total Accidents	1	1	100	100

1.19 Run-Off Road Indicator

Indicates whether any vehicle involved in the accident ran off the roadway.

Table 19. Run-Off Road Indicator

Description	2007	Total	Observed Percent	Average Percent
Unknown	1	1	100	N/A
Total Accidents	1	1	100	N/A

1.20 School Bus Related

Indicates if a school bus or vehicle functioning as a school bus for a school-related purpose was involved in the accident. The school bus, with or without a passenger on board, must be directly involved as a contact vehicle or indirectly involved as a non-contact vehicle.

Table 20. School Bus Related

Description	2007	Total	Observed Percent	Average Percent
Unknown	1	1	100	0
Total Accidents	1	1	100	100

1.21 Tow-Away Indicator

Indicates whether any vehicle involved in the accident was towed away from the scene.

Table 21. Tow-Away Indicator

Description	2007	Total	Observed Percent	Average Percent
No	1	1	100	0
Total Accidents	1	1	100	100

1.22 Vehicle Configuration

Indicates the general configuration of the vehicle.

Table 22. Vehicle Configuration

Description	2007	Total	Observed Percent	Average Percent
Single-unit truck	1	1	50	N/A
Unknown vehicle configuration	1	1	50	N/A
Total Vehicles	2	2	100	N/A

1.23 Vehicle Maneuver/Action

The controlled maneuver that the vehicle was doing prior to the first event in the sequence of events for this vehicle.

Table 23. Vehicle Maneuver/Action

Description	2007	Total	Observed Percent	Average Percent
Overtaking/passing	1	1	50	N/A
Unknown	1	1	50	N/A
Total Vehicles	2	2	100	N/A

1.24 Vehicle Turning Movement

Characterization of multiple vehicle accidents where any involved vehicle was performing a turning maneuver prior to impact. Any left turn maneuver or U-turn maneuver will take precedence over any right turn maneuver. For example, if Vehicle 1 made a left turn and Vehicle 2 made a right turn, then this data item will be classified as a left turn accident. Even though the first level of this data element is labeled Left turn, the left turn category also includes U-turn accidents.

Table 24. Vehicle Turning Movement

Description	2007	Total	Observed Percent	Average Percent
No-turn	1	1	100	98
Total Accidents	1	1	100	100

1.25 Weather Condition

The main prevailing atmospheric conditions that existed at the time of the accident.

Table 25. Weather Condition

Description	2007	Total	Observed Percent	Average Percent
Clear	1	1	100	0
Total Accidents	1	1	100	100

1.26 Work Zone Related

Indicates whether the accident occurred in or near a construction, maintenance, or utility work zone, whether workers were actually present at the time of the accident or not. Work zone related accidents include those involving vehicles slowed or stopped because of the work zone, even if the first harmful event was before the first warning sign. MMUCC has additional subfields related to this data item that are not included in this format.

Table 26. Work Zone Related

Description	2007	Total	Observed Percent	Average Percent
No	1	1	100	0

Description	2007	Total	Observed Percent	Average Percent
Total Accidents	1	1	100	100

[Previous: Accident Summary for Route ISR 90-TAMIAMI TRAIL, Milepost 6.409 to 6.626 (Segment 3600)] [Top] [Next: Route ISR 90-TAMIAMI TRAIL, Milepost 6.409 to 6.626]

SafetyAnalyst

Accident Statistics Report

Jul 23, 2009

Disclaimer

This document is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its content or use thereof. This document does not constitute a standard, specification, or regulation.

The United States Government does not endorse products or manufacturers. Trade and manufacturers' names may appear in this document only because they are considered essential to the objective of the document.

Limited Warranty and Limitations of Remedies

This software product is provided "as-is," without warranty of any kind-either expressed or implied (but not limited to the implied warranties of merchantability and fitness for a particular purpose). The FHWA and distributor do not warrant that the functions contained in the software will meet the end-user's requirements or that the operation of the software will be uninterrupted and error-free.

Under no circumstances will the FHWA or the distributor be liable to the end-user for any damages or claimed lost profits, lost savings, or other incidental or consequential damages rising out of the use or inability to use the software (even if these organizations have been advised of the possibility of such damages), or for any claim by any other party.

Notice

The use and testing of the SafetyAnalyst software is being done strictly on a voluntary basis. In exchange for provision of SafetyAnalyst, the user agrees that the Federal Highway Administration (FHWA), U.S. Department of Transportation and any other agency of the Federal Government shall not be responsible for any errors, damage or other liability that may result from any and all use of the software, including installation and testing of the software. The user further agrees to hold the FHWA and the Federal Government harmless from any resulting liability. The user agrees that this hold harmless provision shall flow to any person to whom or any entity to which the user provides the SafetyAnalyst software. It is the user's full responsibility to inform any person to whom or any entity to which it provides the SafetyAnalyst software of this hold harmless provision.

Table of Contents

List of Tables

[Previous: Accident Statistics Report] [Table Of Contents]

1. Accident Statistics

This is a summary of the accident statistics associated with **Segment 3600**.
The dataset comment is "null".
The data set was created 2:23 AM.

Notes:
The summary includes a total of **1 Total Accidents** accidents spanning the years **2007** to **2007**.

The summary includes accidents that occur at the site between locations **6.409** to **6.626** inclusive.

The site subtype: **Seg/Rur; 2-lane**

The minimum accident frequency: **5.0**

The p-value: **0.1**

1.1 Accident Pattern Identification

Table 1. Accident Pattern Identification

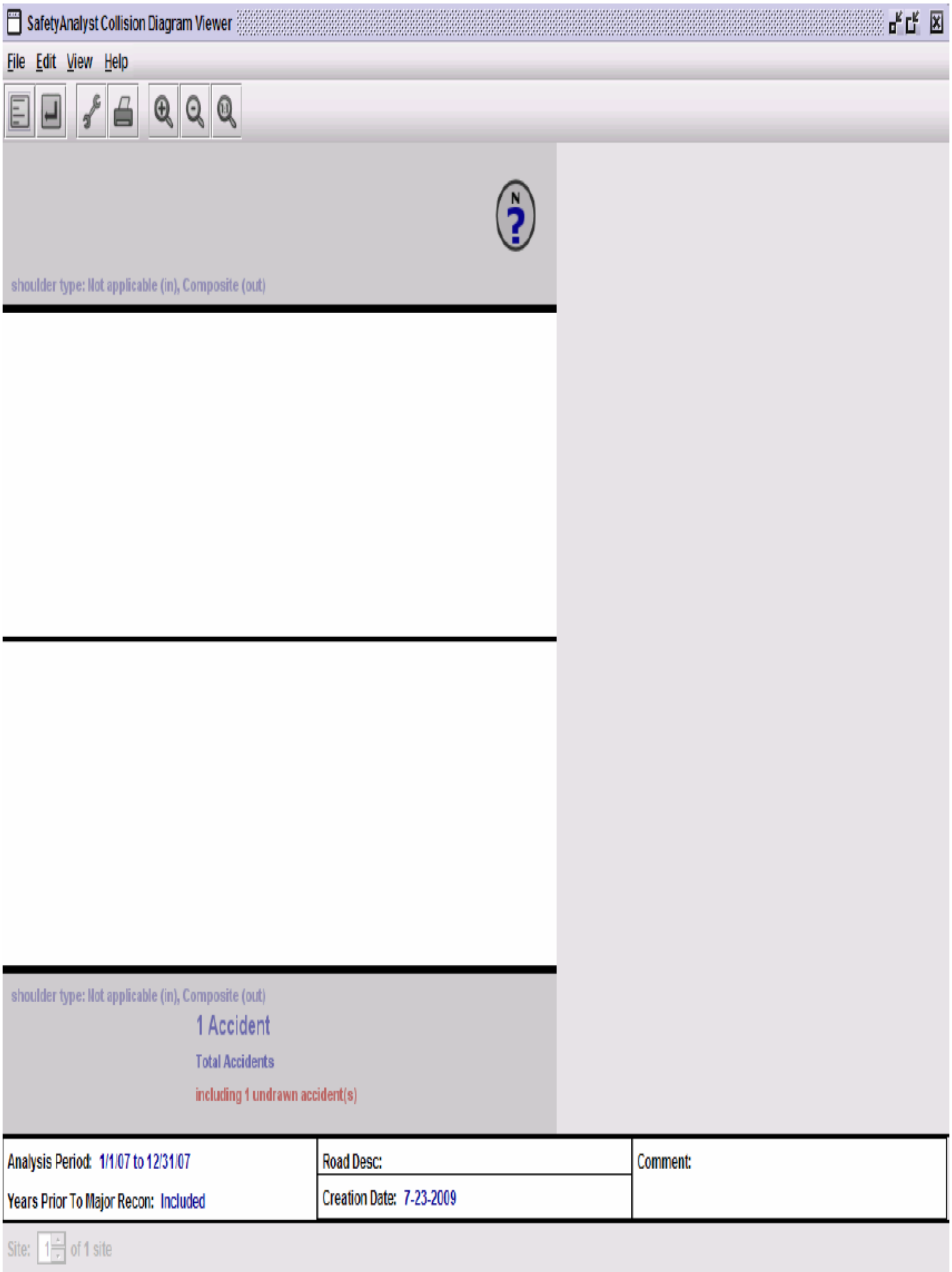
	Average Observed Accident Frequency	Average EB-Adjusted Accident Frequency	Observed Proportion (%)	Limiting Proportion (%)	Probability Observed Proportion Exceeds Limiting Proportion
All Accident Attributes					
Accident Month					
August	4.61	0.06	100.0	6.0	0.75
Accident Month TOTAL	4.61	0.06	100.0		
Accident Type and Manner of Collision					
Other multiple-vehicle collision	4.61	0.05	100.0	0.7	***0.94***
Accident Type and Manner of Collision TOTAL	4.61	0.05	100.0		
Day of Week					
Sunday	4.61	0.07	100.0	12.4	0.68
Day of Week TOTAL	4.61	0.07	100.0		
Vehicle Turning Movement					
No-turn	4.61	0.16	100.0	97.9	0.60
Vehicle Turning Movement TOTAL	4.61	0.16	100.0		

1.2 Summary Accident Data

Table 2. Summary Accident Data Used for Accident Pattern Identification

Accident Attribute	2007	Total	P(CT/TOT) %
Accident Month			
August	1	1	100.0
Accident Month TOTALS	1	1	100.0
Accident Type and Manner of Collision			
Other multiple-vehicle collision	1	1	100.0
Accident Type and Manner of Collision TOTALS	1	1	100.0
Day of Week			
Sunday	1	1	100.0
Day of Week TOTALS	1	1	100.0
Vehicle Turning Movement			
No-turn	1	1	100.0
Vehicle Turning Movement TOTALS	1	1	100.0

[Previous: Accident Statistics Report] [Top]


SafetyAnalyst Collision Diagram Viewer
File Edit View Help
N
shoulder type: Not applicable (in), Composite (out)
shoulder type: Not applicable (in), Composite (out)
1 Accident
Total Accidents
including 1 undrawn accident(s)
Analysis Period: 1/1/07 to 12/31/07
Years Prior To Major Recon: Included
Road Desc:
Creation Date: 7-23-2009
Comment:
Site: 1 of 1 site

SafetyAnalyst

Diagnosis and Countermeasure Selection Report

Jul 23, 2009

Disclaimer

This document is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its content or use thereof. This document does not constitute a standard, specification, or regulation.

The United States Government does not endorse products or manufacturers. Trade and manufacturers' names may appear in this document only because they are considered essential to the objective of the document.

Limited Warranty and Limitations of Remedies

This software product is provided "as-is," without warranty of any kind-either expressed or implied (but not limited to the implied warranties of merchantability and fitness for a particular purpose). The FHWA and distributor do not warrant that the functions contained in the software will meet the end-user's requirements or that the operation of the software will be uninterrupted and error-free.

Under no circumstances will the FHWA or the distributor be liable to the end-user for any damages or claimed lost profits, lost savings, or other incidental or consequential damages rising out of the use or inability to use the software (even if these organizations have been advised of the possibility of such damages), or for any claim by any other party.

Notice

The use and testing of the SafetyAnalyst software is being done strictly on a voluntary basis. In exchange for provision of SafetyAnalyst, the user agrees that the Federal Highway Administration (FHWA), U.S. Department of Transportation and any other agency of the Federal Government shall not be responsible for any errors, damage or other liability that may result from any and all use of the software, including installation and testing of the software. The user further agrees to hold the FHWA and the Federal Government harmless from any resulting liability. The user agrees that this hold harmless provision shall flow to any person to whom or any entity to which the user provides the SafetyAnalyst software. It is the user's full responsibility to inform any person to whom or any entity to which it provides the SafetyAnalyst software of this hold harmless provision.

Table of Contents

List of Tables

1. Report for Segment 3600

1.1 Site Summary

Roadway Segment
Segment ID: 3600
Internal Segment ID: S34
Route Number Display Value: ISR 90-TAMIAMI TRAIL
Site Subtype: Seg/Rur; 2-lane
Start Location: 6.409
End Location: 6.626
Next Roadway Segment ID: S35
Previous Roadway Segment ID: S33
Segment Length: 0.2170 miles
Terrain: Unknown
Roadway Class Level 1: Principal arterial-other
Roadway Class Level 2: Principal arterial-other rural
Roadway Class Level 3: Rural two-lane
Number of Through Lanes - Combined: 2
Median Type Level 1: Unknown
Median Type Level 2: Unknown
Access Control: No Access Control
Driveway Density: 550.0 driveways per mile
Growth Factor: 1.0500
Growth Factor Source: Specified
Maximum AADT: 16 vehicles per day
Speed Limit: 60 miles per hour
Two-Way vs. One-Way Operation: Unknown
Direction of Travel: Unknown
Direction of Increasing Mileposts or Distances: Unknown
Interchange Influence Area on Mainline Freeway: Unknown
Discontinuity: No
Number of Accidents: 1

Geographic Description
Identifier: G1
Route Name: SR 90-TAMIAMI TRAIL
Route Type: Interstate
County: 3
Jurisdiction: Unknown
Area Type: Rural

Table 1. 3600 Annual Traffic

Year	AADT	Heavy Vehicles	Peak or Design Volume	Volume Source	Comment
2005	15			Measured	
2006	15			Measured	
2007	16			Measured	

Table 2. 3600 Directional Attributes

Direction	Number of Through Lanes	Average Lane Width	Shoulder Type - Outside	Shoulder Type - Inside	Average Shoulder Width - Outside	Average Shoulder Width - Inside	Bikeway	Comment
Direction 1	1	12.00	Composite	Not applicable	2.00		Unknown	
Direction 2	1	12.00	Composite	Not applicable	2.00		Unknown	

1.2 Recommended Countermeasures

This section presents the countermeasures that were recommended in the evaluation of the scenarios for this site.

Table 3. Recommended Countermeasures

Countermeasure	Contraindication	Recommended By *	Accident Pattern(s)	Implemented
Improve pavement friction	Possibility of increased pavement deterioration; May increase dry road crashes	5, 62	All single-vehicle types	no
Maintain surface of lanes		5, 62	All single-vehicle types	no
Improve drainage patterns or structures		5, 62	All single-vehicle types	no
Raise standard for winter maintenance		62	All single-vehicle types	no
Apply preventive salting or chemical anti-icing		62	All single-vehicle types	no
Remove shoulder-edge drop-offs		3, 2, 1, 5, 4	All single-vehicle types	no
Widen clear zone		4	All single-vehicle types	no
Improve traversability of object		2, 4	All single-vehicle types	no
Flatten side slopes		2, 4	All single-vehicle types	no
Install continuous milled-in shoulder (or edgeline) rumble strips	Noise - should not be placed in vicinity of residences	3, 1	All single-vehicle types	no
Install centerline rumble strips	Noise - should not be placed in vicinity of residences	3, 1	All single-vehicle types	no
Install raised pavement markers (on roads with radius > 1640 and ADT between 15,001 to 20,000 vpd)		3, 1	All single-vehicle types	no
Flatten horizontal curve		3	All single-vehicle types	no
Install curve ahead warning signs		3	All single-vehicle types	no
Widen lane through curve		3	All single-vehicle types	no
Install transverse rumble strips	Noise - should not be placed in vicinity of residences	3	All single-vehicle types	no
Install transverse pavement markings	More effective for unfamiliar drivers	3	All single-vehicle types	no
Install chevrons		3	All single-vehicle types	no
Flatten crest vertical curve	May increase operating speeds	3	All single-vehicle types	no
Remove/restrict movements at access points		3	All single-vehicle types	no
Remove foliage		3	All single-vehicle types	no
Improve sight distance to access		3	All single-vehicle types	no
Obstruct line of sight to the former tangential alignment		3	All single-vehicle types	no
Widen lanes	Increase of lane width beyond 12 ft may increase crashes	1	All single-vehicle types	no
Improve visibility/retroreflectivity of pavement markings		1	All single-vehicle types	no

* A scenario ID ending in 'u' indicates the countermeasure was user-selected and is not a result of the diagnosis.

1.3 Potential Diagnoses

1.3.1 Diagnosis 1: Driver Inattention / Impairment

Accident Pattern: All single-vehicle types

Evaluation Status: Complete

Statement:
Single vehicle crashes, which are mostly run-off-road crashes, can occur due to driver inattention or impairment.

Rationale:
For experienced drivers, driving is a highly automated task which can lead to drivers being inattentive or allowing themselves to be distracted from the driving task. Inattention may occur due to drivers' preoccupation with internal thoughts, driver distraction due to the handling of food or drinks in the vehicle, due to cell phone use (whether hands-free or hand-held, the attentional distraction is the same), due to use of the radio or CD player, or due to being distracted by people, animals or other objects in the vehicle or along the roadside. While drivers' attention is elsewhere, inadvertent steering movements or lack of attention to the road path can lead to a run-off-road event. While distraction can occur anytime, sleepiness is very closely related to time of day. It is most prevalent between the hours of 2 am and 6 am, when risk of single vehicle crashes/mile driven increase dramatically. There is a secondary period of increased sleepiness, known as the post-lunch dip, between about 2 and 4 pm. If drivers have had insufficient sleep the previous night, whether due to shift work, or medical problems such as sleep apnea (affecting about 5% of the male population), they are more likely to fall asleep while driving at these times of the day and night. The use of alcohol, which is a sedative, can also contribute to impairment, as can many prescription and over-the-counter drugs.

Question:
Are run-off-road crashes widely distributed throughout the road section?
Answer:
Yes
Recommended CM:
Install continuous milled-in shoulder (or edgeline) rumble strips
Install centerline rumble strips

Question:
Are crashes occurring in sections where there are shoulder-edge drop-offs greater than 2 inches (5 cm)?
Answer:
Yes
Recommended CM:
Remove shoulder-edge drop-offs

Question:
Are the travel lanes less than 11 ft (3.4 m) wide?
Answer:
Yes
Recommended CM:
Widen lanes

Question:
Are traffic volumes greater than 5,000 veh/day?
Answer:
Yes
Recommended CM:
None

Question:
Do most curves have a radius more than 1640 ft (500 m)?
Answer:
Yes
Recommended CM:
Install raised pavement markers (on roads with radius > 1640 and ADT between 15,001 to 20,000 vpd)

Question:
Are crashes occurring at night darkness when the roadway surface is wet?
Answer:
Yes
Recommended CM:
Improve visibility/retroreflectivity of pavement markings

1.3.2 Diagnosis 2: Roadside Design

Accident Pattern: All single-vehicle types

Evaluation Status: Complete

Statement:
Single vehicle crashes, which are mostly run-off-road crashes, can occur when drivers leave their travel lane due to: driver fatigue or inattention, excessive speed, driving under the influence of drugs or alcohol, crash avoidance, roadway conditions, vehicle failure, and/or poor visibility, and encounter a roadside that is not clear from obstacles or forgiving to the errant vehicle.

Rationale:
For experienced drivers, driving is a highly automated task which can lead to drivers being inattentive or allowing themselves to be distracted from the driving task. While drivers' attention is elsewhere, inadvertent steering movements or lack of attention to the road path can lead to a run-off-road event. Avoidance maneuvers, poor road conditions, vehicle failure, unfamiliar road alignment, and weather conditions like snow, rain, or fog can also contribute to drivers unintentionally leaving the roadway. Once the vehicle has left the travel lane, a more forgiving roadside with a clear zone free of obstacles will minimize the possibility of crashing or overturning by providing the opportunity to recover control and return to the travel lane. If a roadside obstacle cannot be moved away from the roadside or be made to break away under the impact of a vehicle, the implementation of a barrier or crash attenuating system could be implemented to reduce the crash severity.

Question:
Are crashes occurring in sections where there are shoulder-edge drop-offs greater than 2 inches (5 cm)?
Answer:
Yes
Recommended CM:
Remove shoulder-edge drop-offs

Question:
Is the shoulder surface in a well-maintained state?
Answer:
Yes
Recommended CM:
None

Question:
Is the shoulder width consistent with design standards?
Answer:
Yes
Recommended CM:
None

Question:
Are there fixed objects located within the clear zone?
Answer:
Yes
Recommended CM:
None

Question:
Can the object be redesigned so that it can be safely traversed?
Answer:
Yes
Recommended CM:
Improve traversability of object

Question:
Do fill height and foreslope warrant barrier protection?
Answer:
Yes
Recommended CM:
None

Question:
Can the foreslopes be upgraded to eliminate the need for barrier?
Answer:
Yes
Recommended CM:
Flatten side slopes

1.3.3 Diagnosis 3: Speeds Too High / Unexpected Curvature / Poor Path Definition

Accident Pattern: All single-vehicle types

Attribute: Horizontal curve

Evaluation Status: Complete

Statement:
Single vehicle crashes, which are mostly run-off-road crashes, can occur when drivers are unprepared for a curve, whether due to inappropriately high approach speeds, or driver impairment and inattention, or the driver's expectation of the alignment based on the prior horizontal alignment on this roadway, or poor curve path definition.

Rationale:
Studies show that run-off-road crashes are four times more likely on curves than on tangents. A driver's mental and visual workload is greater in curves than on tangents, and the workload increases for sharper curves. Drivers sometimes fail to compensate for low friction road surfaces such as wet or icy pavement. Furthermore, drivers develop expectations about the upcoming horizontal alignment based on their recent experience with the roadway. Studies show that when a curve is unusually sharp for a given roadway, more crashes occur than when the same radius curve is encountered on a roadway where there are many such sharp curves and drivers are expecting them. Run-off-road crashes may also occur if the road path is poorly defined, especially at night and in poor weather.

Question:
Are run-off-road crashes widely distributed throughout the road section?
Answer:
Yes
Recommended CM:
Install continuous milled-in shoulder (or edgeline) rumble strips
Install centerline rumble strips

Question:
Are crashes occurring in sections where there are shoulder-edge drop-offs greater than 2 inches (5 cm)?
Answer:
Yes
Recommended CM:
Remove shoulder-edge drop-offs

Question:
Are traffic volumes greater than 5,000 veh/day?
Answer:
Yes
Recommended CM:
None

Question:
Do most curves have a radius more than 1640 ft (500 m)?
Answer:
Yes
Recommended CM:
Install raised pavement markers (on roads with radius > 1640 and ADT between 15,001 to 20,000 vpd)

Question:
Are run-off-road crashes clustered around particular curves?
Answer:
Yes
Recommended CM:
Flatten horizontal curve
Install curve ahead warning signs

Widen lane through curve
Install transverse rumble strips
Install transverse pavement markings

Question:
Do the curves in question have a deflection angle greater than 7 degrees?
Answer:
Yes
Recommended CM:
Install chevrons

Question:
Are crashes related to poor sight distance to accesses beyond the curves?
Answer:
Yes
Recommended CM:
Flatten horizontal curve
Flatten crest vertical curve
Remove/restrict movements at access points
Remove foliage
Improve sight distance to access

Question:
Is the curve at a location where there is evidence (i.e., a road with streetlights, telephone poles, signs, etc.) of a former tangential continuation, leading to drivers being surprised that the main road curves?
Answer:
Yes
Recommended CM:
Install curve ahead warning signs
Obstruct line of sight to the former tangential alignment
Install chevrons

1.3.4 Diagnosis 4: Roadside Design

Accident Pattern: All single-vehicle types

Attribute: Horizontal curve

Evaluation Status: Complete

Statement:
Single vehicle crashes, which are mostly run-off-road crashes, can occur when drivers are unprepared for a curve due to inappropriately high approach speeds (especially in wet or icy conditions), or driver impairment and inattention, or the driver's expectation of the alignment based on the prior horizontal alignment on this roadway, or poor curve path definition. Drivers who are unable to negotiate a horizontal curve will encroach onto the roadside where impacts with objects or features may occur. Studies show that run-off-road crashes are four times more likely on curves than on tangents. Roadsides along curves should be forgiving in nature so that errant vehicles have an opportunity to correct the errant maneuver in sufficient time to, ideally, regain control and avoid the crash, or at a minimum, reduce the severity of the crash.

Rationale:
For experienced drivers, driving is a highly automated task which can lead to drivers being inattentive or allowing themselves to be distracted from the driving task. While drivers' attention is elsewhere, inadvertent steering movements or lack of attention to the road path can lead to a run-off-road event. Avoidance maneuvers, poor road conditions, vehicle failure, unfamiliar road alignment, and weather conditions like snow, rain, or fog can also contribute to drivers unintentionally leaving the roadway. Once the vehicle has left the travel lane, a more forgiving roadside with a clear zone free of obstacles will minimize the possibility of crashing or overturning by providing the opportunity to recover control and return to the travel lane. If a roadside obstacle cannot be moved away from the roadside or be made to break away under the impact of a vehicle, the implementation of a barrier or crash attenuating system could be implemented to reduce the crash severity.

Question:
Are crashes occurring in sections where there are shoulder-edge drop-offs greater than 2 inches (5 cm)?
Answer:
Yes
Recommended CM:
Remove shoulder-edge drop-offs

Question:
Is the shoulder surface in a well-maintained state?
Answer:
Yes
Recommended CM:
None

Question:
Is the shoulder width consistent with design standards?
Answer:
Yes
Recommended CM:
None

Question:
Are there fixed objects located within the clear zone?
Answer:
Yes
Recommended CM:
Widen clear zone

Question:
Can the object be redesigned so that it can be safely traversed?
Answer:
Yes
Recommended CM:
Improve traversability of object

Question:
Do fill height and foreslope warrant barrier protection?
Answer:
Yes
Recommended CM:
None

Question:
Can the foreslopes be upgraded to eliminate the need for barrier?
Answer:
Yes
Recommended CM:
Flatten side slopes

1.3.5 Diagnosis 5: Road Surface Condition / Superelevation

Accident Pattern: All single-vehicle types

Attribute: Horizontal curve

Evaluation Status: Complete

Statement:
Single vehicle crashes, which are mostly run-off-road crashes, can occur when drivers are unable to negotiate a curve as intended due to low pavement skid resistance and roughness and/or insufficient superelevation. The reduced lateral friction between the vehicle tire and the road surface may cause the vehicle to skid or slide and leave the intended travel lane. Drivers who are unable to negotiate a horizontal curve will encroach onto the roadside where impacts with objects or features may occur.

Rationale:
Pavement that has deteriorated and no longer provides adequate lateral friction as a vehicle negotiates a turn can lead to an increase in single vehicle crashes. If sufficient superelevation is not provided, there is less force due to friction counteracting the effects of centripetal force as a vehicle begins to turn, thus leading to a higher potential of leaving the travel lane. Studies show that run-off-road crashes are four times more likely on curves than on tangents. A driver's mental and visual workload is greater on curves than on tangents, and the workload increases for sharper curves. When low pavement friction or insufficient

superelevation is combined with wet or icy conditions, high speeds, driver inattention or impairment, the risk for leaving the roadway along a curve increases.

Question:
Does the asphalt at the curve, where the target crashes were recorded, show noticeable signs of deterioration, water ponding, ice build-up, or look "polished" in appearance?
Answer:
Yes
Recommended CM:
Improve drainage patterns or structures
Improve pavement friction
Maintain surface of lanes

Question:
Are crashes occurring in sections where there are shoulder-edge drop-offs greater than 2 inches (5 cm)?
Answer:
Yes
Recommended CM:
Remove shoulder-edge drop-offs

Question:
Is the superelevation along the curve in accordance to design standards?
Answer:
Yes
Recommended CM:
None

1.3.6 Diagnosis 62: Road Surface Condition/Drainage

Accident Pattern: All single-vehicle types

Attribute: Wet weather

Evaluation Status: Complete

Statement:
Single-vehicle crashes can occur when drivers are unable to maneuver, slow or stop as intended due to poor pavement surface condition and/or water ponding on the roadway.

Rationale:
A pavement in poor condition may have reduced surface friction which can cause a vehicle to skid, slide, or require a longer stopping distance. Water accumulating or ponding on a roadway, particularly in the wheel path, may result in a vehicle hydroplaning (i.e., tires lose contact with road surface). If a driver fails to adjust their speed appropriately due to poor road surface conditions (e.g., if the surface is worn or rutted, particularly when wet or icy), the risk for leaving the roadway increases.

Question:
Does the asphalt on the segment show noticeable signs of deterioration or look "polished" in appearance?
Answer:
Yes
Recommended CM:
Improve pavement friction
Maintain surface of lanes

Question:
Is there water ponding or ice-buildup on the roadway or in the area of catch basins, culverts, or other drainage structures, which may be related to the crash type?
Answer:
Yes
Recommended CM:
Improve drainage patterns or structures
Raise standard for winter maintenance
Apply preventive salting or chemical anti-icing

Question:
Is the cross-fall a minimum of 2%?

Answer:
Yes
Recommended CM:
None

Question:
Is a minimum longitudinal grade of 0.5% provided?
Answer:
Yes
Recommended CM:
None

[Previous: Diagnosis and Countermeasure Selection Report] [Top] [Next: Descriptions for Recommended Procedures]

SafetyAnalyst

Economic Analysis

Jul 23, 2009

Table of Contents

List of Tables

[Previous: Economic Analysis] [Table Of Contents] [Next: Economic Appraisal]

1. Summary of Input Parameters

SafetyAnalyst: v3.0.0, packaged: Jun 30, 2009 3:37 PM on sa_dev.ittsystems.com
Data set title: Kemi
Data set comment: null
Data set created: Jul 23, 2009 2:23 AM

Economic Analyses and Priority Ranking started: Jul 23, 2009 3:46 AM.

Processing Parameters

Types of Economic Analyses Performed:
Cost-effectiveness

Ranking Criteria: Cost Effectiveness (based upon Total Accidents)
Countermeasures Listed for a Site by: Highest Ranked Countermeasure for each Site
Display Order: Standard Order

Years of Data Considered:
History Period: Available years (2007 - 2007)
Major Reconstruction: No major reconstruction occurred at any sites during the history period

Analysis Period:
Implementation Year: 2010
Years To Analyze: 20

Minimum Attractive Rate of Return (Percent): 4

Table 1. Site Countermeasures Data

ID	Site ID	Site Type	County	Route	Beginning Location	Ending Location	CM ID	CM Title	CM Start Location	CM End Location
1	3600	Segment	3	SR 90-TAMIAMI TRAIL	6.409	6.626	43	Remove/restrict movements at access points	6.409	6.626
2	3600	Segment	3	SR 90-TAMIAMI TRAIL	6.409	6.626	195	Improve drainage patterns or structures	6.409	6.626
3	3600	Segment	3	SR 90-TAMIAMI TRAIL	6.409	6.626	2	Flatten crest vertical curve	6.409	6.626
4	3600	Segment	3	SR 90-TAMIAMI TRAIL	6.409	6.626	3	Flatten horizontal curve	6.409	6.626
5	3600	Segment	3	SR 90-TAMIAMI TRAIL	6.409	6.626	46	Widen lane through curve	6.409	6.626
6	3600	Segment	3	SR 90-TAMIAMI TRAIL	6.409	6.626	47	Widen lanes	6.409	6.626
7	3600	Segment	3	SR 90-TAMIAMI TRAIL	6.409	6.626	8	Improve pavement friction	6.409	6.626
8	3600	Segment	3	SR 90-TAMIAMI TRAIL	6.409	6.626	37	Maintain surface of lanes	6.409	6.626
9	3600	Segment	3	SR 90-TAMIAMI TRAIL	6.409	6.626	196	Apply preventive salting or chemical anti-icing	6.409	6.626
10	3600	Segment	3	SR 90-TAMIAMI TRAIL	6.409	6.626	399	Raise standard for winter maintenance	6.409	6.626

User Input:
(1) Site ID= 3600; CM ID = 43; Category = access: Access Management; Title = Remove/restrict movements at access points; Service Life = 10; Unit Construction Cost = 2000.000; Construction Cost Units = site; Construction Cost Function = 1: Cost Per Site; Site ID = S34; ID = 3600; Start Location = A|I|SR 90-TAMIAMI TRAIL|6.409|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|6.409|; End Location = A|I|SR 90-TAMIAMI TRAIL|6.626|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|6.626|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 2000.000; Total Construction Cost Source = C: Calculated; AMF Total Before Condition = 0.000000; AMF Total After Condition = 0.000000; AMF FI Before Condition = 0.000000; AMF FI After Condition = 0.000000; AMF Total Final Condition = 0.950000; AMF FI Final Condition =

0.950000;

(2) Site ID= 3600; CM ID = 195; Category = drainage: Drainage; Title = Improve drainage patterns or structures; Service Life = 20; Unit Construction Cost = 300000.000; Construction Cost Units = CL mi; Construction Cost Function = 2: Cost Per Centerline Mile of Roadway; Site ID = S34; ID = 3600; Start Location = A|I|SR 90-TAMIAMI TRAIL|6.409|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|6.409|; End Location = A|I|SR 90-TAMIAMI TRAIL|6.626|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|6.626|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 65100.000; Total Construction Cost Source = C: Calculated; AMF Total Before Condition = 0.000000; AMF Total After Condition = 0.000000; AMF FI Before Condition = 0.000000; AMF FI After Condition = 0.000000; AMF Total Final Condition = 0.950000; AMF FI Final Condition = 0.950000;

(3) Site ID= 3600; CM ID = 2; Category = geometry: Geometry; Title = Flatten crest vertical curve; Service Life = 20; Unit Construction Cost = 700000.000; Construction Cost Units = site; Construction Cost Function = 1: Cost Per Site; Site ID = S34; ID = 3600; Start Location = A|I|SR 90-TAMIAMI TRAIL|6.409|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|6.409|; End Location = A|I|SR 90-TAMIAMI TRAIL|6.626|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|6.626|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 700000.000; Total Construction Cost Source = C: Calculated; AMF Total Before Condition = 0.000000; AMF Total After Condition = 0.000000; AMF FI Before Condition = 0.000000; AMF FI After Condition = 0.000000; AMF Total Final Condition = 0.950000; AMF FI Final Condition = 0.950000;

(4) Site ID= 3600; CM ID = 3; Category = geometry: Geometry; Title = Flatten horizontal curve; AMF Function = 5: Flatten Horizontal Curve; Service Life = 20; Unit Construction Cost = 700000.000; Construction Cost Units = site; Construction Cost Function = 1: Cost Per Site; Site ID = S34; ID = 3600; Start Location = A|I|SR 90-TAMIAMI TRAIL|6.409|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|6.409|; End Location = A|I|SR 90-TAMIAMI TRAIL|6.626|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|6.626|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 700000.000; Total Construction Cost Source = C: Calculated; AMF Total Final Condition = 0.950000; AMF Total Before Condition = 1.517419; AMF Total After Condition = 1.517419; AMF FI Final Condition = 0.950000; AMF FI Before Condition = 1.517419; AMF FI After Condition = 1.517419; Radius of existing curve (ft) = 100.000; Length of existing curve (mi) = 1.000; Is the existing curve a Spiral? = false; Radius of proposed curve (ft) = 100.000; Length of proposed curve (mi) = 1.000; Is the proposed curve a Spiral? = false;

(5) Site ID= 3600; CM ID = 46; Category = geometry: Geometry; Title = Widen lane through curve; Service Life = 20; Unit Construction Cost = 15000.000; Construction Cost Units = site; Construction Cost Function = 1: Cost Per Site; Site ID = S34; ID = 3600; Start Location = A|I|SR 90-TAMIAMI TRAIL|6.409|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|6.409|; End Location = A|I|SR 90-TAMIAMI TRAIL|6.626|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|6.626|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 15000.000; Total Construction Cost Source = C: Calculated; AMF Total Before Condition = 0.000000; AMF Total After Condition = 0.000000; AMF FI Before Condition = 0.000000; AMF FI After Condition = 0.000000; AMF Total Final Condition = 0.950000; AMF FI Final Condition = 0.950000;

(6) Site ID= 3600; CM ID = 47; Category = geometry: Geometry; Title = Widen lanes; Site Subtype Factor (TOT) = 1.000; Site Subtype Factor (FI) = 1.000; AMF Function = 2: Widen Lanes; Service Life = 20; Unit Construction Cost = 10.000; Construction Cost Units = sq ft; Construction Cost Function = 6: Cost Per Square Foot of Lane Widening; Site ID = S34; ID = 3600; Start Location = A|I|SR 90-TAMIAMI TRAIL|6.409|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|6.409|; End Location = A|I|SR 90-TAMIAMI TRAIL|6.626|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|6.626|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 0.000; Total Construction Cost Source = C: Calculated; AMF Total Final Condition = 0.950000; AMF Total Before Condition = 1.000000; AMF Total After Condition = 1.000000; AMF FI Final Condition = 0.950000; AMF FI Before Condition = 1.000000; AMF FI After Condition = 1.000000; Enable existing lane width for direction 1 = true; Enable existing lane width for direction 2 = true; Existing lane width for direction 1 = 12.000; Existing lane width for direction 2 = 12.000; Lane width of proposed improvement = 12.000; Enable the number of through lanes for direction 1 = true; Enable the number of through lanes for direction 2 = true; Number of through lanes for direction 1 = 1; Number of through lanes for direction 2 = 1; Collision Type = head_on: Head-on; Collision Type Severity = FI: Fatal and Injury; Collision Type = object: Collision with fixed object; Collision Type Severity = FI: Fatal and Injury; Collision Type = other_single_noncollision: Other single-vehicle non-collision; Collision Type Severity = FI: Fatal and Injury; Collision Type = overturn: Overturn; Collision Type Severity = FI: Fatal and Injury; Collision Type = sideswipe_opp_dir: Sideswipe, opposite direction; Collision Type Severity = FI: Fatal and Injury; Collision Type = sideswipe_same_dir: Sideswipe, same direction; Collision Type Severity = FI: Fatal and Injury; Collision Type = head_on: Head-on; Collision Type Severity = TOT: Total; Collision Type = object: Collision with fixed object; Collision Type Severity = TOT: Total; Collision Type = other_single_noncollision: Other single-vehicle non-collision; Collision Type Severity = TOT: Total; Collision Type = overturn: Overturn; Collision Type Severity = TOT: Total; Collision Type = sideswipe_opp_dir: Sideswipe, opposite direction; Collision Type Severity = TOT: Total; Collision Type = sideswipe_same_dir: Sideswipe, same direction; Collision Type Severity = TOT: Total;

(7) Site ID= 3600; CM ID = 8; Category = pavement: Pavement; Title = Improve pavement friction; AMF (TOT) = 0.760000; Service Life = 5; Unit Construction Cost = 5.000; Construction Cost Units = sq ft; Construction Cost Function = 4: Cost Per Square Foot of Traveled Way; Site ID = S34; ID = 3600; Start Location = A|I|SR 90-TAMIAMI TRAIL|6.409|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|6.409|; End Location = A|I|SR 90-TAMIAMI TRAIL|6.626|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|6.626|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 137491.200; Total Construction Cost Source = C: Calculated; AMF Total Final Condition = 0.950000; AMF Total Before Condition = 0.000000; AMF Total After Condition = 0.000000; AMF FI Before Condition = 0.000000; AMF FI After Condition = 0.000000; AMF FI Final Condition = 0.950000; Enable the number of auxiliary lanes for direction 1 = true; Enable the number of auxiliary lanes for direction 2 = true; Number of auxiliary lanes for direction 1 = 0; Number of auxiliary lanes for direction 2 = 0; Enable the number

of through lanes for direction 1 = true; Enable the number of through lanes for direction 2 = true; Number of through lanes for direction 1 = 1; Number of through lanes for direction 2 = 1; Enable existing lane width for direction 1 = true; Enable existing lane width for direction 2 = true; Existing lane width for direction 1 = 12.000; Existing lane width for direction 2 = 12.000;

(8) Site ID= 3600; CM ID = 37; Category = pavement: Pavement; Title = Maintain surface of lanes; Service Life = 10; Unit Construction Cost = 3.000; Construction Cost Units = sq ft; Construction Cost Function = 4: Cost Per Square Foot of Traveled Way; Site ID = S34; ID = 3600; Start Location = A|I|SR 90-TAMIAMI TRAIL|6.409|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|6.409|; End Location = A|I|SR 90-TAMIAMI TRAIL|6.626|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|6.626|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 82494.720; Total Construction Cost Source = C: Calculated; AMF Total Before Condition = 0.000000; AMF Total After Condition = 0.000000; AMF FI Before Condition = 0.000000; AMF FI After Condition = 0.000000; AMF Total Final Condition = 0.950000; AMF FI Final Condition = 0.950000; Enable the number of auxiliary lanes for direction 1 = true; Enable the number of auxiliary lanes for direction 2 = true; Number of auxiliary lanes for direction 1 = 0; Number of auxiliary lanes for direction 2 = 0; Enable the number of through lanes for direction 1 = true; Enable the number of through lanes for direction 2 = true; Number of through lanes for direction 1 = 1; Number of through lanes for direction 2 = 1; Enable existing lane width for direction 1 = true; Enable existing lane width for direction 2 = true; Existing lane width for direction 1 = 12.000; Existing lane width for direction 2 = 12.000;

(9) Site ID= 3600; CM ID = 196; Category = pavement: Pavement; Title = Apply preventive salting or chemical anti-icing; AMF (FI) = 0.980000; Service Life = 1; Unit Construction Cost = 1000.000; Construction Cost Units = LN mi; Construction Cost Function = 3: Cost Per Lane Mile of TraveledWay; Site ID = S34; ID = 3600; Start Location = A|I|SR 90-TAMIAMI TRAIL|6.409|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|6.409|; End Location = A|I|SR 90-TAMIAMI TRAIL|6.626|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|6.626|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 434.000; Total Construction Cost Source = C: Calculated; AMF Total Before Condition = 0.000000; AMF Total After Condition = 0.000000; AMF FI Final Condition = 0.950000; AMF FI Before Condition = 0.000000; AMF FI After Condition = 0.000000; AMF Total Final Condition = 0.950000; Enable the number of auxiliary lanes for direction 1 = true; Enable the number of auxiliary lanes for direction 2 = true; Number of auxiliary lanes for direction 1 = 0; Number of auxiliary lanes for direction 2 = 0; Enable the number of through lanes for direction 1 = true; Enable the number of through lanes for direction 2 = true; Number of through lanes for direction 1 = 1; Number of through lanes for direction 2 = 1;

(10) Site ID= 3600; CM ID = 399; Category = pavement: Pavement; Title = Raise standard for winter maintenance; AMF (FI) = 0.990000; Service Life = 1; Unit Construction Cost = 1000.000; Construction Cost Units = CL mi; Construction Cost Function = 2: Cost Per Centerline Mile of Roadway; Site ID = S34; ID = 3600; Start Location = A|I|SR 90-TAMIAMI TRAIL|6.409|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|6.409|; End Location = A|I|SR 90-TAMIAMI TRAIL|6.626|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|6.626|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 217.000; Total Construction Cost Source = C: Calculated; AMF Total Before Condition = 0.000000; AMF Total After Condition = 0.000000; AMF FI Final Condition = 0.950000; AMF FI Before Condition = 0.000000; AMF FI After Condition = 0.000000; AMF Total Final Condition = 0.950000;

[Previous: Economic Analysis] [Top] [Next: Economic Appraisal]

SafetyAnalyst

Accident Summary for Route ISR 90-TAMIAMI TRAIL, Milepost 4.704 to 4.889 (Segment 2700)

Jul 23, 2009

Disclaimer

Limited Warranty and Limitations of Remedies

Notice

Table of Contents

List of Tables

[Previous: Accident Summary for Route ISR 90-TAMIAMI TRAIL, Milepost 4.704 to 4.889 (Segment 2700)] [Table Of Contents] [Next: Route ISR 90-TAMIAMI TRAIL, Milepost 4.704 to 4.889]

1. Accident Summary

This is a summary of the accident data associated with the following Segment from the **Kemi** data set, created on 2:23 AM:

Route ISR 90-TAMIAMI TRAIL, Milepost 4.704 to 4.889 (Segment 2700)

The details for this site are listed in the next section.

Notes:
The summary includes **1 Total Accidents** spanning the dates **1/1/2007** to **12/31/2007**.

Dates excluded from the summary period due to major reconstruction: **option not selected when specifying the analysis period.**

The summary includes accidents that occur at the site between locations **4.704** to **4.889** inclusive.

Generated by Diagnosis and Countermeasure Selection Module

1.1 Accident Month

The month in which the accident occurred.

Table 1. Accident Month

Description	2007	Total	Observed Percent	Average Percent
August	1	1	100	6
Total Accidents	1	1	100	100

1.2 Accident Severity Level 1

The severity of the accident based on the most severe injury to any person involved.

Table 2. Accident Severity Level 1

Description	2007	Total	Observed Percent	Average Percent
Non-Incapacitating Injury	1	1	100	N/A
Total Accidents	1	1	100	N/A

1.3 Accident Time of Day

The time (hour and minute) at which the accident occurred.

Table 3. Accident Time of Day

Description	2007	Total	Observed Percent	Average Percent
1:00 pm to 1:59 pm	1	1	100	N/A
Total Accidents	1	1	100	N/A

1.4 Accident Type and Manner of Collision

The type of first harmful event in a single-vehicle accident or, in a multiple-vehicle collision, manner in which two vehicles in transport initially came together without regard to the direction of force, or the type of object with which a single vehicle collided.

Table 4. Accident Type and Manner of Collision

Description	2007	Total	Observed Percent	Average Percent
Sideswipe, same direction	1	1	100	1
Total Accidents	1	1	100	100

1.5 Alcohol/Drug Involvement

The investigating police officer's assessment of whether alcohol or drug use was suspected or demonstrated to be present by test for any vehicle driver or non-motorist in the accident.

Table 5. Alcohol/Drug Involvement

Description	2007	Total	Observed Percent	Average Percent
Neither alcohol nor other drugs	1	1	100	0
Total Accidents	1	1	100	100

1.6 Bicycle Indicator

Indicates whether a bicycle was involved in the accident.

Table 6. Bicycle Indicator

Description	2007	Total	Observed Percent	Average Percent
Unknown	1	1	100	N/A
Total Accidents	1	1	100	N/A

1.7 Contributing Circumstances, Environment

Apparent environmental conditions which contributed to the accident.

Table 7. Contributing Circumstances, Environment

Description	2007	Total	Observed Percent	Average Percent
Unknown	1	1	100	0
Total Accidents	1	1	100	100

1.8 Contributing Circumstances, Road

Apparent conditions of the road which contributed to the accident.

Table 8. Contributing Circumstances, Road

Description	2007	Total	Observed Percent	Average Percent
Unknown	1	1	100	71
Total Accidents	1	1	100	100

1.9 Day of Week

The day of the week on which the accident occurred.

Table 9. Day of Week

Description	2007	Total	Observed Percent	Average Percent
Monday	1	1	100	13
Total Accidents	1	1	100	100

1.10 Driver Age

The value of this item is the driver age, in years, at the time of the accident. The value of this item is calculated during data set post processing.

Table 10. Driver Age in Years

Description	2007	Total	Observed Percent	Average Percent
Unknown	1	1	100	N/A
Total Vehicles	1	1	100	N/A

1.11 Driveway Indicator

Indicates if the accident occurred at or near a driveway junction.

Table 11. Driveway Indicator

Description	2007	Total	Observed Percent	Average Percent
No	1	1	100	100
Total Accidents	1	1	100	100

1.12 First Harmful Event

The first injury or damage-producing event that characterizes the accident type.

Table 12. First Harmful Event

Description	2007	Total	Observed Percent	Average Percent
Ditch	1	1	50	N/A
Unknown	1	1	50	N/A
Total Vehicles	2	2	100	N/A

1.13 Initial Direction of Travel

The direction of a vehicle's normal, general travel on the roadway before the accident. Notice that this is not a compass direction but a direction consistent with the designated direction of the road. For example, the direction of a state designated north-south highway must be either northbound or southbound even though a vehicle may have been traveling due east as a result of a short segment of the highway having an east-west orientation.

Table 13. Initial Direction of Travel

Description	2007	Total	Observed Percent	Average Percent
Westbound	1	1	50	N/A
Unknown	1	1	50	N/A
Total Vehicles	2	2	100	N/A

1.14 Light Condition

The type/level of lighting that existed at the time of the accident.

Table 14. Light Condition

Description	2007	Total	Observed Percent	Average Percent
Daylight	1	1	100	44
Total Accidents	1	1	100	100

1.15 Number of Vehicles Involved

The count of motor vehicles (e.g., automobiles, single-unit trucks, truck combinations that are in motion or on a roadway) involved in the accident. (Note: Parked vehicles are not included in this vehicle count, nor are bicycles and pedestrians.)

Table 15. Number of Vehicles Involved

Description	2007	Total	Observed Percent	Average Percent
2 Vehicles	1	1	100	N/A
Total Accidents	1	1	100	N/A

1.16 Pedestrian Indicator

Indicates whether a pedestrian was involved in the accident.

Table 16. Pedestrian Indicator

Description	2007	Total	Observed Percent	Average Percent
Unknown	1	1	100	N/A
Total Accidents	1	1	100	N/A

1.17 Relationship to Junction

Identifies the type of related cross street to the accident site. Definitions vary across states. For compatibility with the structure of SafetyAnalyst, a recoding that differs from MMUCC is recommended. Some distinctions that MMUCC tries to make in this field will instead be made in site characteristics data in SafetyAnalyst.

Table 17. Relationship to Junction

Description	2007	Total	Observed Percent	Average Percent
Non-junction	1	1	100	N/A
Total Accidents	1	1	100	N/A

1.18 Roadway Surface Condition

The roadway surface condition at the time and place of the accident.

Table 18. Roadway Surface Condition

Description	2007	Total	Observed Percent	Average Percent
Dry	1	1	100	71
Total Accidents	1	1	100	100

1.19 Run-Off Road Indicator

Indicates whether any vehicle involved in the accident ran off the roadway.

Table 19. Run-Off Road Indicator

Description	2007	Total	Observed Percent	Average Percent
Unknown	1	1	100	N/A
Total Accidents	1	1	100	N/A

1.20 School Bus Related

Indicates if a school bus or vehicle functioning as a school bus for a school-related purpose was involved in the accident. The school bus, with or without a passenger on board, must be directly involved as a contact vehicle or indirectly involved as a non-contact vehicle.

Table 20. School Bus Related

Description	2007	Total	Observed Percent	Average Percent
Unknown	1	1	100	0
Total Accidents	1	1	100	100

1.21 Tow-Away Indicator

Indicates whether any vehicle involved in the accident was towed away from the scene.

Table 21. Tow-Away Indicator

Description	2007	Total	Observed Percent	Average Percent
No	1	1	100	0
Total Accidents	1	1	100	100

1.22 Vehicle Configuration

Indicates the general configuration of the vehicle.

Table 22. Vehicle Configuration

Description	2007	Total	Observed Percent	Average Percent
Passenger car	1	1	50	N/A
Unknown vehicle configuration	1	1	50	N/A
Total Vehicles	2	2	100	N/A

1.23 Vehicle Maneuver/Action

The controlled maneuver that the vehicle was doing prior to the first event in the sequence of events for this vehicle.

Table 23. Vehicle Maneuver/Action

Description	2007	Total	Observed Percent	Average Percent
Movements essentially straight ahead	1	1	50	N/A
Unknown	1	1	50	N/A
Total Vehicles	2	2	100	N/A

1.24 Vehicle Turning Movement

Characterization of multiple vehicle accidents where any involved vehicle was performing a turning maneuver prior to impact. Any left turn maneuver or U-turn maneuver will take precedence over any right turn maneuver. For example, if Vehicle 1 made a left turn and Vehicle 2 made a right turn, then this data item will be classified as a left turn accident. Even though the first level of this data element is labeled Left turn, the left turn category also includes U-turn accidents.

Table 24. Vehicle Turning Movement

Description	2007	Total	Observed Percent	Average Percent
No-turn	1	1	100	98
Total Accidents	1	1	100	100

1.25 Weather Condition

The main prevailing atmospheric conditions that existed at the time of the accident.

Table 25. Weather Condition

Description	2007	Total	Observed Percent	Average Percent
Clear	1	1	100	0
Total Accidents	1	1	100	100

1.26 Work Zone Related

Indicates whether the accident occurred in or near a construction, maintenance, or utility work zone, whether workers were actually present at the time of the accident or not. Work zone related accidents include those involving vehicles slowed or stopped because of the work zone, even if the first harmful event was before the first warning sign. MMUCC has additional subfields related to this data item that are not included in this format.

Table 26. Work Zone Related

Description	2007	Total	Observed Percent	Average Percent
No	1	1	100	0
Total Accidents	1	1	100	100

[Previous: Accident Summary for Route ISR 90-TAMIAMI TRAIL, Milepost 4.704 to 4.889 (Segment 2700)] [Top] [Next: Route ISR 90-TAMIAMI TRAIL, Milepost 4.704 to 4.889]

SafetyAnalyst

Accident Statistics Report

Jul 23, 2009

Table of Contents

List of Tables

Disclaimer

This document is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its content or use thereof. This document does not constitute a standard, specification, or regulation.

The United States Government does not endorse products or manufacturers. Trade and manufacturers' names may appear in this document only because they are considered essential to the objective of the document.

Limited Warranty and Limitations of Remedies

This software product is provided "as-is," without warranty of any kind-either expressed or implied (but not limited to the implied warranties of merchantability and fitness for a particular purpose). The FHWA and distributor do not warrant that the functions contained in the software will meet the end-user's requirements or that the operation of the software will be uninterrupted and error-free.

Under no circumstances will the FHWA or the distributor be liable to the end-user for any damages or claimed lost profits, lost savings, or other incidental or consequential damages rising out of the use or inability to use the software (even if these organizations have been advised of the possibility of such damages), or for any claim by any other party.

Notice

The use and testing of the SafetyAnalyst software is being done strictly on a voluntary basis. In exchange for provision of SafetyAnalyst, the user agrees that the Federal Highway Administration (FHWA), U.S. Department of Transportation and any other agency of the Federal Government shall not be responsible for any errors, damage or other liability that may result from any and all use of the software, including installation and testing of the software. The user further agrees to hold the FHWA and the Federal Government harmless from any resulting liability. The user agrees that this hold harmless provision shall flow to any person to whom or any entity to which the user provides the SafetyAnalyst software. It is the user's full responsibility to inform any person to whom or any entity to which it provides the SafetyAnalyst software of this hold harmless provision.

[Previous: Accident Statistics Report]   [Table Of Contents]

1. Accident Statistics

This is a summary of the accident statistics associated with **Segment 2700**.
The dataset comment is "null".
The data set was created 2:23 AM.

Notes:
The summary includes a total of **1 Total Accidents** accidents spanning the years **2007** to **2007**.

The summary includes accidents that occur at the site between locations **4.704** to **4.889** inclusive.

The site subtype: **Seg/Rur; 2-lane**

The minimum accident frequency: **5.0**

The p-value: **0.1**

1.1 Accident Pattern Identification

Table 1. Accident Pattern Identification

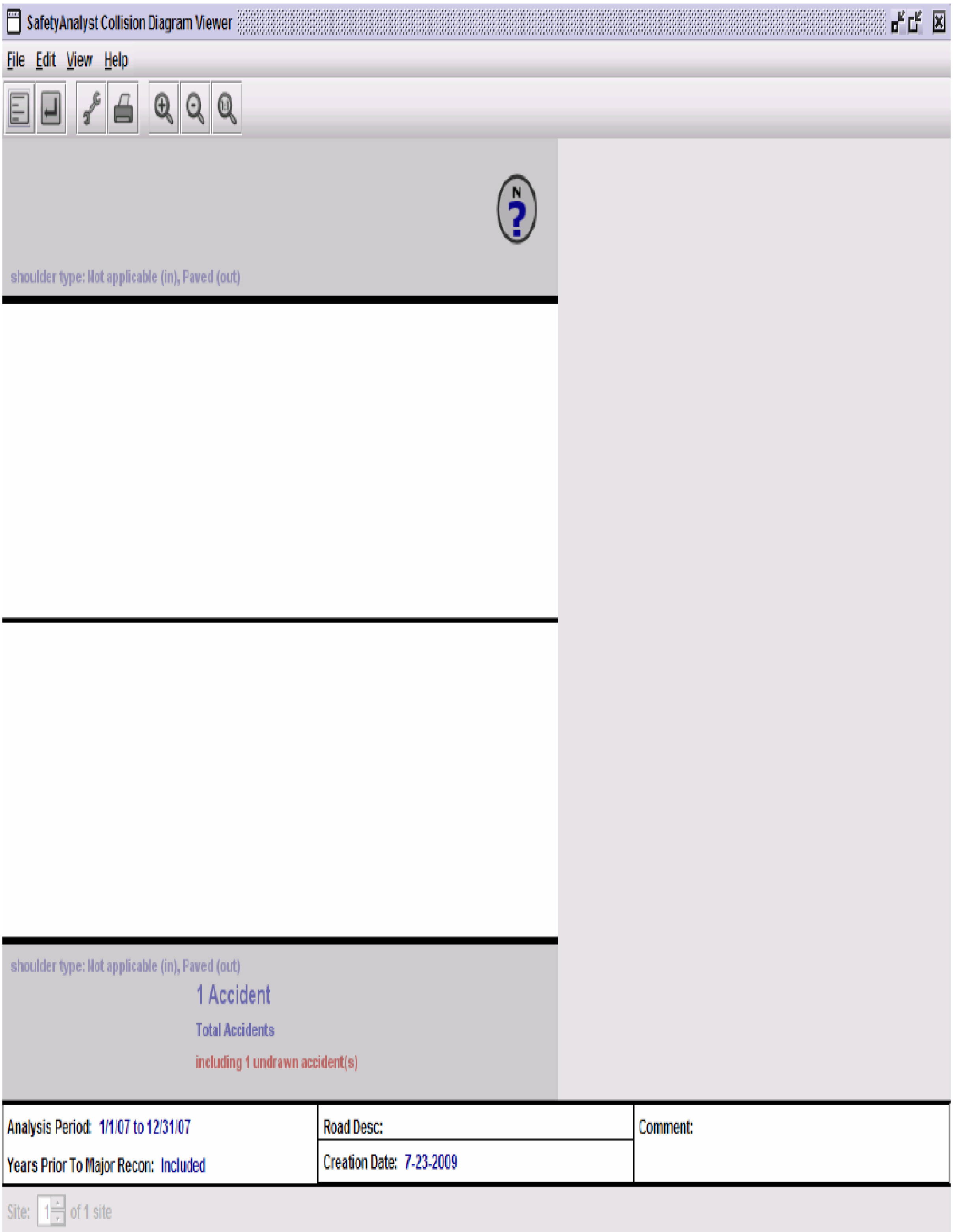
	Average Observed Accident Frequency	Average EB-Adjusted Accident Frequency	Observed Proportion (%)	Limiting Proportion (%)	Probability Observed Proportion Exceeds Limiting Proportion
All Accident Attributes					
Accident Month					
August	***5.41***	0.12	100.0	6.0	0.75
Accident Month TOTAL	***5.41***	0.12	100.0		
Accident Type and Manner of Collision					
Sideswipe, same direction	***5.41***	0.11	100.0	1.5	0.85
Accident Type and Manner of Collision TOTAL	***5.41***	0.11	100.0		
Day of Week					
Monday	***5.41***	0.13	100.0	13.4	0.67
Day of Week TOTAL	***5.41***	0.13	100.0		
Vehicle Turning Movement					
No-turn	***5.41***	0.31	100.0	97.9	0.60
Vehicle Turning Movement TOTAL	***5.41***	0.31	100.0		

1.2 Summary Accident Data

Table 2. Summary Accident Data Used for Accident Pattern Identification

Accident Attribute	2007	Total	P(CT/TOT) %
Accident Month			
August	1	1	100.0
Accident Month TOTALS	1	1	100.0
Accident Type and Manner of Collision			
Sideswipe, same direction	1	1	100.0
Accident Type and Manner of Collision TOTALS	1	1	100.0
Day of Week			
Monday	1	1	100.0
Day of Week TOTALS	1	1	100.0
Vehicle Turning Movement			
No-turn	1	1	100.0
Vehicle Turning Movement TOTALS	1	1	100.0

[Previous: Accident Statistics Report] [Top]


SafetyAnalyst Collision Diagram Viewer
File Edit View Help
N
shoulder type: Not applicable (in), Paved (out)
shoulder type: Not applicable (in), Paved (out)
1 Accident
Total Accidents
including 1 undrawn accident(s)
Analysis Period: 1/1/07 to 12/31/07
Years Prior To Major Recon: Included
Road Desc:
Creation Date: 7-23-2009
Comment:
Site: 1 of 1 site

SafetyAnalyst

Diagnosis and Countermeasure Selection Report

Jul 23, 2009

Table of Contents

List of Tables

1. Report for Segment 2700

1.1 Site Summary

Roadway Segment
Segment ID: 2700
Internal Segment ID: S25
Route Number Display Value: ISR 90-TAMIAMI TRAIL
Site Subtype: Seg/Rur; 2-lane
Start Location: 4.704
End Location: 4.889
Next Roadway Segment ID: S26
Previous Roadway Segment ID: S24
Segment Length: 0.1850 miles
Terrain: Unknown
Roadway Class Level 1: Principal arterial-other
Roadway Class Level 2: Principal arterial-other rural
Roadway Class Level 3: Rural two-lane
Number of Through Lanes - Combined: 2
Median Type Level 1: Unknown
Median Type Level 2: Unknown
Access Control: No Access Control
Driveway Density: 550.0 driveways per mile
Growth Factor: 1.0500
Growth Factor Source: Specified
Maximum AADT: 60 vehicles per day
Speed Limit: 60 miles per hour
Two-Way vs. One-Way Operation: Unknown
Direction of Travel: Unknown
Direction of Increasing Mileposts or Distances: Unknown
Interchange Influence Area on Mainline Freeway: Unknown
Discontinuity: No
Number of Accidents: 1

Geographic Description
Identifier: G1
Route Name: SR 90-TAMIAMI TRAIL
Route Type: Interstate
County: 3
Jurisdiction: Unknown
Area Type: Rural

Table 1. 2700 Annual Traffic

Year	AADT	Heavy Vehicles	Peak or Design Volume	Volume Source	Comment
2005	54			Measured	
2006	57			Measured	
2007	60			Measured	

Table 2. 2700 Directional Attributes

Direction	Number of Through Lanes	Average Lane Width	Shoulder Type - Outside	Shoulder Type - Inside	Average Shoulder Width - Outside	Average Shoulder Width - Inside	Bikeway	Comment
Direction 1	1	12.00	Paved	Not applicable	2.00		Unknown	
Direction 2	1	12.00	Paved	Not applicable	2.00		Unknown	

1.2 Recommended Countermeasures

This section presents the countermeasures that were recommended in the evaluation of the scenarios for this site.

Table 3. Recommended Countermeasures

Countermeasure	Contraindication	Recommended By *	Accident Pattern(s)	Implemented
Improve pavement friction	Possibility of increased pavement deterioration; May increase dry road crashes	5, 62	All single-vehicle types	no
Maintain surface of lanes		5, 62	All single-vehicle types	no
Improve drainage patterns or structures		5, 62	All single-vehicle types	no
Raise standard for winter maintenance		62	All single-vehicle types	no
Apply preventive salting or chemical anti-icing		62	All single-vehicle types	no
Remove shoulder-edge drop-offs		3, 2, 1, 5, 4	All single-vehicle types	no
Widen clear zone		4	All single-vehicle types	no
Improve traversability of object		2, 4	All single-vehicle types	no
Flatten side slopes		2, 4	All single-vehicle types	no
Install continuous milled-in shoulder (or edgeline) rumble strips	Noise - should not be placed in vicinity of residences	3, 1	All single-vehicle types	no
Install centerline rumble strips	Noise - should not be placed in vicinity of residences	3, 1	All single-vehicle types	no
Install raised pavement markers (on roads with radius > 1640 and ADT between 15,001 to 20,000 vpd)		3, 1	All single-vehicle types	no
Flatten horizontal curve		3	All single-vehicle types	no
Install curve ahead warning signs		3	All single-vehicle types	no
Widen lane through curve		3	All single-vehicle types	no
Install transverse rumble strips	Noise - should not be placed in vicinity of residences	3	All single-vehicle types	no
Install transverse pavement markings	More effective for unfamiliar drivers	3	All single-vehicle types	no
Install chevrons		3	All single-vehicle types	no
Flatten crest vertical curve	May increase operating speeds	3	All single-vehicle types	no
Remove/restrict movements at access points		3	All single-vehicle types	no
Remove foliage		3	All single-vehicle types	no
Improve sight distance to access		3	All single-vehicle types	no
Obstruct line of sight to the former tangential alignment		3	All single-vehicle types	no
Widen lanes	Increase of lane width beyond 12 ft may increase crashes	1	All single-vehicle types	no
Improve visibility/retroreflectivity of pavement markings		1	All single-vehicle types	no

* A scenario ID ending in 'u' indicates the countermeasure was user-selected and is not a result of the diagnosis.

1.3 Potential Diagnoses

1.3.1 Diagnosis 1: Driver Inattention / Impairment

Accident Pattern: All single-vehicle types

Evaluation Status: Complete

Statement:
Single vehicle crashes, which are mostly run-off-road crashes, can occur due to driver inattention or impairment.

Rationale:
For experienced drivers, driving is a highly automated task which can lead to drivers being inattentive or allowing themselves to be distracted from the driving task. Inattention may occur due to drivers' preoccupation with internal thoughts, driver distraction due to the handling of food or drinks in the vehicle, due to cell phone use (whether hands-free or hand-held, the attentional distraction is the same), due to use of the radio or CD player, or due to being distracted by people, animals or other objects in the vehicle or along the roadside. While drivers' attention is elsewhere, inadvertent steering movements or lack of attention to the road path can lead to a run-off-road event. While distraction can occur anytime, sleepiness is very closely related to time of day. It is most prevalent between the hours of 2 am and 6 am, when risk of single vehicle crashes/mile driven increase dramatically. There is a secondary period of increased sleepiness, known as the post-lunch dip, between about 2 and 4 pm. If drivers have had insufficient sleep the previous night, whether due to shift work, or medical problems such as sleep apnea (affecting about 5% of the male population), they are more likely to fall asleep while driving at these times of the day and night. The use of alcohol, which is a sedative, can also contribute to impairment, as can many prescription and over-the-counter drugs.

Question:
Are run-off-road crashes widely distributed throughout the road section?
Answer:
Yes
Recommended CM:
Install continuous milled-in shoulder (or edgeline) rumble strips
Install centerline rumble strips

Question:
Are crashes occurring in sections where there are shoulder-edge drop-offs greater than 2 inches (5 cm)?
Answer:
Yes
Recommended CM:
Remove shoulder-edge drop-offs

Question:
Are the travel lanes less than 11 ft (3.4 m) wide?
Answer:
Yes
Recommended CM:
Widen lanes

Question:
Are traffic volumes greater than 5,000 veh/day?
Answer:
Yes
Recommended CM:
None

Question:
Do most curves have a radius more than 1640 ft (500 m)?
Answer:
Yes
Recommended CM:
Install raised pavement markers (on roads with radius > 1640 and ADT between 15,001 to 20,000 vpd)

Question:
Are crashes occurring at night darkness when the roadway surface is wet?
Answer:
Yes
Recommended CM:
Improve visibility/retroreflectivity of pavement markings

1.3.2 Diagnosis 2: Roadside Design

Accident Pattern: All single-vehicle types

Evaluation Status: Complete

Statement:
Single vehicle crashes, which are mostly run-off-road crashes, can occur when drivers leave their travel lane due to: driver fatigue or inattention, excessive speed, driving under the influence of drugs or alcohol, crash avoidance, roadway conditions, vehicle failure, and/or poor visibility, and encounter a roadside that is not clear from obstacles or forgiving to the errant vehicle.

Rationale:
For experienced drivers, driving is a highly automated task which can lead to drivers being inattentive or allowing themselves to be distracted from the driving task. While drivers' attention is elsewhere, inadvertent steering movements or lack of attention to the road path can lead to a run-off-road event. Avoidance maneuvers, poor road conditions, vehicle failure, unfamiliar road alignment, and weather conditions like snow, rain, or fog can also contribute to drivers unintentionally leaving the roadway. Once the vehicle has left the travel lane, a more forgiving roadside with a clear zone free of obstacles will minimize the possibility of crashing or overturning by providing the opportunity to recover control and return to the travel lane. If a roadside obstacle cannot be moved away from the roadside or be made to break away under the impact of a vehicle, the implementation of a barrier or crash attenuating system could be implemented to reduce the crash severity.

Question:
Are crashes occurring in sections where there are shoulder-edge drop-offs greater than 2 inches (5 cm)?
Answer:
Yes
Recommended CM:
Remove shoulder-edge drop-offs

Question:
Is the shoulder surface in a well-maintained state?
Answer:
Yes
Recommended CM:
None

Question:
Is the shoulder width consistent with design standards?
Answer:
Yes
Recommended CM:
None

Question:
Are there fixed objects located within the clear zone?
Answer:
Yes
Recommended CM:
None

Question:
Can the object be redesigned so that it can be safely traversed?
Answer:
Yes
Recommended CM:
Improve traversability of object

Question:
Do fill height and foreslope warrant barrier protection?
Answer:
Yes
Recommended CM:
None

Question:
Can the foreslopes be upgraded to eliminate the need for barrier?
Answer:
Yes
Recommended CM:
Flatten side slopes

1.3.3 Diagnosis 3: Speeds Too High / Unexpected Curvature / Poor Path Definition

Accident Pattern: All single-vehicle types

Attribute: Horizontal curve

Evaluation Status: Complete

Statement:
Single vehicle crashes, which are mostly run-off-road crashes, can occur when drivers are unprepared for a curve, whether due to inappropriately high approach speeds, or driver impairment and inattention, or the driver's expectation of the alignment based on the prior horizontal alignment on this roadway, or poor curve path definition.

Rationale:
Studies show that run-off-road crashes are four times more likely on curves than on tangents. A driver's mental and visual workload is greater in curves than on tangents, and the workload increases for sharper curves. Drivers sometimes fail to compensate for low friction road surfaces such as wet or icy pavement. Furthermore, drivers develop expectations about the upcoming horizontal alignment based on their recent experience with the roadway. Studies show that when a curve is unusually sharp for a given roadway, more crashes occur than when the same radius curve is encountered on a roadway where there are many such sharp curves and drivers are expecting them. Run-off-road crashes may also occur if the road path is poorly defined, especially at night and in poor weather.

Question:
Are run-off-road crashes widely distributed throughout the road section?
Answer:
Yes
Recommended CM:
Install continuous milled-in shoulder (or edgeline) rumble strips
Install centerline rumble strips

Question:
Are crashes occurring in sections where there are shoulder-edge drop-offs greater than 2 inches (5 cm)?
Answer:
Yes
Recommended CM:
Remove shoulder-edge drop-offs

Question:
Are traffic volumes greater than 5,000 veh/day?
Answer:
Yes
Recommended CM:
None

Question:
Do most curves have a radius more than 1640 ft (500 m)?
Answer:
Yes
Recommended CM:
Install raised pavement markers (on roads with radius > 1640 and ADT between 15,001 to 20,000 vpd)

Question:
Are run-off-road crashes clustered around particular curves?
Answer:
Yes
Recommended CM:
Flatten horizontal curve
Install curve ahead warning signs

Widen lane through curve
Install transverse rumble strips
Install transverse pavement markings

Question:
Do the curves in question have a deflection angle greater than 7 degrees?
Answer:
Yes
Recommended CM:
Install chevrons

Question:
Are crashes related to poor sight distance to accesses beyond the curves?
Answer:
Yes
Recommended CM:
Flatten horizontal curve
Flatten crest vertical curve
Remove/restrict movements at access points
Remove foliage
Improve sight distance to access

Question:
Is the curve at a location where there is evidence (i.e., a road with streetlights, telephone poles, signs, etc.) of a former tangential continuation, leading to drivers being surprised that the main road curves?
Answer:
Yes
Recommended CM:
Install curve ahead warning signs
Obstruct line of sight to the former tangential alignment
Install chevrons

1.3.4 Diagnosis 4: Roadside Design

Accident Pattern: All single-vehicle types

Attribute: Horizontal curve

Evaluation Status: Complete

Statement:
Single vehicle crashes, which are mostly run-off-road crashes, can occur when drivers are unprepared for a curve due to inappropriately high approach speeds (especially in wet or icy conditions), or driver impairment and inattention, or the driver's expectation of the alignment based on the prior horizontal alignment on this roadway, or poor curve path definition. Drivers who are unable to negotiate a horizontal curve will encroach onto the roadside where impacts with objects or features may occur. Studies show that run-off-road crashes are four times more likely on curves than on tangents. Roadsides along curves should be forgiving in nature so that errant vehicles have an opportunity to correct the errant maneuver in sufficient time to, ideally, regain control and avoid the crash, or at a minimum, reduce the severity of the crash.

Rationale:
For experienced drivers, driving is a highly automated task which can lead to drivers being inattentive or allowing themselves to be distracted from the driving task. While drivers' attention is elsewhere, inadvertent steering movements or lack of attention to the road path can lead to a run-off-road event. Avoidance maneuvers, poor road conditions, vehicle failure, unfamiliar road alignment, and weather conditions like snow, rain, or fog can also contribute to drivers unintentionally leaving the roadway. Once the vehicle has left the travel lane, a more forgiving roadside with a clear zone free of obstacles will minimize the possibility of crashing or overturning by providing the opportunity to recover control and return to the travel lane. If a roadside obstacle cannot be moved away from the roadside or be made to break away under the impact of a vehicle, the implementation of a barrier or crash attenuating system could be implemented to reduce the crash severity.

Question:
Are crashes occurring in sections where there are shoulder-edge drop-offs greater than 2 inches (5 cm)?
Answer:
Yes
Recommended CM:
Remove shoulder-edge drop-offs

Question:
Is the shoulder surface in a well-maintained state?
Answer:
Yes
Recommended CM:
None

Question:
Is the shoulder width consistent with design standards?
Answer:
Yes
Recommended CM:
None

Question:
Are there fixed objects located within the clear zone?
Answer:
Yes
Recommended CM:
Widen clear zone

Question:
Can the object be redesigned so that it can be safely traversed?
Answer:
Yes
Recommended CM:
Improve traversability of object

Question:
Do fill height and foreslope warrant barrier protection?
Answer:
Yes
Recommended CM:
None

Question:
Can the foreslopes be upgraded to eliminate the need for barrier?
Answer:
Yes
Recommended CM:
Flatten side slopes

1.3.5 Diagnosis 5: Road Surface Condition / Superelevation

Accident Pattern: All single-vehicle types

Attribute: Horizontal curve

Evaluation Status: Complete

Statement:
Single vehicle crashes, which are mostly run-off-road crashes, can occur when drivers are unable to negotiate a curve as intended due to low pavement skid resistance and roughness and/or insufficient superelevation. The reduced lateral friction between the vehicle tire and the road surface may cause the vehicle to skid or slide and leave the intended travel lane. Drivers who are unable to negotiate a horizontal curve will encroach onto the roadside where impacts with objects or features may occur.

Rationale:
Pavement that has deteriorated and no longer provides adequate lateral friction as a vehicle negotiates a turn can lead to an increase in single vehicle crashes. If sufficient superelevation is not provided, there is less force due to friction counteracting the effects of centripetal force as a vehicle begins to turn, thus leading to a higher potential of leaving the travel lane. Studies show that run-off-road crashes are four times more likely on curves than on tangents. A driver's mental and visual workload is greater on curves than on tangents, and the workload increases for sharper curves. When low pavement friction or insufficient

superelevation is combined with wet or icy conditions, high speeds, driver inattention or impairment, the risk for leaving the roadway along a curve increases.

Question:
Does the asphalt at the curve, where the target crashes were recorded, show noticeable signs of deterioration, water ponding, ice build-up, or look "polished" in appearance?
Answer:
Yes
Recommended CM:
Improve drainage patterns or structures
Improve pavement friction
Maintain surface of lanes

Question:
Are crashes occurring in sections where there are shoulder-edge drop-offs greater than 2 inches (5 cm)?
Answer:
Yes
Recommended CM:
Remove shoulder-edge drop-offs

Question:
Is the superelevation along the curve in accordance to design standards?
Answer:
Yes
Recommended CM:
None

1.3.6 Diagnosis 62: Road Surface Condition/Drainage

Accident Pattern: All single-vehicle types

Attribute: Wet weather

Evaluation Status: Complete

Statement:
Single-vehicle crashes can occur when drivers are unable to maneuver, slow or stop as intended due to poor pavement surface condition and/or water ponding on the roadway.

Rationale:
A pavement in poor condition may have reduced surface friction which can cause a vehicle to skid, slide, or require a longer stopping distance. Water accumulating or ponding on a roadway, particularly in the wheel path, may result in a vehicle hydroplaning (i.e., tires lose contact with road surface). If a driver fails to adjust their speed appropriately due to poor road surface conditions (e.g., if the surface is worn or rutted, particularly when wet or icy), the risk for leaving the roadway increases.

Question:
Does the asphalt on the segment show noticeable signs of deterioration or look "polished" in appearance?
Answer:
Yes
Recommended CM:
Improve pavement friction
Maintain surface of lanes

Question:
Is there water ponding or ice-buildup on the roadway or in the area of catch basins, culverts, or other drainage structures, which may be related to the crash type?
Answer:
Yes
Recommended CM:
Improve drainage patterns or structures
Raise standard for winter maintenance
Apply preventive salting or chemical anti-icing

Question:
Is the cross-fall a minimum of 2%?

Answer:
Yes
Recommended CM:
None

Question:
Is a minimum longitudinal grade of 0.5% provided?
Answer:
Yes
Recommended CM:
None

[Previous: Diagnosis and Countermeasure Selection Report] [Top] [Next: Descriptions for Recommended Procedures]

SafetyAnalyst

Economic Analysis

Jul 23, 2009

Table of Contents

List of Tables

Disclaimer

Limited Warranty and Limitations of Remedies

Notice

1. Summary of Input Parameters

SafetyAnalyst: v3.0.0, packaged: Jun 30, 2009 3:37 PM on sa_dev.ittsystems.com
Data set title: Kemi
Data set comment: null
Data set created: Jul 23, 2009 2:23 AM

Economic Analyses and Priority Ranking started: Jul 23, 2009 4:03 AM.

Processing Parameters

Types of Economic Analyses Performed:
Cost-effectiveness

Ranking Criteria: Cost Effectiveness (based upon Total Accidents)
Countermeasures Listed for a Site by: Highest Ranked Countermeasure for each Site
Display Order: Standard Order

Years of Data Considered:
History Period: Available years (2007 - 2007)
Major Reconstruction: No major reconstruction occurred at any sites during the history period

Analysis Period:
Implementation Year: 2010
Years To Analyze: 20

Minimum Attractive Rate of Return (Percent): 4

Table 1. Site Countermeasures Data

ID	Site ID	Site Type	County	Route	Beginning Location	Ending Location	CM ID	CM Title	CM Start Location	CM End Location
1	2700	Segment	3	SR 90-TAMIAMI TRAIL	4.704	4.889	43	Remove/restrict movements at access points	4.704	4.889
2	2700	Segment	3	SR 90-TAMIAMI TRAIL	4.704	4.889	195	Improve drainage patterns or structures	4.704	4.889
3	2700	Segment	3	SR 90-TAMIAMI TRAIL	4.704	4.889	2	Flatten crest vertical curve	4.704	4.889
4	2700	Segment	3	SR 90-TAMIAMI TRAIL	4.704	4.889	3	Flatten horizontal curve	4.704	4.889
5	2700	Segment	3	SR 90-TAMIAMI TRAIL	4.704	4.889	46	Widen lane through curve	4.704	4.889
6	2700	Segment	3	SR 90-TAMIAMI TRAIL	4.704	4.889	47	Widen lanes	4.704	4.889
7	2700	Segment	3	SR 90-TAMIAMI TRAIL	4.704	4.889	8	Improve pavement friction	4.704	4.889
8	2700	Segment	3	SR 90-TAMIAMI TRAIL	4.704	4.889	37	Maintain surface of lanes	4.704	4.889
9	2700	Segment	3	SR 90-TAMIAMI TRAIL	4.704	4.889	196	Apply preventive salting or chemical anti-icing	4.704	4.889
10	2700	Segment	3	SR 90-TAMIAMI TRAIL	4.704	4.889	399	Raise standard for winter maintenance	4.704	4.889

User Input:
(1) Site ID= 2700; CM ID = 43; Category = access: Access Management; Title = Remove/restrict movements at access points; Service Life = 10; Unit Construction Cost = 2000.000; Construction Cost Units = site; Construction Cost Function = 1: Cost Per Site; Site ID = S25; ID = 2700; Start Location = A|I|SR 90-TAMIAMI TRAIL|4.704|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|4.704|; End Location = A|I|SR 90-TAMIAMI TRAIL|4.889|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|4.889|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 2000.000; Total Construction Cost Source = C: Calculated; AMF Total Before Condition = 0.000000; AMF Total After Condition = 0.000000; AMF FI Before Condition = 0.000000; AMF FI After Condition = 0.000000; AMF Total Final Condition = 0.950000; AMF FI Final Condition =

0.950000;

(2) Site ID= 2700; CM ID = 195; Category = drainage: Drainage; Title = Improve drainage patterns or structures; Service Life = 20; Unit Construction Cost = 300000.000; Construction Cost Units = CL mi; Construction Cost Function = 2: Cost Per Centerline Mile of Roadway; Site ID = S25; ID = 2700; Start Location = A|I|SR 90-TAMIAMI TRAIL|4.704|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|4.704|; End Location = A|I|SR 90-TAMIAMI TRAIL|4.889|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|4.889|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 55500.000; Total Construction Cost Source = C: Calculated; AMF Total Before Condition = 0.000000; AMF Total After Condition = 0.000000; AMF FI Before Condition = 0.000000; AMF FI After Condition = 0.000000; AMF Total Final Condition = 0.950000; AMF FI Final Condition = 0.950000;

(3) Site ID= 2700; CM ID = 2; Category = geometry: Geometry; Title = Flatten crest vertical curve; Service Life = 20; Unit Construction Cost = 700000.000; Construction Cost Units = site; Construction Cost Function = 1: Cost Per Site; Site ID = S25; ID = 2700; Start Location = A|I|SR 90-TAMIAMI TRAIL|4.704|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|4.704|; End Location = A|I|SR 90-TAMIAMI TRAIL|4.889|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|4.889|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 700000.000; Total Construction Cost Source = C: Calculated; AMF Total Before Condition = 0.000000; AMF Total After Condition = 0.000000; AMF FI Before Condition = 0.000000; AMF FI After Condition = 0.000000; AMF Total Final Condition = 0.950000; AMF FI Final Condition = 0.950000;

(4) Site ID= 2700; CM ID = 3; Category = geometry: Geometry; Title = Flatten horizontal curve; AMF Function = 5: Flatten Horizontal Curve; Service Life = 20; Unit Construction Cost = 700000.000; Construction Cost Units = site; Construction Cost Function = 1: Cost Per Site; Site ID = S25; ID = 2700; Start Location = A|I|SR 90-TAMIAMI TRAIL|4.704|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|4.704|; End Location = A|I|SR 90-TAMIAMI TRAIL|4.889|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|4.889|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 700000.000; Total Construction Cost Source = C: Calculated; AMF Total Final Condition = 0.950000; AMF Total Before Condition = 1.517419; AMF Total After Condition = 1.517419; AMF FI Final Condition = 0.950000; AMF FI Before Condition = 1.517419; AMF FI After Condition = 1.517419; Radius of existing curve (ft) = 100.000; Length of existing curve (mi) = 1.000; Is the existing curve a Spiral? = false; Radius of proposed curve (ft) = 100.000; Length of proposed curve (mi) = 1.000; Is the proposed curve a Spiral? = false;

(5) Site ID= 2700; CM ID = 46; Category = geometry: Geometry; Title = Widen lane through curve; Service Life = 20; Unit Construction Cost = 15000.000; Construction Cost Units = site; Construction Cost Function = 1: Cost Per Site; Site ID = S25; ID = 2700; Start Location = A|I|SR 90-TAMIAMI TRAIL|4.704|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|4.704|; End Location = A|I|SR 90-TAMIAMI TRAIL|4.889|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|4.889|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 15000.000; Total Construction Cost Source = C: Calculated; AMF Total Before Condition = 0.000000; AMF Total After Condition = 0.000000; AMF FI Before Condition = 0.000000; AMF FI After Condition = 0.000000; AMF Total Final Condition = 0.950000; AMF FI Final Condition = 0.950000;

(6) Site ID= 2700; CM ID = 47; Category = geometry: Geometry; Title = Widen lanes; Site Subtype Factor (TOT) = 1.000; Site Subtype Factor (FI) = 1.000; AMF Function = 2: Widen Lanes; Service Life = 20; Unit Construction Cost = 10.000; Construction Cost Units = sq ft; Construction Cost Function = 6: Cost Per Square Foot of Lane Widening; Site ID = S25; ID = 2700; Start Location = A|I|SR 90-TAMIAMI TRAIL|4.704|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|4.704|; End Location = A|I|SR 90-TAMIAMI TRAIL|4.889|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|4.889|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 0.000; Total Construction Cost Source = C: Calculated; AMF Total Final Condition = 0.950000; AMF Total Before Condition = 1.000000; AMF Total After Condition = 1.000000; AMF FI Final Condition = 0.950000; AMF FI Before Condition = 1.000000; AMF FI After Condition = 1.000000; Enable existing lane width for direction 1 = true; Enable existing lane width for direction 2 = true; Existing lane width for direction 1 = 12.000; Existing lane width for direction 2 = 12.000; Lane width of proposed improvement = 12.000; Enable the number of through lanes for direction 1 = true; Enable the number of through lanes for direction 2 = true; Number of through lanes for direction 1 = 1; Number of through lanes for direction 2 = 1; Collision Type = head_on: Head-on; Collision Type Severity = FI: Fatal and Injury; Collision Type = object: Collision with fixed object; Collision Type Severity = FI: Fatal and Injury; Collision Type = other_single_noncollision: Other single-vehicle non-collision; Collision Type Severity = FI: Fatal and Injury; Collision Type = overturn: Overturn; Collision Type Severity = FI: Fatal and Injury; Collision Type = sideswipe_opp_dir: Sideswipe, opposite direction; Collision Type Severity = FI: Fatal and Injury; Collision Type = sideswipe_same_dir: Sideswipe, same direction; Collision Type Severity = FI: Fatal and Injury; Collision Type = head_on: Head-on; Collision Type Severity = TOT: Total; Collision Type = object: Collision with fixed object; Collision Type Severity = TOT: Total; Collision Type = other_single_noncollision: Other single-vehicle non-collision; Collision Type Severity = TOT: Total; Collision Type = overturn: Overturn; Collision Type Severity = TOT: Total; Collision Type = sideswipe_opp_dir: Sideswipe, opposite direction; Collision Type Severity = TOT: Total; Collision Type = sideswipe_same_dir: Sideswipe, same direction; Collision Type Severity = TOT: Total;

(7) Site ID= 2700; CM ID = 8; Category = pavement: Pavement; Title = Improve pavement friction; AMF (TOT) = 0.760000; Service Life = 5; Unit Construction Cost = 5.000; Construction Cost Units = sq ft; Construction Cost Function = 4: Cost Per Square Foot of Traveled Way; Site ID = S25; ID = 2700; Start Location = A|I|SR 90-TAMIAMI TRAIL|4.704|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|4.704|; End Location = A|I|SR 90-TAMIAMI TRAIL|4.889|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|4.889|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 117216.000; Total Construction Cost Source = C: Calculated; AMF Total Final Condition = 0.950000; AMF Total Before Condition = 0.000000; AMF Total After Condition = 0.000000; AMF FI Before Condition = 0.000000; AMF FI After Condition = 0.000000; AMF FI Final Condition = 0.950000; Enable the number of auxiliary lanes for direction 1 = true; Enable the number of auxiliary lanes for direction 2 = true; Number of auxiliary lanes for direction 1 = 0; Number of auxiliary lanes for direction 2 = 0; Enable the number

of through lanes for direction 1 = true; Enable the number of through lanes for direction 2 = true; Number of through lanes for direction 1 = 1; Number of through lanes for direction 2 = 1; Enable existing lane width for direction 1 = true; Enable existing lane width for direction 2 = true; Existing lane width for direction 1 = 12.000; Existing lane width for direction 2 = 12.000;

(8) Site ID= 2700; CM ID = 37; Category = pavement: Pavement; Title = Maintain surface of lanes; Service Life = 10; Unit Construction Cost = 3.000; Construction Cost Units = sq ft; Construction Cost Function = 4: Cost Per Square Foot of Traveled Way; Site ID = S25; ID = 2700; Start Location = A|I|SR 90-TAMIAMI TRAIL|4.704|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|4.704|; End Location = A|I|SR 90-TAMIAMI TRAIL|4.889|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|4.889|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 70329.600; Total Construction Cost Source = C: Calculated; AMF Total Before Condition = 0.000000; AMF Total After Condition = 0.000000; AMF FI Before Condition = 0.000000; AMF FI After Condition = 0.000000; AMF Total Final Condition = 0.950000; AMF FI Final Condition = 0.950000; Enable the number of auxiliary lanes for direction 1 = true; Enable the number of auxiliary lanes for direction 2 = true; Number of auxiliary lanes for direction 1 = 0; Number of auxiliary lanes for direction 2 = 0; Enable the number of through lanes for direction 1 = true; Enable the number of through lanes for direction 2 = true; Number of through lanes for direction 1 = 1; Number of through lanes for direction 2 = 1; Enable existing lane width for direction 1 = true; Enable existing lane width for direction 2 = true; Existing lane width for direction 1 = 12.000; Existing lane width for direction 2 = 12.000;

(9) Site ID= 2700; CM ID = 196; Category = pavement: Pavement; Title = Apply preventive salting or chemical anti-icing; AMF (FI) = 0.980000; Service Life = 1; Unit Construction Cost = 1000.000; Construction Cost Units = LN mi; Construction Cost Function = 3: Cost Per Lane Mile of TraveledWay; Site ID = S25; ID = 2700; Start Location = A|I|SR 90-TAMIAMI TRAIL|4.704|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|4.704|; End Location = A|I|SR 90-TAMIAMI TRAIL|4.889|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|4.889|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 370.000; Total Construction Cost Source = C: Calculated; AMF Total Before Condition = 0.000000; AMF Total After Condition = 0.000000; AMF FI Final Condition = 0.950000; AMF FI Before Condition = 0.000000; AMF FI After Condition = 0.000000; AMF Total Final Condition = 0.950000; Enable the number of auxiliary lanes for direction 1 = true; Enable the number of auxiliary lanes for direction 2 = true; Number of auxiliary lanes for direction 1 = 0; Number of auxiliary lanes for direction 2 = 0; Enable the number of through lanes for direction 1 = true; Enable the number of through lanes for direction 2 = true; Number of through lanes for direction 1 = 1; Number of through lanes for direction 2 = 1;

(10) Site ID= 2700; CM ID = 399; Category = pavement: Pavement; Title = Raise standard for winter maintenance; AMF (FI) = 0.990000; Service Life = 1; Unit Construction Cost = 1000.000; Construction Cost Units = CL mi; Construction Cost Function = 2: Cost Per Centerline Mile of Roadway; Site ID = S25; ID = 2700; Start Location = A|I|SR 90-TAMIAMI TRAIL|4.704|; CM Start Location = A|I|SR 90-TAMIAMI TRAIL|4.704|; End Location = A|I|SR 90-TAMIAMI TRAIL|4.889|; CM End Location = A|I|SR 90-TAMIAMI TRAIL|4.889|; Site Growth Factor = 1.05000; Growth Factor Source = S: Specified; Total Construction Cost = 185.000; Total Construction Cost Source = C: Calculated; AMF Total Before Condition = 0.000000; AMF Total After Condition = 0.000000; AMF FI Final Condition = 0.950000; AMF FI Before Condition = 0.000000; AMF FI After Condition = 0.000000; AMF Total Final Condition = 0.950000;

[Previous: Economic Analysis] [Top] [Next: Economic Appraisal]