APPENDIX C: IMPLEMETING THE CALIBRATED INDIANA PARAMETERS IN THE IHSDM

The SPFs, CMFs, and crash proportions included in the HSM predictive method have been calibrated for Indiana conditions. These components may be incorporated in the IHSDM using the Administration Tool, shown in Figure C.1 below. The crash proportions are implemented under the "Crash Distribution Data Sets" module, while the SPF and CMF parameters are implemented under the "Model Data Sets" module.

e <u>E</u> dit <u>H</u> elp								
Genera <mark>l</mark>			Intersection Review	ew	Available Polic	les		
Rebuild	Data Dictionarie	s	Rebuild IRI	M Configuration Data	Policy Title	Unit System	Last Update	Edit
				-	AASHTO 1990	U.S. Customary	Feb 1, 2007 6:4	A
rash Prediction					AASHTO 1994	Metric	Feb 1, 2007 6:5	Delete
Calibration Dat	a Sote				AASHTO 2001	U.S. Customary	Feb 1, 2007 6:4	
summation but					AASHTO 2001	Metric	Feb 1, 2007 6:4	Copy
Title	Comment	Distribution	Model Data	Edit	AASHTO 2004	U.S. Customary	Feb 1, 2007 6:4	
		Data Set	Set		AASHTO 2004	Metric	Feb 1, 2007 6:4	Convert
HSM Configurat	Default calibrati	HSM Configur	LICH Configurat	- A.g.	AASHTO 2011	Metric	Jan 6, 2012 12:	 ✓
Crash Distributi	on Data Sets Title	Comm	nent L		Title	Configuration L	Last Update	Edit
HSM Configuratio	n	Default cra	sh di O	d 1	Default	Default TAM con.	. Oct 19, 2016 1:	
•			Model	Data Sata	-			
Model Data Set	s		Model	Data Sets				
	Title		Comment	Edit				
HSM Configuratio	n	E	Default model c	_	Driver/Vehicle	Configuration D	ata Sets	
•			8	Delete	 Title 	Comment	Last Update	Display
Economic Anal	sis Model Data	Sets			Deterministic A	System default	Oct 19, 2016 1:	_
Leononne Anur	ysis model butu	500			Deterministic A	System default	Oct 19, 2016 1:	Help
Title	Comment	Last Upda	ite	Edit	Deterministic A	System default	Oct 19, 2016 1:	
Economic Analy	Default Econom.	Oct 5, 2017	1:2		Deterministic A	System default	Oct 19, 2016 1:	
				Delete	Deterministic N	. System default	Oct 19, 2016 1:	

Figure C.1 IHSDM Administration Tool

This appendix illustrates how the Indiana-specific parameters may be implemented in the IHSDM Administration Tool and how this configuration is selected for use in the IHSDM crash prediction tool. The step-by-step procedures are detailed here for two cases. The first case involves transferring the prepared files containing the Indiana configuration to the Administration Tool interface. This case is applicable if the Administration Tool is in the default configuration (in other words, the HSM default is the only configuration available in the tool). In the second case, the user inputs the Indiana-specific parameters directly into the Administration Tool. This case is applicable if the Administration Tool is not in the default configuration (there are user-specified custom configurations already entered in the tool in addition to the HSM default).

Case 1 - Transferring the Indiana Configuration Files to the Administration Tool

Step 1: Locate and copy the files with the Indiana configuration.

Two files that contain the Indiana configuration have been prepared, one that includes the updated crash proportions and the other which has the parameters of the SPFs and CMFs. These files are named "config.cd.cpm.local_1" and "config.md.cpm.local_1", respectively, as shown in Figure C.2.



Figure C.2 Files with Indiana-specific parameters

Step 2: Navigate to the IHSDM configuration folder.

As displayed in Figure C.3, in this case, the folder is located in the C: drive under the following path: C: > IHSDM2017 > config

I Image: Imag					
Pin to Quick access Copy Paste shortcut	Move Copy to * Copy to * Copy	New item •	Perties	Select all Select none	
$\leftarrow \rightarrow \checkmark \land \square \rightarrow$ This PC \rightarrow Local Disk	(C:) > IHSDM2017 > config >			رة بي رو	Sei
	Name	Date modified	Туре	Size	000
A QUICK BLCESS	config.ea.cpm.default	10/5/2017 1:25 P	M XML Docume	nt 5 KB	
CneDrive CneDrive	config.idrm.blob	2/5/2017 11:25 P	M XML Docume	nt 118 KB	
This PC	installer.props	10/19/2016 1:35	PM PROPS File	1 KB	
	ancillary.init	10/19/2016 1:34	PM XML Docume	nt 12 KB	
Desktop	📄 build	10/19/2016 1:34	PM XML Docume	nt 7 KB	
Documents	📄 config.cal.cpm.default	10/19/2016 1:34	PM XML Docume	nt 10 KB	
👆 Downloads	config.cd.cpm.default	10/19/2016 1:34	PM XML Docume	nt 112 KB	
🁌 Music	📄 config.dcm.blob	10/19/2016 1:34	PM XML Docume	nt 2 KB	
Pictures	📄 config.dcm	10/19/2016 1:34	PM XML Docume	nt 3 KB	
Videos	config.dvm.deterministicAggressiveCent	t 10/19/2016 1:34	PM XML Docume	nt 6 KB	
Level Disk (C)	config.dvm.deterministicAggressiveCent	t 10/19/2016 1:34	PM XML Docume	nt 6 KB	
	🔮 config.dvm.deterministicAggressiveCut0	10/19/2016 1:34	PM XML Docume	nt 6 KB	
boot	config.dvm.deterministicAggressiveCut0	10/19/2016 1:34	PM XML Docume	nt 6 KB	
IHSDM2017	config.dvm.deterministicNominalCenter	10/19/2016 1:34	PM XML Docume	nt 6 KB	
📙 Intel	config.dvm.deterministicNominalCenter	10/19/2016 1:34	PM XML Docume	nt 6 KB	

Figure C.3 IHSDM configuration folder

Step 3: Paste the files with the Indiana configuration in the IHSDM configuration folder.

This step is shown in Figure C.4. The configuration folder may then be closed.

Image: Image of the second					
★ ↓ </th <th>Move Copy to Copy to Copy to Copy</th> <th>Rew item ▼ Easy access ▼ New</th> <th>Properties Open Open</th> <th>Select all Select none Invert selection Select</th> <th></th>	Move Copy to Copy to Copy to Copy	Rew item ▼ Easy access ▼ New	Properties Open Open	Select all Select none Invert selection Select	
← → → ↑ 🛄 → This PC → Local Dis	k (C:) > IHSDM2017 > config >			~ C	b Sea
^	Name	Date modified	Туре	Size	
A Quick access	👕 config.ea.cpm.default	10/5/2017 1:25 P	M XML Document	5 KB	
a OneDrive	config.md.cpm.local_1	9/27/2017 1:07 F	M XML Document	118 KB	
This PC	🕐 config.cd.cpm.local_1	9/27/2017 12:38	PM XML Document	110 KB	
	🖹 config.idrm.blob	2/5/2017 11:25 P	M XML Document	118 KB	
Desktop	installer.props	10/19/2016 1:35	PM PROPS File	1 KB	
Documents	ancillary.init	10/19/2016 1:34	PM XML Document	12 KB	
👆 Downloads	🔮 build	10/19/2016 1:34	PM XML Document	7 KB	
👌 Music	config.cal.cpm.default	10/19/2016 1:34	PM XML Document	10 KB	
Pictures	config.cd.cpm.default	10/19/2016 1:34	PM XML Document	112 KB	
Videos	🖆 config.dcm.blob	10/19/2016 1:34	PM XML Document	2 KB	
Local Disk (C)	💼 config.dcm	10/19/2016 1:34	PM XML Document	3 KB	
	config.dvm.deterministicAggressiveCent	10/19/2016 1:34	PM XML Document	6 KB	
DOOL	config.dvm.deterministicAggressiveCent	10/19/2016 1:34	PM XML Document	6 KB	
IHSDM2017	config.dvm.deterministicAggressiveCutC	10/19/2016 1:34	PM XML Document	6 KB	
Intel	confia.dvm.deterministicAaaressiveCutC	10/19/2016 1:34	PM XML Document	6 KB	

Figure C.4 Indiana configuration files in the IHSDM configuration folder

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Step 4: Open the IHSDM Administration Tool from the Start menu (Figure C.5).



Figure C.5 Opening the IHSDM Administration Tool

The software should open with both the default HSM configuration and Indiana configuration appearing under the "Crash Distribution Data Sets" and "Model Data Sets" (Figure C.6).

e <u>E</u> dit <u>H</u> elp								
General			Intersection Rev	iew		Available Polic	ies	
Pobuil	d Data Dictionari		Pobuild IPM Configuration Data			Policy Title	Unit System	Last Update
Rebuil		es				AASHTO 1990	U.S. Customary	Feb 1, 2007 6:4
						AASHTO 1994	Metric	Feb 1, 2007 6:5
rash Prediction						AASHTO 2001	U.S. Customary	Feb 1, 2007 6:4
Calibration Data	a Sets					AASHTO 2001	Metric	Feb 1, 2007 6:4
Title	Comment	Distribution	Model Data	18		AASHTO 2004	U.S. Customary	Feb 1, 2007 6:4
1000		Data Set	Set	Eultra .	33	AASHTO 2004	Metric	Feb 1, 2007 6:4
HSM Configurat	Default calibrati	HSM Configurat	HSM Configurat	Oct		AASHTO 2011	Metric	Jan 6, 2012 12:
		nom comgara.		Delete	-	AASHTO 2011	U.S. Customary	Jan 6, 2012 12:
Crash Distributio	on Data Sets			Linear p		Traffic Analysis	Configuration D	ata Sets
Titlo	Comm	ont	Last Undato			Title	Comment	Last Update
HSM Configuration	n Default cras	sh di	Oct 19, 2016 1:34	AZ PM		Default	Default TAM con	Oct 19, 2016 1:
Indiana Configura	tion Indiana Cra	eh 9	on 27 2017 12:38	03 PM	ALC: N			
Indiana Comigura			ep 27, 2017 12.30.		-			
Model Data Set	s							
Title	Comm	ent	Last Update	Edit				
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indiana Comigura		-5	5ep 27, 2017 1.07.4	Pelete	-	Title	Comment	Last Update
		C - 4-			1	Deterministic A	System default	Oct 19, 2016 1:
Economic Analy	sis model Data	Sets				Deterministic A	System default	Oct 19, 2016 1:
Title	Comment	Last Update		Edit		Deterministic A	System default	Oct 19, 2016 1:
Economic Analy	Default Econom	Oct 5, 2017 1:2.		- Les Martines -	2000	Deterministic A	System default	Oct 19, 2016 1:
				Delete		Deterministic N	System default	Oct 19, 2016 1:
				Egosoto	-	Deterministic N	System default	Oct 19, 2016 1:
1				1 P.				

Figure C.6 IHSDM Administration Tool with HSM and Indiana configuration

Step 5: Save backup copies of the Indiana configuration files.

In order for the Indiana configuration to work properly and be compatible with any other custom configurations that the user may decide to add later, backup copies of the Indiana configuration files should be saved. Under the "Crash Distribution Data Sets" module, select the Indiana configuration and click the "Edit" button as displayed in Figure C.7.

ile Edit Help		2011 11010000,11		000000000000000		***********			
General			Intersection R	eview			Available Polic	ies	
Dahuild D	ata Diatianasi		Dahu		of exercise Data		Policy Title	Unit System	La
Rebuil <u>a</u> Di	ata Dictionari	es	Rebu		niiguration Data		AASHTO 1990	U.S. Customary	Feb 1
							AASHTO 1994	Metric	Feb 1
rash Prediction							AASHTO 2001	U.S. Customary	Feb 1
Calibration Data Set	ts						AASHTO 2001	Metric	Feb 1
Title	Comment	Distribution	Model Data	Last U	Call.	-	AASHTO 2004	U.S. Customary	Feb 1
		Data Set	Set	la na san ter	Lunca	333	AASHTO 2004	Metric	Feb 1
HSM Configurat Defa	ult calibrati	HSM Configurat	HSM Configurat	Oct 19 2			AASHTO 2011	Metric	Jan 6
					Delete	-	AASHTO 2011	U.S. Customary	Jan 6
Crash Distribution D	ata Sets			el 1 acce			Traffic Analysis	Configuration [)ata S
Title	Comme	ant	Last Undato		E de la		Title	Comment	La
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Indiana Configuration	inuiana cra:		ep 21, 2017 12.30.	USPM	ell Luit the selec				
Model Data Sets			Salaat tha I	ndiana					
Title	Comme	ent	figuration and	nuiana	Edit"				
HSM Configuration	Default mod	el c	ingulation and	CHCK			- Driver/Vehicle	Configuration D	ata Co
Indiana Configuration	Indiana SPF	s S	Sep 27, 2017 1:07:4	19 PM	Delete		Dilvenvenicie	configuration D	ala se
	20110					-	Title	Comment	La
Economic Analysis	Model Date	Cote					Deterministic A	System default	Oct 1
LCOHOINC Analysis I	nouer Data	Jets					Deterministic A	System default	Oct 1

Figure C.7 Saving backup copy of the Indiana configuration for "Crash Distribution Data Sets"

The following dialogue box appears (Figure C.8). No changes need to be made in this box, as the appropriate Indiana crash proportions have already been entered. Simply click "Ok".

Edit Crash Prediction Module Crash Distribution Configuration	1 Data	X
 Data Set Attributes Rural Two-Lane Crash Distribution Data Rural Multi-Lane Crash Distribution Data Urban/Suburban Arterial Crash Distribution Data Freeway Crash Distribution Data 	Title	Indiana Configuration
	Comment	
	Last Update	:Sep 27, 2017 12:38:03 PM
	☑ Can Update Update History	
Click "Ok"	Mar 30, 2009 11:55 AM - hol30480 - edit (I IHSDM) Mar 6, 2017 10:09 PM - CRS - created from Mar 6, 2017 10:09 PM - CRS - output file i Mar 6, 2017 10:09 PM - CRS - edit	Default crash distribution configuration data supplied with m data set 'HSM Configuration' s config.cd.cpm.local_1.xml
Qk		Cancel

Figure C.8 Dialogue box for "Crash Distribution Data Sets" module

Even though no changes were made in the configuration, a backup configuration file was automatically created, in this case under the file path "C: > IHSDM2017 > users > ihsdm_admin > backup". The same procedure is followed for the Indiana configuration file containing the SPF and CMF parameters (located in the "Model Data Sets" module). Figure C.9 shows what the Administration Tool should look like when finished.

👌 IHSDM Administ	tration	Tool (IHSDM	2017 Release, v1	3.0.0)						
ile <u>E</u> dit <u>H</u> elp										
General				Intersection R	eview			Available Polic	ies	
Reb	uild D	ata Dictionar	ias	Rebu	ild IRM Co	nfiguration Data	2	Policy Title	Unit System	Las
Reb			163			inigulation Data		AASHTO 1990	U.S. Customary	Feb 1,
Court Des distant				-				AASHTO 1994	Metric	Feb 1,
Crash Prediction	n —							AASHTO 2001	U.S. Customary	Feb 1,
Calibration Da	ta Set	s						AASHTO 2001	Metric	Feb 1,
Title	(Comment	Distribution	Model Data	Last U	C.A.	-	AASHTO 2004	U.S. Customary	Feb 1,
			Data Set	Set				AASHTO 2004	Metric	Feb 1,
HSM Configurat	Defa	ult calibrati	HSM Configurat	HSM Configurat	Oct 19.2			AASHTO 2011	Metric	Jan 6,
						Delete	-	AASHTO 2011	U.S. Customary	Jan 6,
Crash Distribut	ion D	ata Sets			54. Jacob			Traffic Analysis	Configuration)ata Se
Title		Comm	ent	Last Undate		Edit		Title	Comment	Last
HSM Configurati	on	Default cras	h di	Oct 10, 2016 1:34	47.PM			Default	Default TAM con	. Oct 19
Indiana Configurat	ation	Indiana Cra	ch	Oct 8 2017 2:41	05 PM	Delete	1258			
indiana ooninga	auon	indiana ora		000,20112.11		Delete				
Model Data Se	ts									
Title		Comme	ent	Last Update		Edit				
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Indiana Configur	ation	Indiana SPF	s	Oct 8, 2017 2:58:4	41 PM	Delete		Drivenvenicie	conngulation D	na seis
							-	Title	Comment	Last
	lucie I	Indal Data	Cote					Deterministic A	System default	Oct 19
Leonomic And	iyala I	nouer Data	5613	-				Deterministic A	System default	Oct 19
Title	(Comment	Last Update				-	Deterministic A	System default	Oct 19
Economic Analy	Defa	ult Econom	Oct 5, 2017 1:2			NI-Selection of the selection of the sel		Deterministic A	System default	Oct 19

Figure C.9 IHSDM Administration Tool after saving backup files

Case 2 - Inputting the Indiana-specific Parameters directly into the Administration Tool

In this case, the user may have their own previously-created custom configuration already entered in the Administration Tool in addition to the HSM configuration. The Indiana crash proportions and SPF and CMF parameters may be entered by the user into the IHSDM Administration Tool by creating a new custom configuration for Indiana.

Step 1: Open the IHSDM Administration Tool from the Start menu (Figure C.10).



Figure C.10 Opening the IHSDM Administration Tool

As shown in Figure C.11, the software should open with the HSM configuration and previously-saved custom configuration appearing under the "Crash Distribution Data Sets" and "Model Data Sets".

HSDM Administrat	ion Tool (IHSDM	2017 Release, v1	3.0.0)					
ile <u>E</u> dit <u>H</u> elp								
General			Intersecti	on Review		Available Po	olicies	
Pabi	uild Data Diction	narios		Pabuild IPM Co	figuration Data	Policy Tit	le Unit System	Last Update
INCOL	ui <u>u</u> Data Dictioi	nanes			ingulation Data	AASHTO 1990	U.S. Customary	Feb 1, 2007 6:4
						AASHTO 1994	Metric	Feb 1, 2007 6:5
rach Prodiction						AASHTO 2001	I U.S. Customary	Feb 1, 2007 6:4
Callbardian Data (C					AASHTO 2001	Metric	Feb 1, 2007 6:4
Calibration Data	Sets					AASHTO 2004	U.S. Customary	Feb 1, 2007 6:4
Title	Comment	Distribution	Model Data	Last Update	Edit	AASHTO 2004	L Metric	Feb 1, 2007 6:4
		Data Set	Set			AASHTO 2011	I Metric	Jan 6, 2012 12:
HSM Configurat D	efault calibrati	HSM Configurat	HSM Configurat	Oct 19, 2016 1:	Delete	AASHTO 2011	I U.S. Customary	Jan 6, 2012 12:
					<u>С</u> ору			
Crash Distribution	Data Sets					Traffic Analy	sis Configuration [Jata Sets
Title	Comm	ent	Last Update		Edit	▲ Title	Comment	Last Update
HSM Configuration	Default cras	sh di	Oct 19, 2016 1:34	47 PM	L UILLO	Default	Default TAM con.	Oct 19, 2016 1
Custom Configuration	on		Oct 8, 2017 4:34:	12 PM				
					<u>С</u> ору			
Model Data Sets								
Title	Comm	ent	Last Update		Edit			
HSM Configuration	Default mod	del c	Oct 19, 2016 1:34:4	47 PM				
Custom Configuration	on		Oct 8, 2017 4:34:3	30 PM	Delete	Driver/Vehic	le Configuration D	ata Sets
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Economic Analysi	is Model Data	Sets				Deterministic	A System default	Oct 19, 2016 1
	-					Deterministic	A System default	Oct 19, 2016 1
Title	Comment	Last Update			Edit	Deterministic	A System default	Oct 19, 2016 1
Economic Analy D	efault Econom	Oct 5, 2017 1:2.				Deterministic	N System default	Oct 19, 2016 1
					Delete	Deterministic	N System default	Oct 19 2016 1

Figure C.11 IHSDM Administration Tool with HSM and custom configurations

Step 2: Create the Indiana configuration under the "Crash Distribution Data Sets" module.

This is most easily done by creating a copy of the HSM configuration and updating the crash proportions in this copy. Select the HSM

configuration and click the "Copy" button (Figure C.12).

HSDM Administratio	n Tool (IHSDM 2	2017 Release, v1	13.0.0)						
le <u>E</u> dit <u>H</u> elp									
General			Intersecti	on Review			Available Polic	ies	
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Rebuil		anes		Repuild IRIVI Coll	liguration Data		AASHTO 1990	U.S. Customary	Feb 1, 2
							AASHTO 1994	Metric	Feb 1, 2
Proch Dradiation							AASHTO 2001	U.S. Customary	Feb 1, 2
Liash Prediction							AASHTO 2001	Metric	Feb 1, 2
Calibration Data Se	ets						AASHTO 2004	U.S. Customary	Feb 1, 2
Title	Comment	Distribution	Model Data	Last Update	Eda	_	AASHTO 2004	Metric	Feb 1, 2
		Data Set	Set	•		3333	AASHTO 2011	Metric	Jan 6, 2
HSM Configurat Det	fault calibrati H	HSM Configurat.	HSM Configurat	Oct 19, 2016 1:	Delete	2003	AASHTO 2011	U.S. Customary	Jan 6, 2
					Conv				
Crash Distribution	Data Sets						Traffic Analysis	Configuration)ata Sets
Title	Comme	nt	Last Update	-	Edit		Title	Comment	Last
HSM Configuration	Default crash	n di	Oct 19, 2016 1:34	47 PM	<u>C</u> uit	3333	Default	Default TAM con	. Oct 19,
Custom Configuration	1	\sim	Oct 8, 2017 4:34	12 PM	Delete				
	S	elect the H	SM configur	ation	<u>C</u> opy				
Model Data Sets		and cl	ick "Copy"		Add a new of the selected	onfigurat	ion data set with val	ues copied from	
Title	Comme	nt	Last Update		Edit				
HSM Configuration	Default mode	el c	Oct 19, 2016 1:34:4	47 PM	Eur	2000			
Custom Configuration	1		Oct 8, 2017 4:34:3	30 PM			Driver/Vehicle	Configuration Da	ata Sets
					Cam		Title	Comment	Last
					Coby		Deterministic A	System default	Oct 19,
Economic Analysis	Model Data S	ets					Deterministic A	System default	Oct 19,
-		COLORING COLORING					Deterministic A	System default	Oct 10

Figure C.12 Creating a copy of the HSM configuration for "Crash Distribution Data Sets"

The dialogue box displayed in Figure C.13 appears. For the "Title", the user may enter "Indiana Configuration" (or another name of personal preference). Similarly, under "Comment", the user may enter "Indiana Crash Distribution".

Edit Crash Prediction Module Crash Distribution Configuration	Data
 Data Set Attributes Rural Two-Lane Crash Distribution Data Rural Multi-Lane Crash Distribution Data Urban/Suburban Arterial Crash Distribution Data Freeway Crash Distribution Data 	Enter title and comments here Comment :
	Last Update : Oct 19, 2016 1:34:47 PM
	i⊭ Can Update
	Update History Mar 30, 2009 11:55 AM - hol30480 - edit (Default crash distribution configuration data supplied with IHSDM)
<u></u>	<u>C</u> ancel

Figure C.13 Dialogue box for "Crash Distribution Data Sets" module

Step 3: Input the Indiana crash proportions into the tool.

Under the dropdown "Data Set Attributes" on the left side of the screen, the "Rural Two-Lane Crash Distribution Data" is opened. The general crash distributions to be entered for segments may be found in Table B.4. This data is typed by the user into the appropriate boxes shown in Figure C.14 below.

Edit Crash Prediction Module Crash Distribution Configu	ration Data									
E Data Set Attributes	General Segme	nt Crash Distributions								
E Rural Two-Lane Crash Distribute Pata	This table repres	ents data from HSM Ch.	10, Table 10-3 ar	d 10-12; and the	Crash Prediction	on Rural Two-Lan	e Highways Engir	neer's Manual Tab	le 5 and 6.	
General Segment Crash Distributions Segment Collision Type Distributions General Intersection Crash Distributions Intersection Collision Type Distributions	Data Set A	Attributes					5,5			
Urban/Suburban Arterial Crash Distribution Data	Segment Type	CMF1R/CMF2R	CMF11R Night	CMF11R Night	CMF11R Night	CMF9R TWLT	Percent Fatal	Percent	Percent	Percent
Freeway Crash Distribution Data		Related Crashes (%)	Time FI (%)	Time PDO (%)	Time (%)	Lane (%)	(%)	Incapacitating	Non-incapacita	Possible
	Two-Lane Undi	60.380	38.200	61.800	37.000	50.000	1.062	5.086	10.304	1.344
		<u>O</u> k					<u>C</u> ano	cel]	

Figure C.14 Indiana general crash distributions for rural two-lane segments

The crash type proportions to be entered for rural two-lane segments may be found in Table B.5. This data is input by the user into the

appropriate boxes displayed in Figure C.15.

a Set Attributes	Segment Collision T	ype Distributions			
Rural Two-Lane Crash Distribution Data General Segment Crash Distributions Segment Collision Type Distributions Intersection Crash Distributions Intersection Collision Type Distributions Rural Multi-Lane Crash Distribution Data Urban/Suburban Arterial Crash Distribution Data	This table represents	data from HSM Ch. 10, Table 10-	4; and the Crash Pr	ediction on Rural Two-Lane Hi	ghways Engineer's Manuai
Freeway Crash Distribution Data	Segment Type	Collision Type	Model Class	Distribution (%)	Edit
	Two-Lane Undivided	Collision with Animal	Total	38.479	Help
	Two-Lane Undivided	Collision with Animal	Eatal and Injury	4 807	- Andrew
	Two-Lane Undivided	Collision with Animal	Property Dama	45 769	
	Two-Lane Undivided	Collision with Bicycle	Total	0 103	
	Two-Lane Undivided	Collision with Bicycle	Fatal and Injury	0.475	
	Two-Lane Undivided	Collision with Bicycle	Property Dama	0.023	
	Two-Lane Undivided	Collision with Pedestrian	Total	0 197	
	Two-Lane Undivided	Collision with Pedestrian	Fatal and Injury	0.898	
	Two-Lane Undivided	Collision with Pedestrian	Property Dama	0.046	
	Two-Lane Undivided	Overturned	Total	3 3 19	
	Two-Lane Undivided	Overturned	Fatal and Injury	7 079	
	Two-Lane Undivided	Overturned	Property Dama	2.505	
	Two-Lane Undivided	Run Off Road	Total	25.308	
	Two-Lane Undivided	Run Off Road	Eatal and Injury	44 480	
	Two-Lane Undivided	Run Off Road	Property Dama	21 157	
	Two-Lane Undivided	Other Single-vehicle Collision	Total	4.211	
	Two-Lane Undivided	Other Single-vehicle Collision	Fatal and Injury	1.321	
	Two-Lane Undivided	Other Single-vehicle Collision	Property Dama	4.838	
	Two-Lane Undivided	Angle Collision	Total	2.980	
	Two-Lane Undivided	Angle Collision	Fatal and Injury	6.022	
	Two-Lane Undivided	Angle Collision	Property Dama	2.322	
	Two-Lane Undivided	Head-on Collision	Total	2.172	
	Two-Lane Undivided	Head-on Collision	Fatal and Injury	8.452	
	Two-Lane Undivided	Head-on Collision	Property Dama	0.812	
	Two-Lane Undivided	Rear-end Collision	Total	10.040	
	Two-Lane Undivided	Rear-end Collision	Fatal and Injury	14.474	
	Two-Lane Undivided	Rear-end Collision	Property Dama	9.081	
	Two-Lane Undivided	Sideswipe	Total	5.547	
	Two-Lane Undivided	Sideswipe	Fatal and Injury	7.448	
	Two-Lane Undivided	Sideswipe	Property Dama	5.135	
	Two-Lane Undivided	Other Multiple-vehicle Collision	Total	7.643	
	Two-Lane Undivided	Other Multiple-vehicle Collision	Eatal and Injury	4 543	

Figure C.15 Indiana crash type proportions for rural two-lane segments

A similar procedure is followed for rural divided multilane segments and urban/suburban arterial segments using data from Table B.6 and Table B.7, respectively. Once the user has entered all of the crash proportions, click "Ok" to save the changes and return to the Administration Tool.

Step 4: Create the Indiana configuration under the "Model Data Sets" module.

Again, this is most easily done be creating a copy of the HSM configuration and updating the SPF and CMF parameters in this copy. Once this has been done, the dialogue box in Figure C.16 appears.

Edit Crash Prediction Module Model Configuration Data	
Data Set Attributes B-Rural Two-Lane Model Data G-Rural Multi-Lane Model Data Urban/Suburban Arterial Model Data G-Freeway Segment and Speed-Change Lane Model Data	Title : Copy of HSM Configuration
□-Freeway C-D Road, Ramp, and Ramp Terminal Model Data	Comment :
	Last Update : Oct 19, 2016 1:34:47 PM
	Can Update
	Update History
	Mar 30, 2009 11:54 AM - rob30480 - edit (Default model configuration data supplied with IHSDM) Mar 6, 2017 10:08 PM - CRS - created from data set 'HSM Configuration' Mar 6, 2017 10:09 PM - CRS - output file is config.md.cpm.local_1.xml Mar 6, 2017 11:22 PM - CRS - edit Mar 6, 2017 11:22 PM - CRS - edit
Qk	Cancel

Figure C.16 Dialogue box for "Model Data Sets" module

Step 5: Input the Indiana SPF and CMF parameters into the tool.

The "Rural Two-Lane Model Data" is opened under the "Data Set Attributes" from the dropdown menu. The SPF parameters to be entered for rural two-lane segments (as well as rural divided multilane and urban/suburban arterial segments) are found in Table B.3. The parameters for rural two-lane segments are input by the user into the boxes shown in Figure C.17.



Figure C.17 Indiana SPF parameters for rural two-lane segments

The CMF parameters to be entered for lane width and shoulder width on rural two-lane segments (as well as for lane width on rural divided multilane segments) are found in Table B.1. Figure C.18 and C.19 display the boxes where the user may input the Indiana CMF parameters for lane width and shoulder width, respectively, on rural two-lane segments.

Edit Crash Prediction Module Model Configuration Data								X
Data Set Attributes	CMF1r Lane Wid	Ith Factors						
Rural Two-Lane Model Data Segment SPF AADT Applicability Segment SPF Factors CMF1r Lane Width Factors CMF2r CMFwra Shoulder Width Factors CMF2r CMFwra Shoulder Urae Factors	This table represent CMF is of the form CMF _{1r} = (CMF	ents data from HS m: _{ra} - 1.0) * p _{ra} + 1.	5M Ch.10, Table 10-8 0	, and the Crash	Prediction on Rural	I Two-Lane High	ways Engineer's №	Aanual Table 1. The
CMF3r Horizontal Curves Factors CMF4r Superelevation Factors	Segment Type	Upper AADT (vpd)	Lane Width (ft)	a	b	С	d (vpd)	Add
CMF5r Vertical Grade Factors	Two-Lane Undi	399	9.00	1.4600	0.0000	0	400	Edit
	Two-Lane Undi	2,000	9.00	1.4600	0.0000	0	400	
	Two-Lane Undi	1,000,000	9.00	1.4600	0.0000	0	400	Help
	Two-Lane Undi	399	10.00	1.2900	0.0000	0	400	
CMF9r Iwo-Way Left-Turn Lane Factors	Two-Lane Undi	2,000	10.00	1.2900	0.0000	0	400	
CMF10r Roadside Hazard Rating Factors	Two-Lane Undi	1,000,000	10.00	1.2900	0.0000	0	400	
CMF11r Lighting Factors	Two-Lane Undi	399	11.00	1.1400	0.0000	0	400	
CMF12r Automated Speed Enforcement Facto	Two-Lane Undi	2,000	11.00	1.1400	0.0000	0	400	
Intersection SPF AADT Applicability	Two-Lane Undi	1,000,000	11.00	1.1400	0.0000	0	400	
Intersection SPF Factors	Two-Lane Undi	1,000,000	12.00	1.0000	0.0000	0	400	
B-Rural Multi-Lane Model Data Urban/Suburban Arterial Model Data Freeway Segment and Speed-Change Lane Model Freeway C-D Road, Ramp, and Ramp Terminal Model								
	<u>O</u> k			[<u>C</u> an	cel		

Figure C.18 Indiana CMF parameters for lane width on rural two-lane segments

tion on Rural	Two-Lane Highv	vays Engineer's M	anual Table 2. The	
b	C	d (vpd)	Add	
0.0000	0	400	<u>E</u> dit	

This table represe CMF is of the form $CMF_{2r} = (CMF_{y})$	ents data from HS n:	GM Ch.10, Table 10-9	and the Crash Pr	ediction on Rural				
	This table represents data from HSM Ch. 10, Table 10-9 and the Crash Prediction on Rural Two-Lane Highways Engineer's Manual Table 2. The CMF is of the form: $CMF_{2r} = (CMF_{wra} * CMF_{tra} - 1.0) * p_{ra} + 1.0$							
Segment Type	Upper AADT (vpd)	Shoulder Width (ft)	a	b	С	d (vpd)	Add	
Two-Lane Undi	399	0.00	1.2700	0.0000	0	400	Edit	
Two-Lane Undi	2,000	0.00	1.2700	0.0000	0	400		
Two-Lane Undi	1,000,000	0.00	1.2700	0.0000	0	400	Help	
Two-Lane Undi	399	2.00	1.1800	0.0000	0	400		
Two-Lane Undi	2,000	2.00	1.1800	0.0000	0	400		
Two-Lane Undi	1,000,000	2.00	1.1800	0.0000	0	400		
Two-Lane Undi	399	4.00	1.0900	0.0000	0	400		
Two-Lane Undi	2,000	4.00	1.0900	0.0000	0	400		
Two-Lane Undi	1,000,000	4.00	1.0900	0.0000	0	400		
Two-Lane Undi	1,000,000	6.00	1.0000	0.0000	0	400		
Two-Lane Undi	399	8.00	0.9200	0.0000	0	400		
Two-Lane Undi	2,000	8.00	0.9200	0.0000	0	400		
Two-Lane Undi	1,000,000	8.00	0.9200	0.0000	0	400		
le l								
	Segment Type Two-Lane Undi Two-Lane Undi	Segment Type Upper AADT (vpd) Two-Lane Undi 399 Two-Lane Undi 2,000 Two-Lane Undi 1,000,000 Two-Lane Undi 1,000,000 Two-Lane Undi 2,000 Two-Lane Undi 399 Two-Lane Undi 1,000,000 Two-Lane Undi 1,000,000 Two-Lane Undi 1,000,000 Two-Lane Undi 399 Two-Lane Undi 1,000,000 Two-Lane Undi 1,000,000	Segment Type Upper AADT (vpd) Shoulder Width (ft) Two-Lane Undl 399 0.00 Two-Lane Undl 2,000 0.00 Two-Lane Undl 1,000,000 0.00 Two-Lane Undl 2,000 2.00 Two-Lane Undl 2,000 2.00 Two-Lane Undl 2,000 2.00 Two-Lane Undl 1,000,000 2.00 Two-Lane Undl 1,000,000 4.00 Two-Lane Undl 1,000,000 6.00 Two-Lane Undl 1,000,000 8.00 Two-Lane Undl 2,000 8.00 Two-Lane Undl 1,000,000 8.00	Segment Type (vpd) Upper AADT (vpd) Shoulder Width (ft) a Two-Lane Undi 399 0.00 1.2700 Two-Lane Undi 2,000 0.00 1.2700 Two-Lane Undi 1,000,000 0.00 1.2700 Two-Lane Undi 1,000,000 2.00 1.1800 Two-Lane Undi 2,000 2.00 1.1800 Two-Lane Undi 1,000,000 2.00 1.0900 Two-Lane Undi 1,000,000 4.00 1.0900 Two-Lane Undi 1,000,000 6.00 1.0000 Two-Lane Undi 1,000,000 6.00 1.0000 Two-Lane Undi 1,000,000 8.00 0.9200 Two-Lane Undi 1,000,000 8.00 0.9200	Segment Type Upper AADT (vpd) Shoulder Width (tt) a b Two-Lane Undi 399 0.00 1.2700 0.0000 Two-Lane Undi 2,000 0.00 1.2700 0.0000 Two-Lane Undi 1,000,000 0.00 1.2700 0.0000 Two-Lane Undi 1,000,000 2.00 1.1800 0.0000 Two-Lane Undi 2,000 2.00 1.1800 0.0000 Two-Lane Undi 1,000,000 2.00 1.1800 0.0000 Two-Lane Undi 1,000,000 4.00 1.0900 0.0000 Two-Lane Undi 1,000,000 4.00 1.0900 0.0000 Two-Lane Undi 1,000,000 6.00 1.0000 0.0000 Two-Lane Undi 1,000,000 8.00 0.9200 0.0000 Two-Lane Undi 1,000,000 8.00 0.9200 0.0000 Two-Lane Undi 1,000,000 8.00 0.9200 0.0000	Segment Type Upper AADT (vpd) Shoulder Width (tt) a b c Two-Lane Undi 399 0.00 1.2700 0.0000 0 Two-Lane Undi 2,000 0.00 1.2700 0.0000 0 Two-Lane Undi 1,000,000 0.00 1.2700 0.0000 0 Two-Lane Undi 1,000,000 2.00 1.1800 0.0000 0 Two-Lane Undi 2,000 2.00 1.1800 0.0000 0 Two-Lane Undi 1,000,000 2.00 1.1800 0.0000 0 Two-Lane Undi 1,000,000 4.00 1.0900 0.0000 0 Two-Lane Undi 1,000,000 6.00 1.0000 0 0 Two-Lane Undi 1,000,000 6.00 1.0000 0 0 Two-Lane Undi 1,000,000 8.00 0.9200 0.0000 0 Two-Lane Undi 1,000,000 8.00 0.9200 0.0000 0	Segment Type Upper AADT (vpd) Shoulder Width (ft) a b c d (vpd) Two-Lane Undi 399 0.00 1.2700 0.0000 0 400 Two-Lane Undi 2,000 0.00 1.2700 0.0000 0 400 Two-Lane Undi 1,000,000 0.00 1.2700 0.0000 0 400 Two-Lane Undi 1,000,000 2.00 1.1800 0.0000 0 400 Two-Lane Undi 2,000 2.00 1.1800 0.0000 0 400 Two-Lane Undi 1,000,000 2.00 1.1800 0.0000 0 400 Two-Lane Undi 1,000,000 4.00 1.0900 0.0000 0 400 Two-Lane Undi 1,000,000 6.00 1.0000 0.0000 0 400 Two-Lane Undi 1,000,000 6.00 0.9200 0.0000 0 400 Two-Lane Undi 1,000,000 8.00 0.9200 0.0000	

Figure C.19 Indiana CMF parameters for shoulder width on rural two-lane segments

Utilizing the data from Appendix B, a similar procedure is followed for inputting the available SPF and CMF parameters for rural divided multilane segments and urban/suburban arterial segments. Once the user is finished, click "Ok" to save the changes and return to the Administration Tool. It should now look as shown in Figure C.20.

			S 97	2121 BC			SA:					
General Intersection Review						Available Policies						
Rebuild Data Dictionaries Rebuild IRM Confi		afiguration Data	Policy Title	Unit System	Last Update	Edit						
			ingulation Data	AASHTO 1990	U.S. Customary	Feb 1, 2007 6:4						
						AASHTO 1994	Metric	Feb 1, 2007 6:5				
rach Prodiction						AASHTO 2001	U.S. Customary	Feb 1, 2007 6:4				
Calibastian Data I						AASHTO 2001	Metric	Feb 1, 2007 6:4				
campration Data :	sets					AASHTO 2004	U.S. Customary	Feb 1, 2007 6:4				
Title	Comment	Distribution	Model Data	ata Last Update	Edit	AASHTO 2004	Metric	Feb 1, 2007 6:4	Convert			
		Data Set	Set			AASHTO 2011	Metric	Jan 6, 2012 12:	<u>oonvert</u>			
HSM Configurat D	efault calibrati	HSM Configurat	HSM Configurat	Oct 19, 2016 1:	Delete	AASHTO 2011	U.S. Customary	Jan 6, 2012 12:	Halp			
									Tierb			
					Com	-						
					Entry	4						
Crash Distribution	Data Sets					I raffic Analysis	Configuration L	Jata Sets				
Title	Comm	ent	Last Update		Edit	Title	Comment	Last Update	Edit			
HSM Configuration	Default cras	h di	Oct 19 2016 1:34	I7 PM	<u>L</u> un	Default	Default TAM con.	. Oct 19, 2016 1:				
Custom Configuration	n		Oct 8 2017 4:34:	2 PM	0.1.1							
Indiana Configuratio	n		Oct 8 2017 4:36:0	1 PM	Delete	2						
and a consignation												
					<u>C</u> opy							
Model Data Sets									Convert			
Title	Comm	ant	Last lindate		- m							
USM Configuration	Default mer	olc	Oct 10, 2016 1:24:4	7 DM	Edit				Help			
Custom Configuration	Deladit mod	CI G	Oct 8 2017 4:34:3	PM								
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indiana ooningaraa			0010,2011 1.00.0			Title	Comment	Last Update				
					<u>C</u> opy	Deterministic A	System default	Oct 19, 2016 1:				
Economic Analysi	s Model Data	Sets				Deterministic A	System default	Oct 19, 2016 1:	Heip			
						Deterministic A	System default	Oct 19, 2016 1:	Holphi			
litle	Comment	Last Update			Edit	Deterministic A	System default	Oct 19, 2016 1:				
Economic Analy D	efault Econom	Oct 5, 2017 1:2.				Deterministic N.	System default	Oct 19, 2016 1:	- 28			
					Delete	Deterministic N.	System default	Oct 19, 2016 1:				
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						Stochactic Agar	Quetom default	Oct 10, 2016 1:	•			

Figure C.20 IHSDM Administration Tool after creating Indiana configuration

Selecting the Indiana Configuration for use in the IHSDM Crash Prediction Tool.

The final part of this appendix shows how the Indiana configuration is utilized for crash prediction in the IHSDM. It is assumed that the user has knowledge of the crash prediction tool, the IHSDM-HSM Predictive Method, and has created or input a rural or urban/suburban highway segment and initiated a crash prediction evaluation. Under the "Set crash prediction attributes" dialogue box, the user is prompted to select the desired "Crash Distribution" and "Model/CMF" configurations. As seen in Figure C.21, the Indiana configuration is selected.



Figure C.21 Selecting the Indiana configuration in a crash prediction evaluation

After the user has progressed through the setup for the crash prediction evaluation, the evaluation summary (Figure C.22) appears. The "Crash Distribution Configuration" and "Model/CMF Configuration" provide confirmation that the Indiana configuration has been selected.



Figure C.22 Crash prediction evaluation summary