



HCS™
AWSC Module



USER GUIDE

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Introduction

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HIGHWAY CAPACITY SOFTWARE™ (HCS™)
END-USER LICENSE AGREEMENT (EULA)

Effective Date: 10/15/2024

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Getting Started

System Requirements

HCS is designed for standard Windows installations. For optimal performance, the system should be Windows 10 or newer. While HCS may be compatible with older versions of Windows, any installation and operational issues arising from using these older versions will be the sole responsibility of the end user.

Getting Started

To begin, click on New File found on the left side of the screen under the Start header. There are two types of views available in AWSC – Page View (F9) or Full View (F10 and F11). These commands are also accessible through menu items. Normal Windows keyboard and mouse functions are available. In Full View, The PgUp and PgDn keys will scroll the entry screen up and down, respectively. In both views, tabbing, clicking to a new field, or pressing the Enter key will trigger a recalculation and update the Report pane.

All-Way Stop-Controlled (AWSC) Analysis

All-Way Stop-Controlled (AWSC) intersection analyses will estimate Capacity and Level of Service (LOS) for a given set of traffic and geometric conditions. This type of analysis is oriented toward the evaluation of an existing or planned facility. The methodology and procedures of application use the HCM Chapter 21 procedures.

General Controls

Menu Items

New – Creates a new AWSC file (*.xaw) and starts a new analysis project; shortcut is Ctrl+N

Open – Opens an existing AWSC file (*.xhu, *.xaw); shortcut is Ctrl+O

Example Folder – Opens folder with all HCS examples in File Explorer

Save – Saves an open AWSC file (*.xaw) using the current file name; shortcut is Ctrl+S

Save As... – Saves an open AWSC file (*.xaw) using a specified file name; shortcut is F12

Close – Closes an existing AWSC file (*.xaw); shortcut is Ctrl+W

Units

USC Units – Changes the units of the current file to U.S. Customary

Metric Units – Changes the units of the current file to Metric

Print – Brings up printer selection and prints an AWSC report to the printer or specified file type; shortcut is Ctrl+P

Print Preview – Displays preview of current report before printing; shortcut is Ctrl+F2

View

Page View – Changes the view to display inputs and reports by pages; shortcut is F9

Full View

Report -> Right – Changes the view to display both the input screen and report simultaneously; the report is displayed on the right portion of the screen; shortcut is F10

Report -> Bottom – Changes the view to display both the input screen and report simultaneously; the report is displayed on the bottom portion of the screen; shortcut is F11

Report

Formatted Report – Displays formatted report including the most important values; shortcut is F4

Text Report – Displays text report with all input, intermediary, and final results; shortcut is F6

Default Settings – Opens a dialog box for the user to input defaults for Analyst, Agency, and Jurisdiction, which will be applied to all new files; also allows selection of USC or SI units, which will be applied to all new files; shortcut is Alt+F

Help

Contents – Provides access to glossary, acknowledgements, copyrights, and information on the HCM procedure; shortcut is Ctrl+F1

Index – Allows user to search for keywords within the glossary

Search – Allows user to search for any word within the Contents

User Guide – Opens a comprehensive user guide in PDF format; shortcut is Ctrl+G

HCM Reference Guide – Opens a reference guide for the HCM in PDF format

HCS Updates – Sends the HCS version number anonymously without any personally identifiable information to McTrans to check for a newer version

HCM/HCS Training – Opens the McTrans Training Page in the default web browser to view the latest training opportunities

HCSQ Web Page – Opens the TRB Highway Capacity and Quality of Service Committee page in the default web browser

Support

Frequently Asked Questions – Opens the McTrans support page for HCS in the default web browser

HCS Overview – Opens the McTrans HCS Overview page in the default web browser

McTrans Website – Opens the McTrans home page in the default web browser

Email McTrans – Composes a new e-mail addressed to McTrans in the default e-mail client with registration number, serial key, module, and version number already populated in the Subject field

About HCS – Opens an about window with software version information, EULA, general acknowledgements, contact information, and other relevant links

CORSIM

View Animation – Sends data to the TSIS-CORSIM program for simulation and/or animation purposes, TRAFVU can be opened within TSIS-CORSIM to allow user to view animation; shortcut is Ctrl+Shift+A

Generate TRF File – Saves an open AWSC file (*.xaw) as a CORSIM file (*.trf), which is a file that contains the input data used to define a CORSIM network and to drive the CORSIM simulation for a single simulation case; shortcut is Ctrl+Shift+T

Exit – Exits the *HCS* AWSC module; shortcut is Alt+F4

All-Way Stop-Controlled Intersections

HCM Chapter 21

The procedure in this chapter can be used to analyze the capacity and level of service, lane requirements, and effects of traffic and design features of all-way stop-controlled (AWSC) intersections.

The procedure for AWSC intersections with one or two lane approaches is addressed in Part 3 of this chapter. The procedure for three lane approaches is addressed in Part 4 of this chapter, but also references supplemental material in Part 4 of Chapter 32. Example problems that demonstrate the calculations and results achieved by applying the procedures are found in Part 5 of Chapter 32.

LIMITATIONS OF THE METHODOLOGY

All of the methods are for steady-state conditions (i.e., the demand and capacity conditions are constant during the analysis period); the methods are not designed to evaluate how fast or how often the facility transitions from one demand/capacity state to another. Analysts interested in that kind of information should consider applying simulation models.

Operational Data

First, the user enters the Project Properties into the respective fields: Analyst, Agency or Company, Date Performed, Time Analyzed, Jurisdiction, Analysis Year, and Project Description. Then, the user enters the Intersection Data into the respective fields: Intersection, East/West Street Name, North/South Street Name, Analysis Time Period (normally 15 minutes, to represent the length of time the peak flow is constant), and Peak Hour Factor.

Note: Hovering over numeric input fields will display the allowable range for that input.

Next, the user codes the lane configurations and traffic characteristics. The total number of lanes per approach is limited to three by the HCM methodology.

The Volume for each movement of the intersection is coded in vehicles per hour. An hourly volume is required for any movement to be included in the analysis.

When there is a thru lane(s) coded along-side a shared left-thru or shared thru-right lane, the Percent Thrus Using Shared Lane field is activated. The user must enter this value to provide for the traffic split for the lanes.

Note: The Percent Heavy Vehicles input is coded by lane and should not be entered by movement.

For queue length calculations, the Stored Passenger Car Length and Stored Heavy Vehicle Length are provided.

Results

Level of Service (LOS) criteria for AWSC intersections in control delay (s/veh):

Control Delay (s/veh)	LOS by Volume-to-Capacity Ratio ^a	
	$v/c \leq 1.0$	$v/c > 1.0$
0–10	A	F
>10–15	B	F
>15–25	C	F
>25–35	D	F
>35–50	E	F
>50	F	F

Note: ^a For approaches and intersectionwide assessment, LOS is defined solely by control delay.

Note: For individual lane evaluation, if any v/c ratio exceeds 1.0, the LOS assigned is F. However, for evaluation at the approach and intersection level, v/c ratio is not considered and LOS is defined only by control delay values.

AWSC Report

The formatted version of the AWSC report is the default report view. The user may easily view the text report instead by clicking the Switch to Formatted Report button found at the bottom of the formatted report. The report updates dynamically based on changes to input values.

Note: In the formatted report, only the first two fields in Vehicle Volumes and Adjustments (Volume and % Thrus in Shared Lane) pertain to movements, as denoted by L, T or R. All subsequent fields pertain to the lane being analyzed, as denoted by L1, L2 or L3. LOS is also reported per lane. Similarly in the text report, only the fields in Vehicle Volumes and Adjustments pertain to movements, as denoted by L, T, or R. All other fields refer to the lane being analyzed, as denoted by L1, L2 or L3.

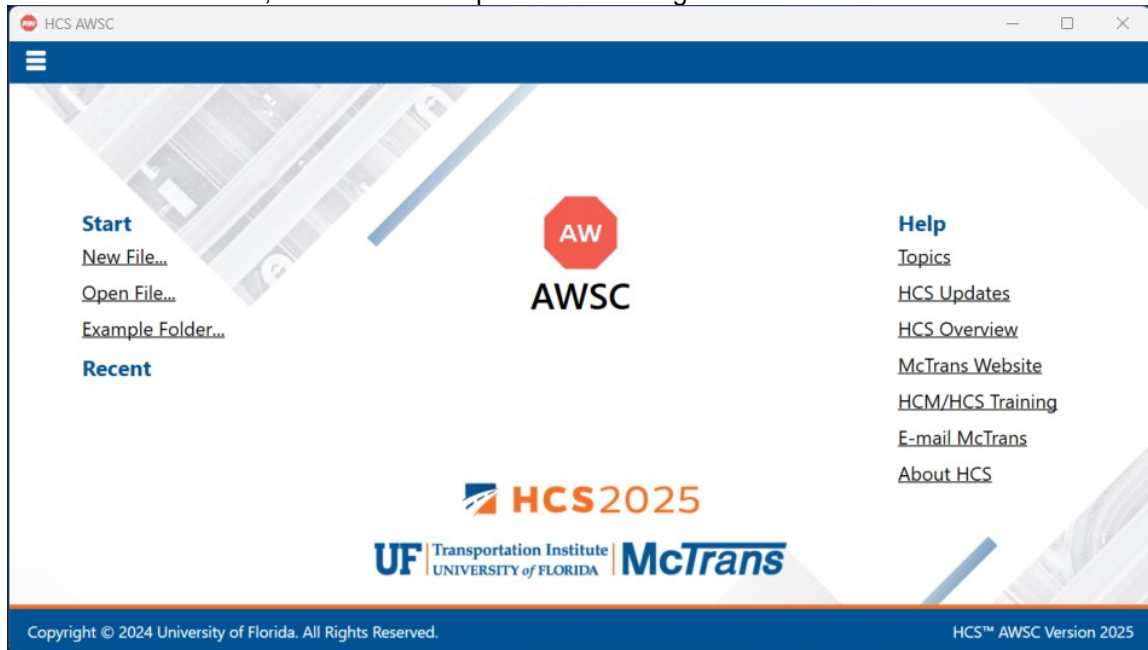
All or a portion of the report can be copied to the Windows clipboard for insertion into other files by right-clicking into the Report pane and selecting Copy or by using keyboard shortcuts Ctrl+C or Ctrl+A to select all. The Report pane can also be printed or saved to a PDF or XPS by using menu items to access Print or by using keyboard shortcut Ctrl+P.

Note: Due to the iterative nature of the AWSC procedure, it is recommended to stay in Page View if the user is making multiple edits to the input fields.

How To

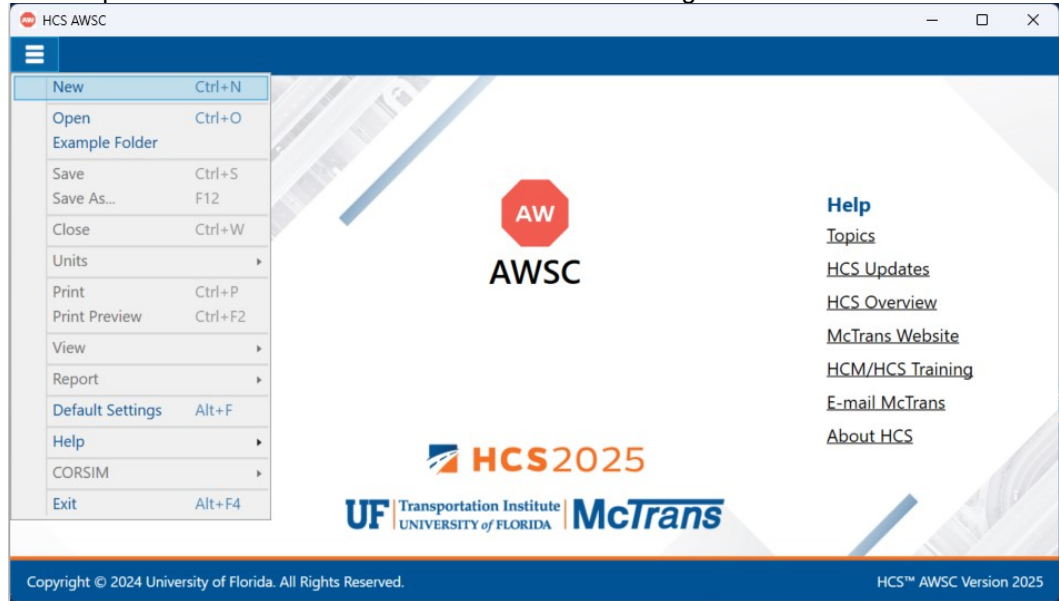
Create a New File

1. From the Start screen, there are three options for creating a new file:

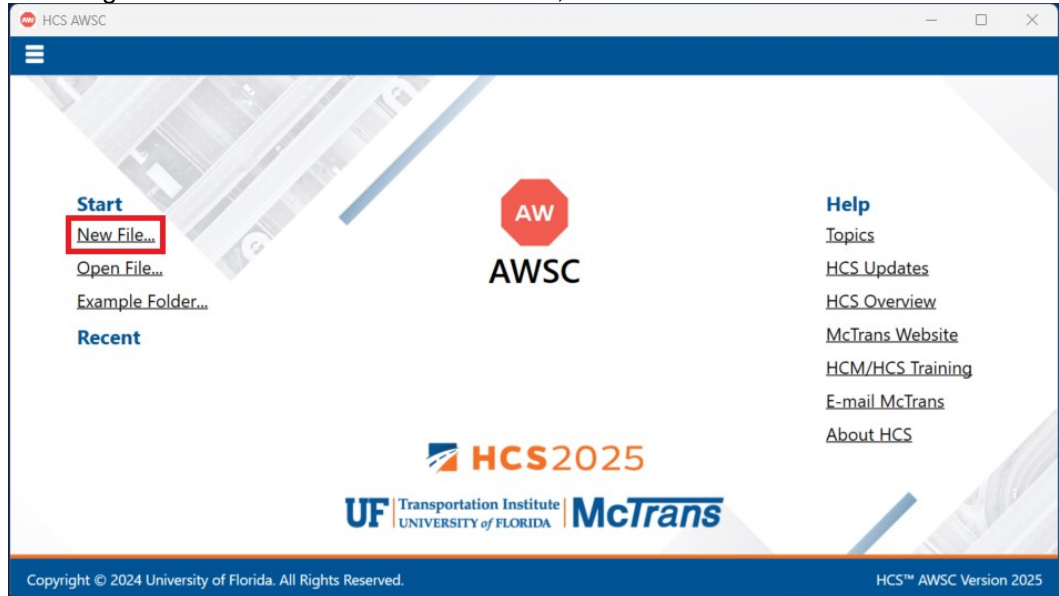


Note: A new file can be created if an existing file is already open; you do not need to start from the Start screen.

- a. Selecting *File* > *New* from the main menu; this can be found by selecting the three lines in the top left-hand corner of the screen and then selecting “New”



- b. Selecting “New File...” from the Start screen; this can be found below in the red box



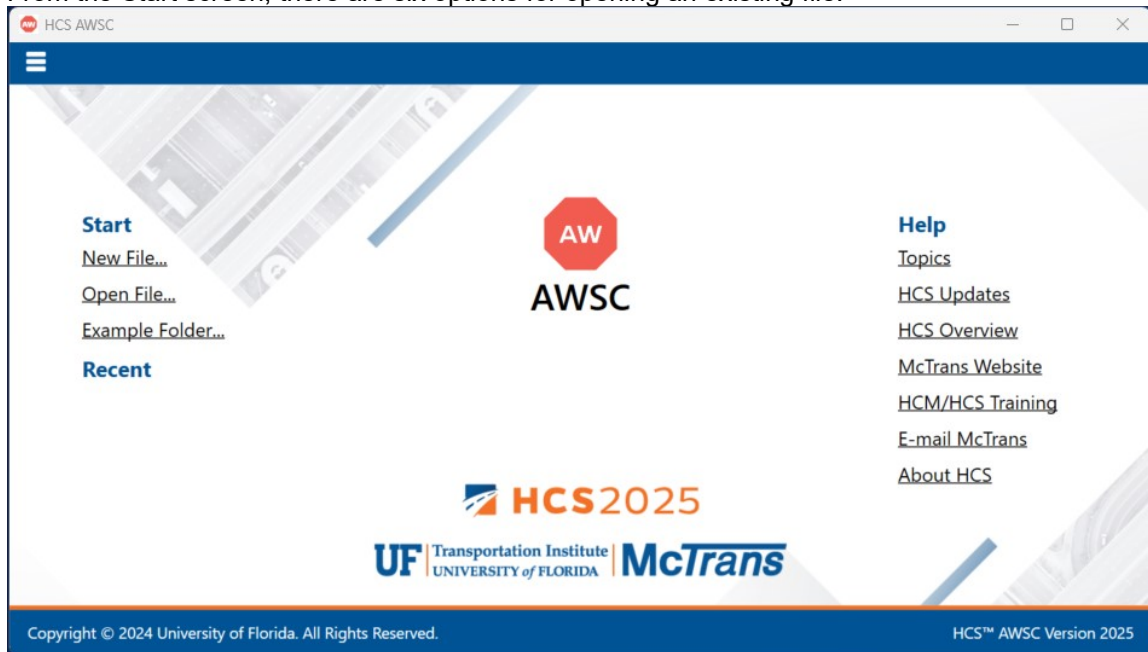
- c. Using the keyboard shortcut “Ctrl+N”
2. Once a new file is created, you will be brought to the General page if in Page View or the input screen split with the report either on the right or the bottom of the screen if in Full View

a. Page View

b. Full View

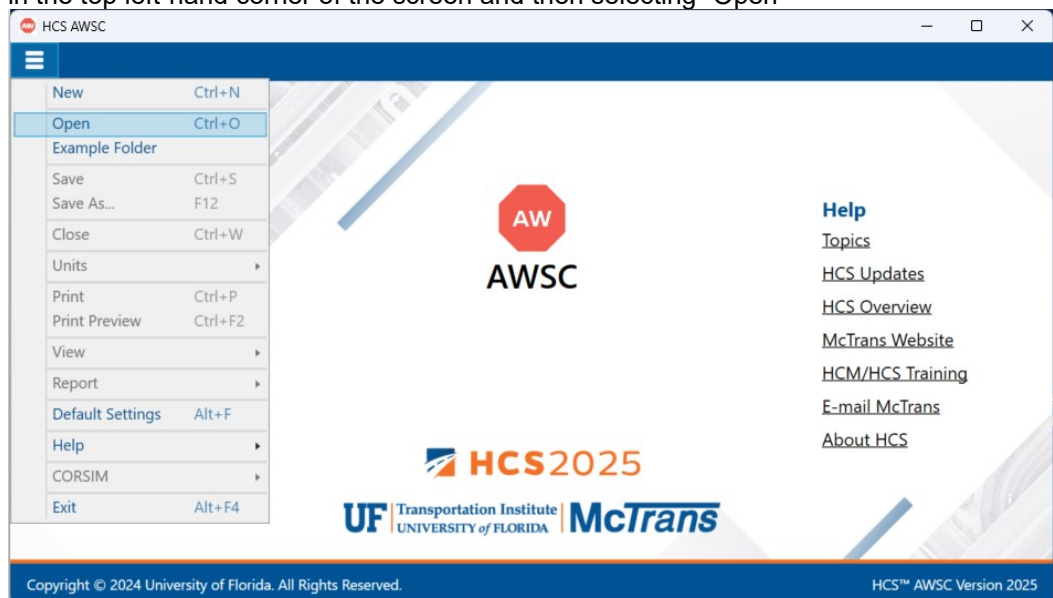
Open an Existing File

1. From the Start screen, there are six options for opening an existing file:

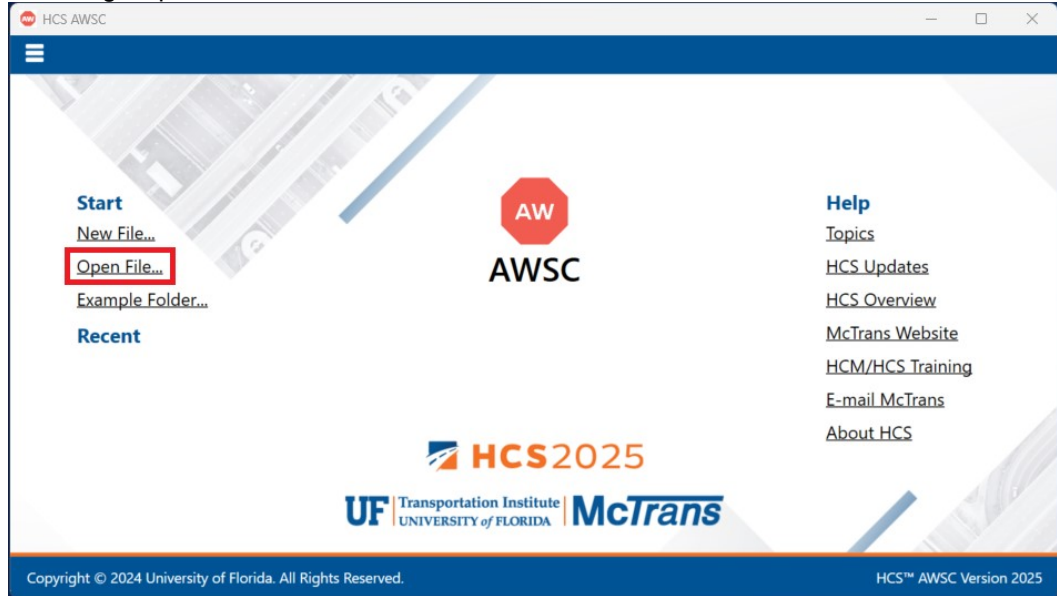


Note: A file can be opened even if another file is currently open; you do not need to start from the Start screen.

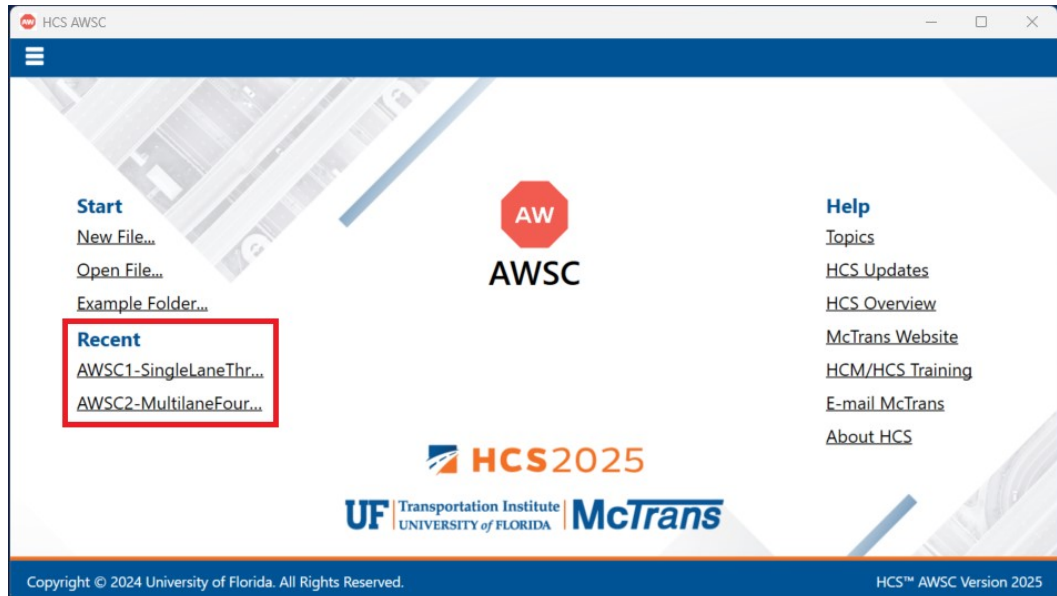
- a. Selecting *File > Open* from the main menu; this can be found by selecting the three lines in the top left-hand corner of the screen and then selecting “Open”



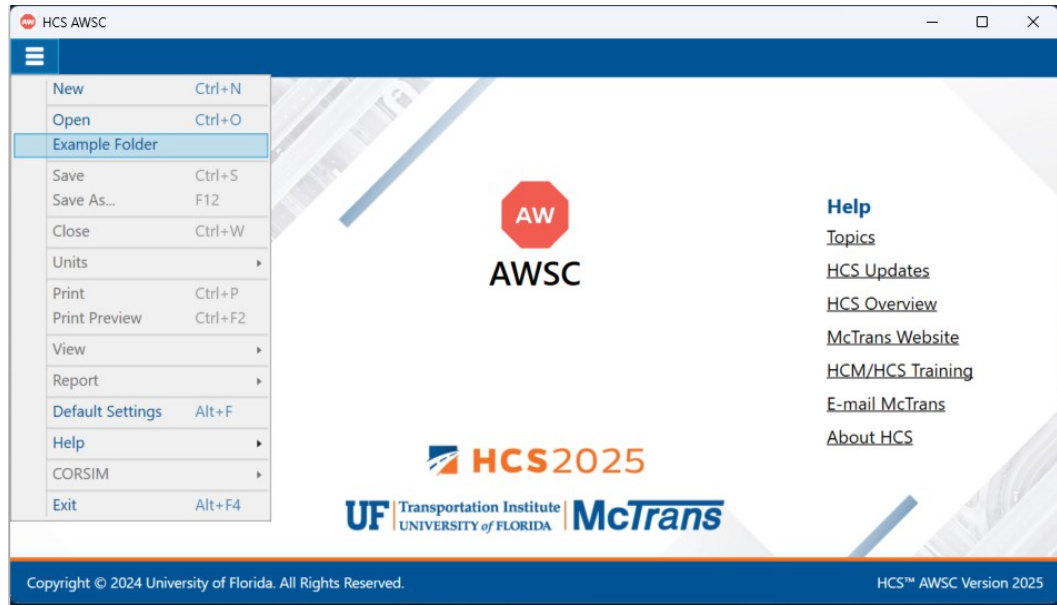
- b. Selecting “Open File...” from the Start screen; this can be found below in the red box



- c. Using the keyboard shortcut “Ctrl+O”
- d. Selecting a file under the Recent files list from the Start screen; this can be found below in the red box



- e. Selecting *File > Example Folder* from the main menu; this can be found by selecting the three lines in the top left-hand corner of the screen and then selecting “Example Folder”. Opening the example folder will open the path of the HCS example files in File Explorer. The desired example file can be double-clicked or right-clicked and selecting ‘Open’, which will open the example file in the AWSC program.



- f. Selecting “Example Folder...” from the Start screen; this can be found below in the red box. Opening the example folder will open the path of the HCS example files in File Explorer. The desired example file can be double-clicked or right-clicked and selecting ‘Open’, which will open the example file in the AWSC program.



2. Once an existing file is opened, you will be brought to the General page if in Page View or the input screen split with the report either on the right or the bottom of the screen if in Full View

a. Page View

Project Properties

Analyst: _____ Jurisdiction: _____
 Agency: _____ Analysis Year: 2024
 Date: 9/17/2024 Project Description: Chapter 32: Example Problem 1
 Time Analyzed: _____ Units: U.S. Customary

Intersection Data

Intersection: _____ Analysis Time Period: 0.25 hours
 East/West Street Name: _____ Peak Hour Factor: 0.95
 North/South Street Name: _____

Back Next

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b. Full View

Project Properties

Analyst: _____ Jurisdiction: _____
 Agency: _____ Analysis Year: 2024
 Date: 9/17/2024 Project Description: Chapter 32: Example Problem 1
 Time Analyzed: _____ Units: U.S. Customary

Intersection Data

Intersection: _____ Analysis Time Period: 0.25 hours
 East/West Street Name: _____ Peak Hour Factor: 0.95
 North/South Street Name: _____

Lanes

Diagram showing intersection layout with lane flow directions.

Vehicle Volume and Adjustments

Volume (vph)	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
50	300			300	100					100	50	
Percent Thrus Using Shared Lane (%)												

HCS All-Way Stop Control Report

General and Site Information

Agency/Cs: _____
 Date Performed: 9/17/2024
 Analysis Year: 2024
 Analysis Time Period (hrs): 0.25
 Time Analyzed: _____
 Project Description: Chapter 32: Example Problem 1
 Intersection: _____
 Jurisdiction: _____
 East/West Street: _____
 North/South Street: _____
 Peak Hour Factor: 0.95

Lanes

Diagram showing intersection layout with lane flow directions.

Turning Movement Demand Volumes

Movement	Eastbound			Westbound			Northbound			Southbound			
	L	T	R	L	T	R	L	T	R	L	T	R	
Volume (veh/h)	50	300				300	100					100	50

Lane Flow Rate and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	L1			R1						L1		
Flow Rate v (veh/h)	300			421						158		
Percent Heavy Vehicles	2			2						2		
Initial Departure Headway, h (s)	3.20			3.20						3.20		
Initial Degree of Utilization, u	0.327			0.374						0.140		
Final Departure Headway, h (s)	4.95			4.73						5.70		
Final Degree of Utilization, u	0.207			0.233						0.220		
Move-Up Time, m (s)	2.0			2.0						2.0		
Service Time, s (s)	2.95			2.73						3.70		

Capacity, Delay and Level of Service

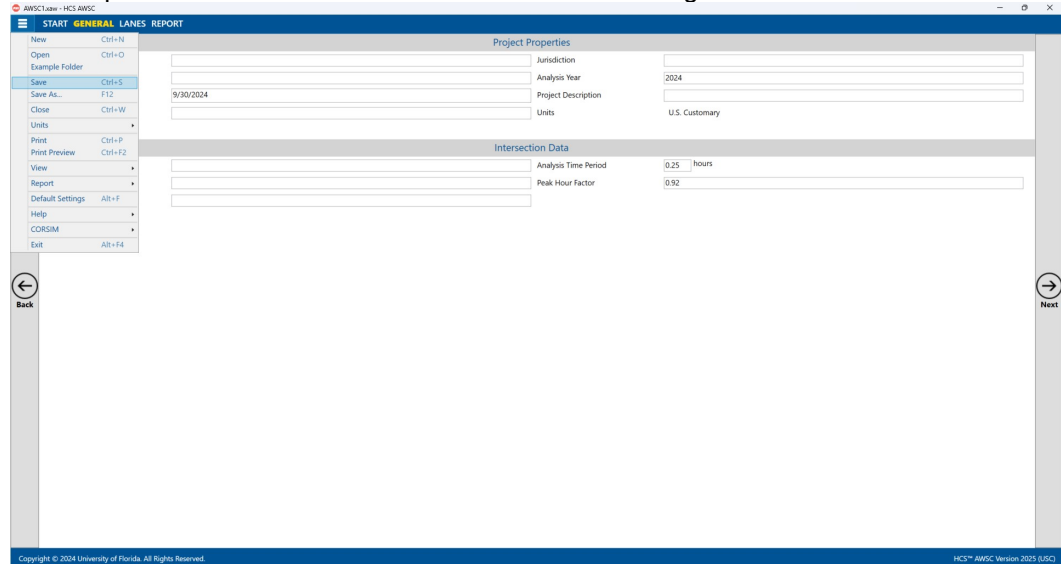
Approach	Eastbound			Westbound			Northbound			Southbound		
	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	L1			R1						L1		
Flow Rate v (veh/h)	300			421						158		
Capacity (veh/h)	727			769						681		
95% Queue Length, Q ₉₅ (veh)	2.9			3.4						1.0		
95% Queue Length, Q ₉₅ (ft)	73.7			86.4						25.4		

Switch to Full Report

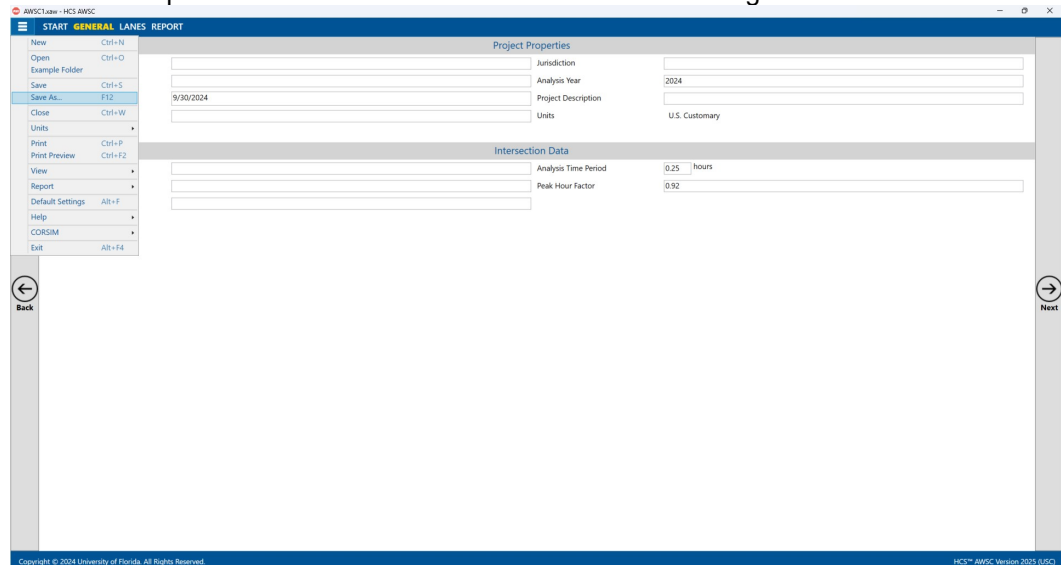
Copyright © 2024 University of Florida. All Rights Reserved. HCS™ AWSC Version 2025 (USC)

Save a File

1. There are five options for saving an open file:
 - a. Selecting *File* > *Save* from the main menu; this can be found by selecting the three lines in the top left-hand corner of the screen and then selecting “Save”

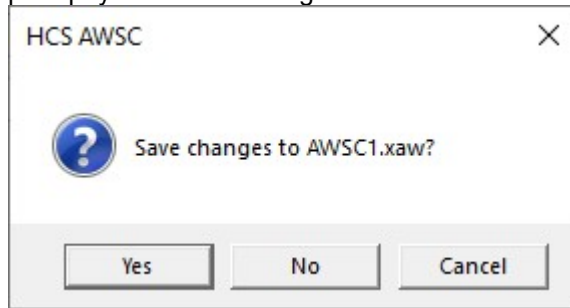


- b. Selecting *File* > *Save As...* from the main menu; this can be found by selecting the three lines in the top left-hand corner of the screen and then selecting “Save As...”



- c. Using the keyboard shortcut “Ctrl+S” for Save
- d. Using the keyboard shortcut “F12” for Save As

- e. Exiting the program or closing the file without saving changes beforehand; this will prompt you to save changes to the file before anything is closed

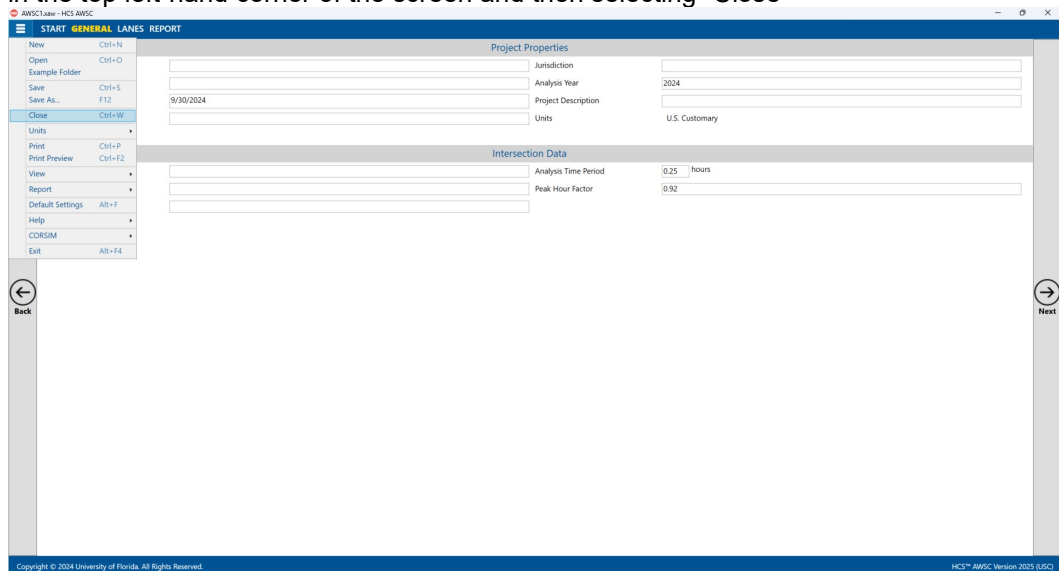


- i. Selecting “Yes” will save the file if it is an existing file. If the file has not been previously saved, the Save As dialog box will pop up allowing you to change the file name and save it.
- ii. Selecting “No” will exit the program or close the file without saving the file
- iii. Selecting “Cancel” will prevent the file from closing

Note: Using Save with an existing file will save a file without prompting you to specify a file name. Using Save with a new file will bring up the Save As dialog box for you to specify a file name for saving. Using Save As will always bring up the Save As dialog box for you to specify a file name for saving.

Close a File

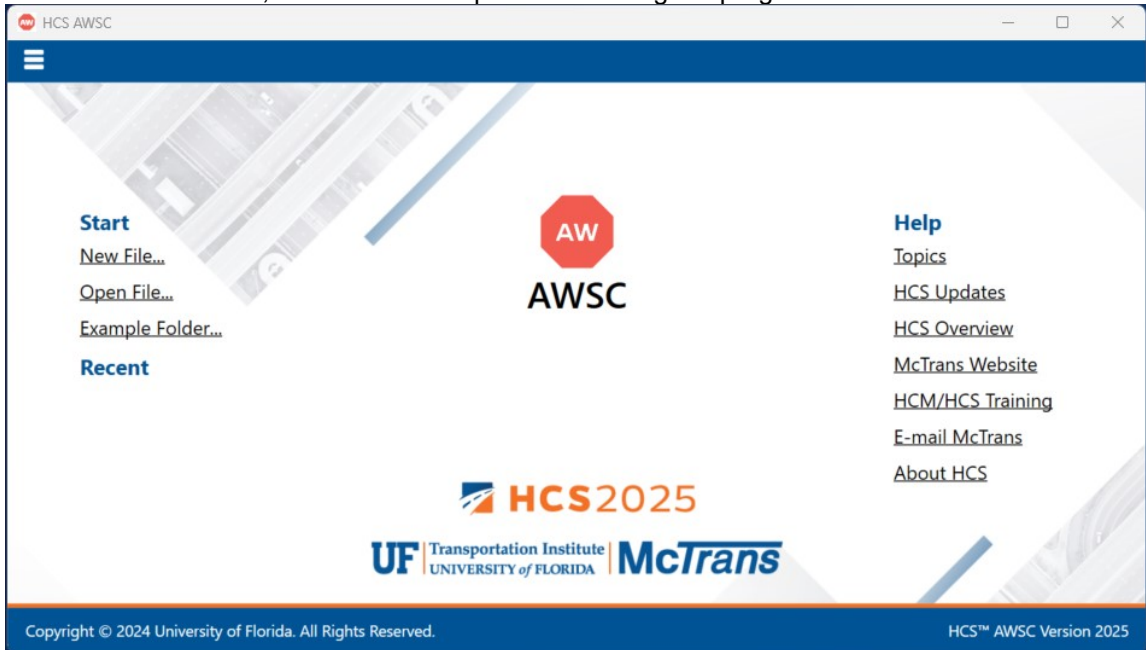
- 1. There are three options for closing an open file:
 - a. Selecting *File > Close* from the main menu; this can be found by selecting the three lines in the top left-hand corner of the screen and then selecting “Close”



- b. Using the keyboard shortcut “Ctrl+W”
- c. Exiting the program itself; please see *How To: Exit the Program*

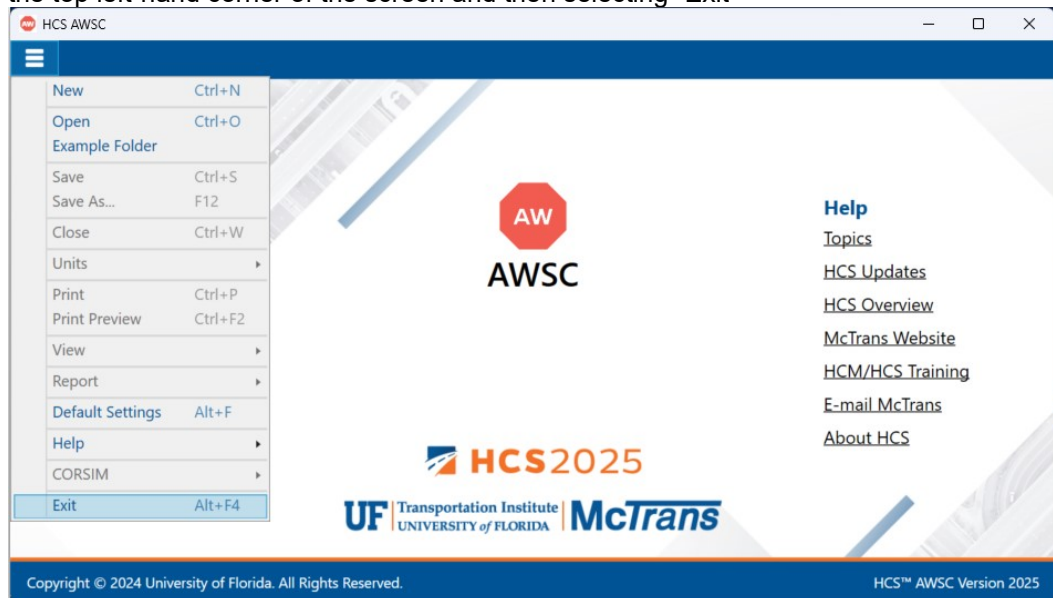
Exit the Program

1. From the Start screen, there are three options for exiting the program:



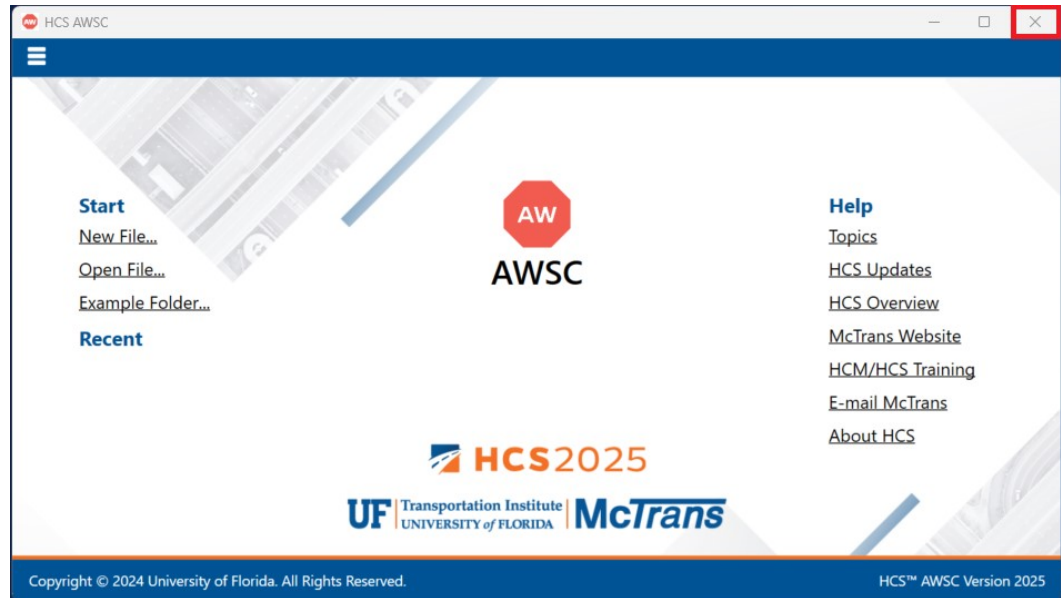
Note: The program can be exited even if a file is still open; you do not need to start from the Start screen.

- a. Selecting *File > Exit* from the main menu; this can be found by selecting the three lines in the top left-hand corner of the screen and then selecting “Exit”



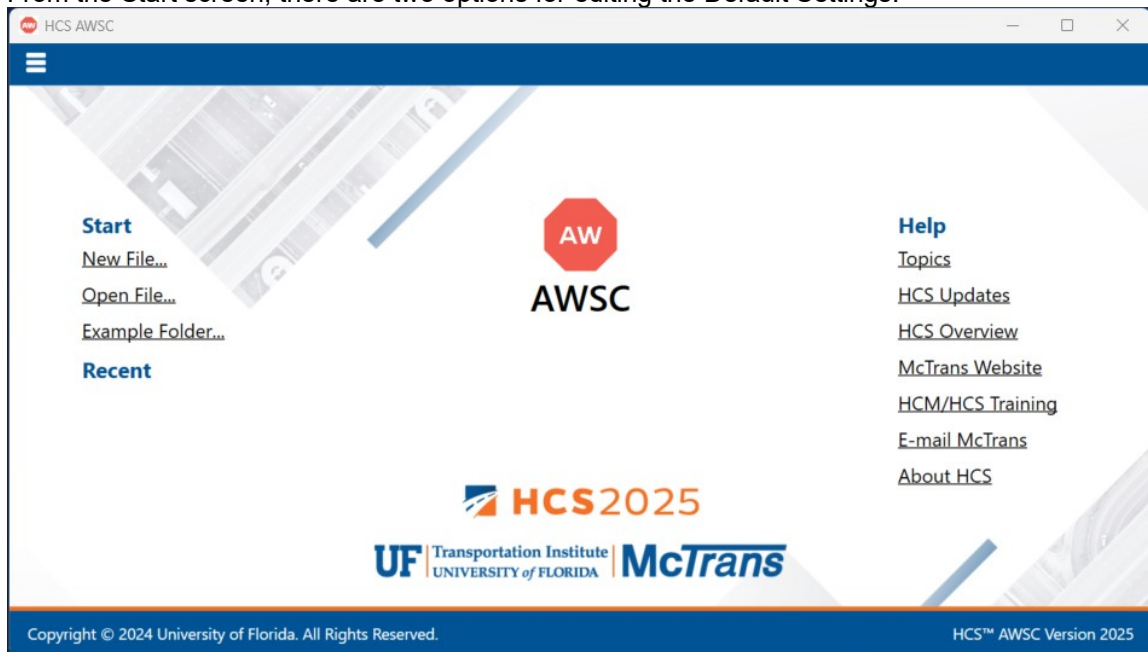
- b. Using the keyboard shortcut “Alt+F4”

- c. Selecting “X” in the top right-hand corner of the screen; this can be found below in the red box



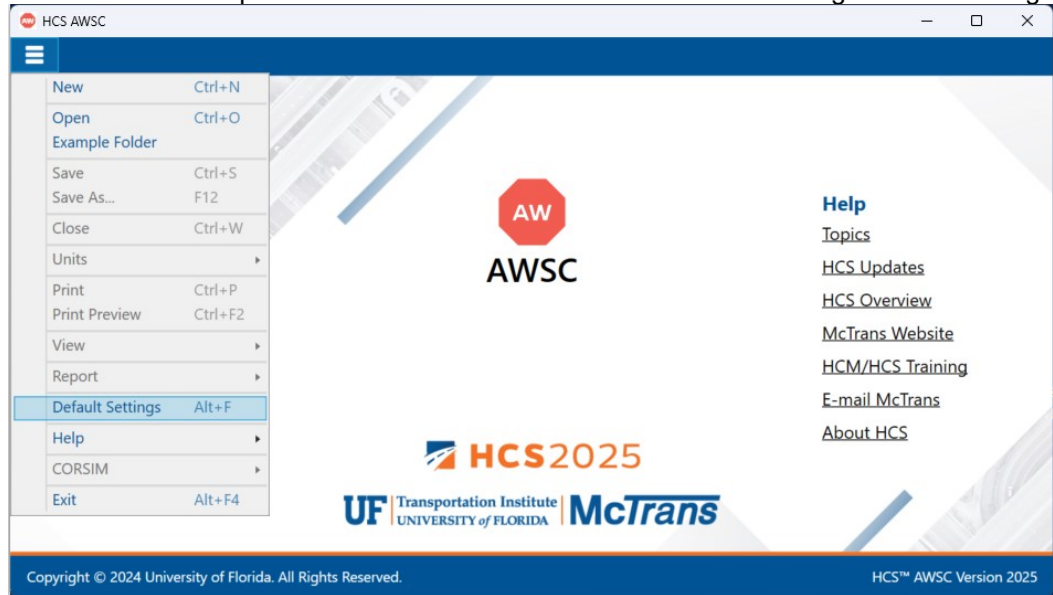
Edit the Default Settings

1. From the Start screen, there are two options for editing the Default Settings:



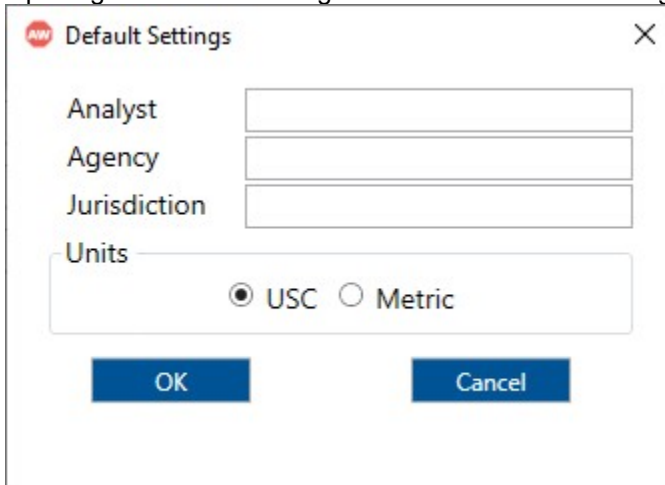
Note: The Default Settings can be changed even if an existing file is already open; you do not need to start from the Start screen.

- a. Selecting *File > Default Settings* from the main menu; this can be found by selecting the three lines in the top left-hand corner of the screen and then selecting “Default Settings”



- b. Using the keyboard shortcut “Alt+F”

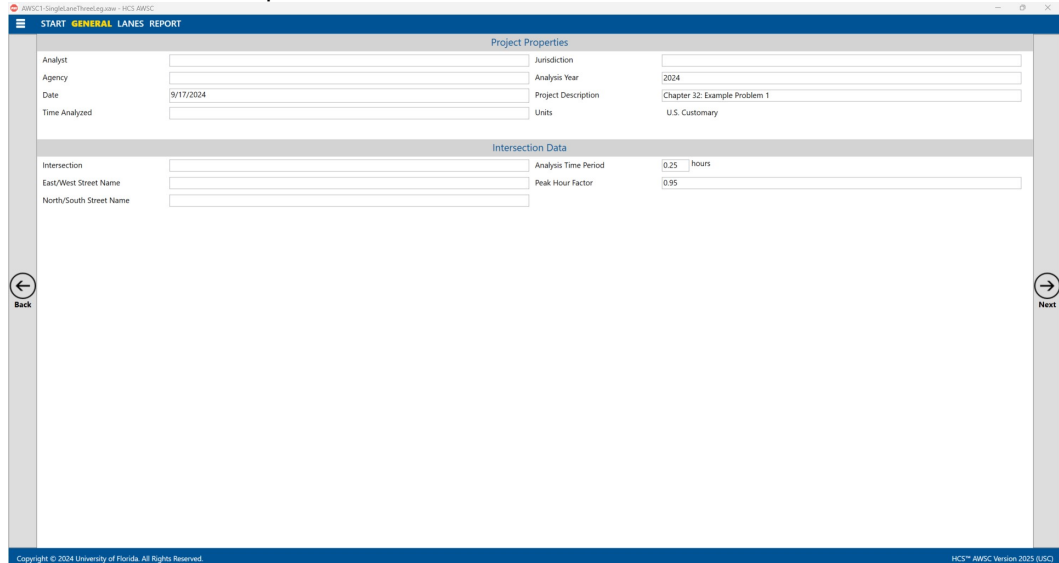
2. Opening the Default Settings will cause a Default Settings window to pop up:



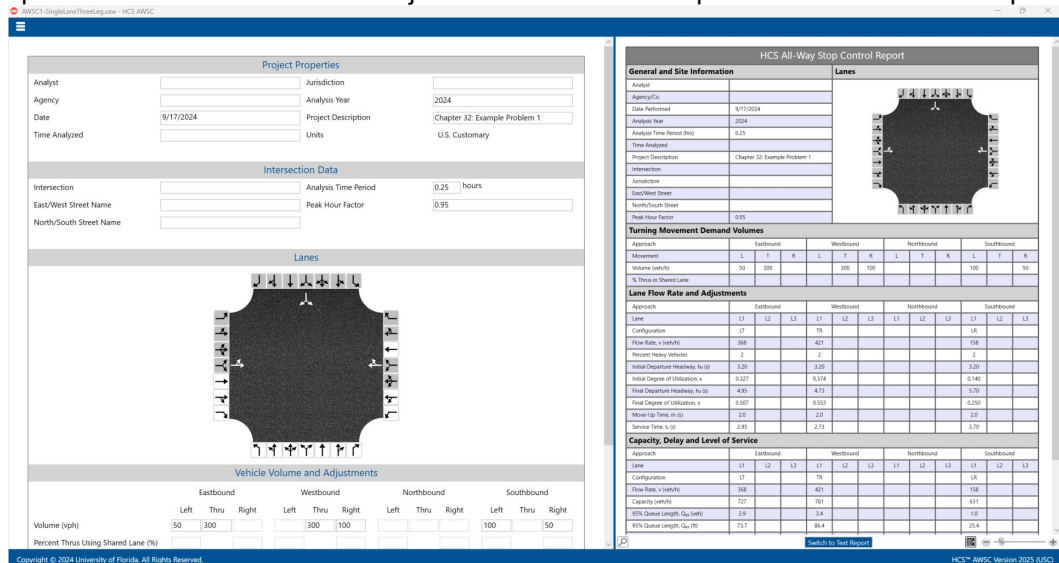
3. You can specify Analyst, Agency, and Jurisdiction by clicking in the corresponding text boxes and typing the desired text.
4. Under 'Units', you are given the option of running the analysis in either *U.S. Customary (USC)* or *SI (Metric)* units.
5. Clicking “OK” will save the changes made and close the Default Settings window; clicking “Cancel” will close the Default Settings window without saving any changes.
6. When a new file is created, the Analyst, Agency, and Jurisdiction fields will automatically be populated with the text specified in the Default Settings.
7. When starting a new file, the input and results will display according to the units specified in the Default Settings.

Change the View

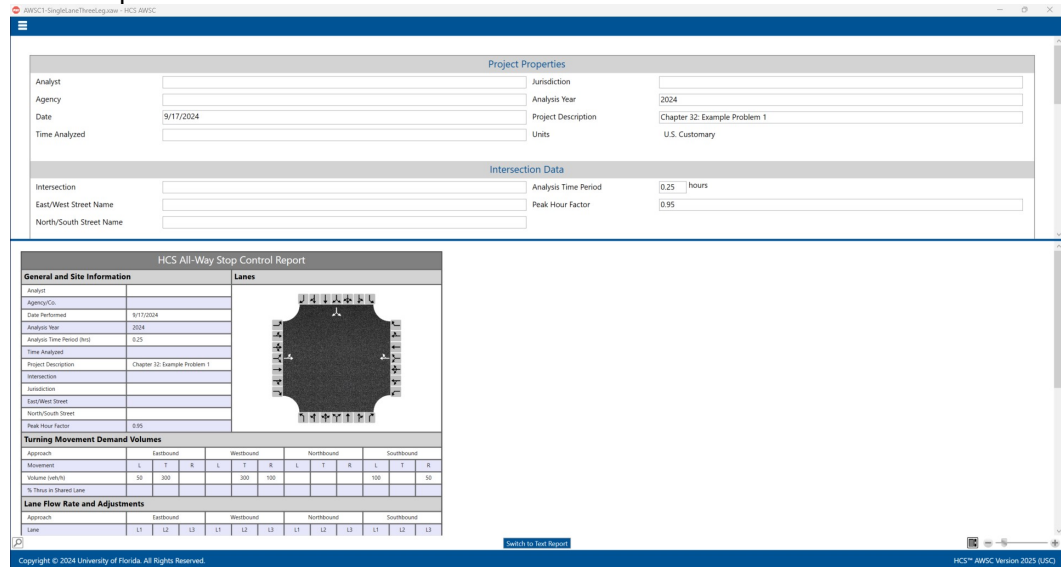
1. When a file is open, there are three main options for the view of the program:
 - a. Page View: the inputs and results reports are separated into pages as seen below. You can navigate between pages using the “Back” and “Next” buttons or by clicking the page names found at the top of the screen.



- b. Full View with the report on the right of the screen: the screen is split with all inputs on the left side and the results reports on the right side. You can access all inputs and view all of the current report by using the corresponding scroll bars. There is also a screen splitter that can be moved to adjust the views of the input screen and results report.



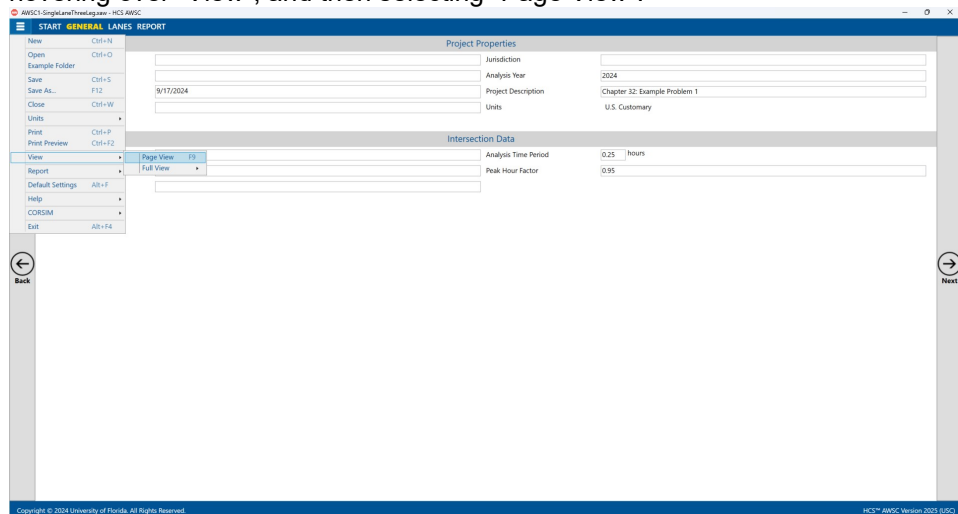
- c. Full View with the report on the bottom of the screen: the screen is split with all inputs on the top of the screen and the results reports on the bottom of the screen. You can access all inputs and view all of the current report by using the corresponding scroll bars. There is also a screen splitter that can be moved to adjust the views of the input screen and results report.



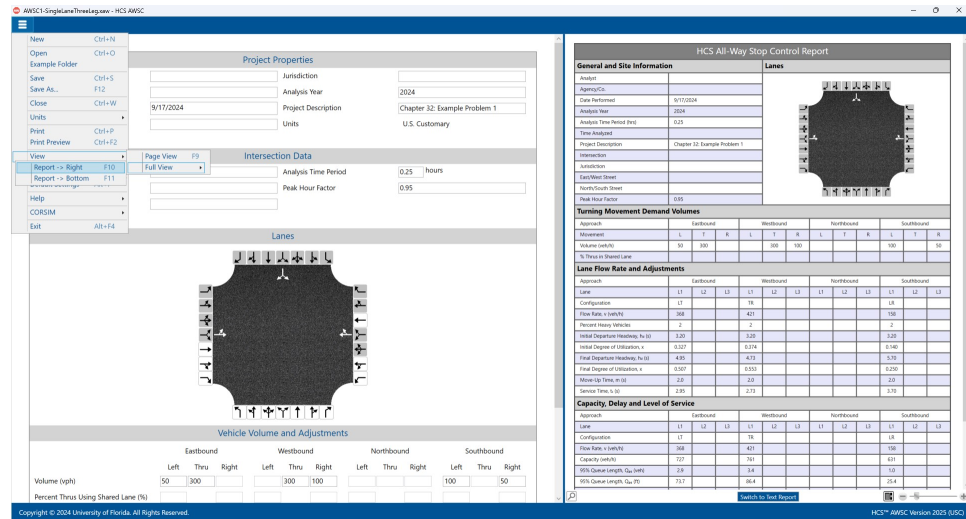
- 2. Views can be changed by using the main menu items or the keyboard shortcuts.

- a. Main Menu Items

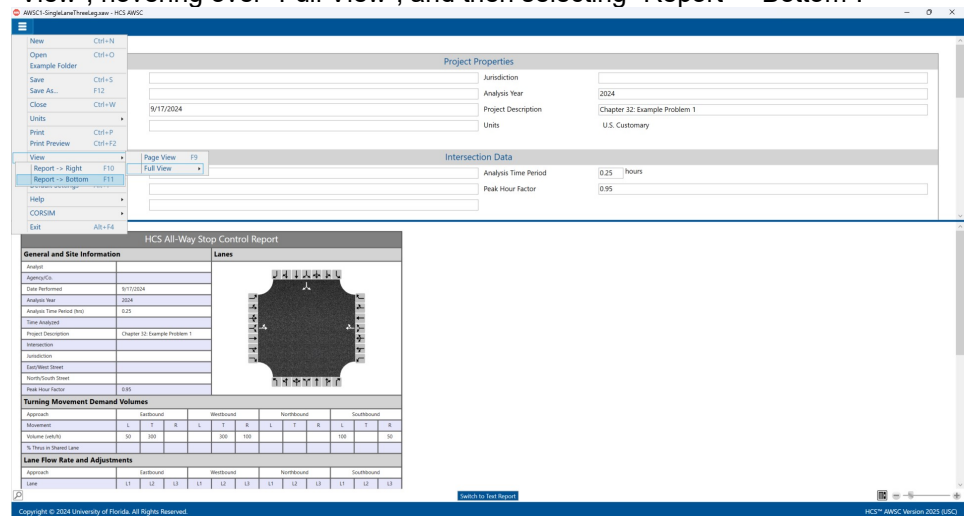
- i. To switch to Page View, select *File > View > Page View* from the main menu; this can be found by selecting the three lines in the top left-hand corner of the screen, hovering over “View”, and then selecting “Page View”.



- ii. To switch to Full View with the report on the right of the screen, select *File > View > Full View > Report -> Right* from the main menu; this can be found by selecting the three lines in the top left-hand corner of the screen, hovering over “View”, hovering over “Full View”, and then selecting “Report -> Right”.



- iii. To switch to Full View with the report on the bottom of the screen, select *File > View > Full View > Report -> Bottom* from the main menu; this can be found by selecting the three lines in the top left-hand corner of the screen, hovering over “View”, hovering over “Full View”, and then selecting “Report -> Bottom”.



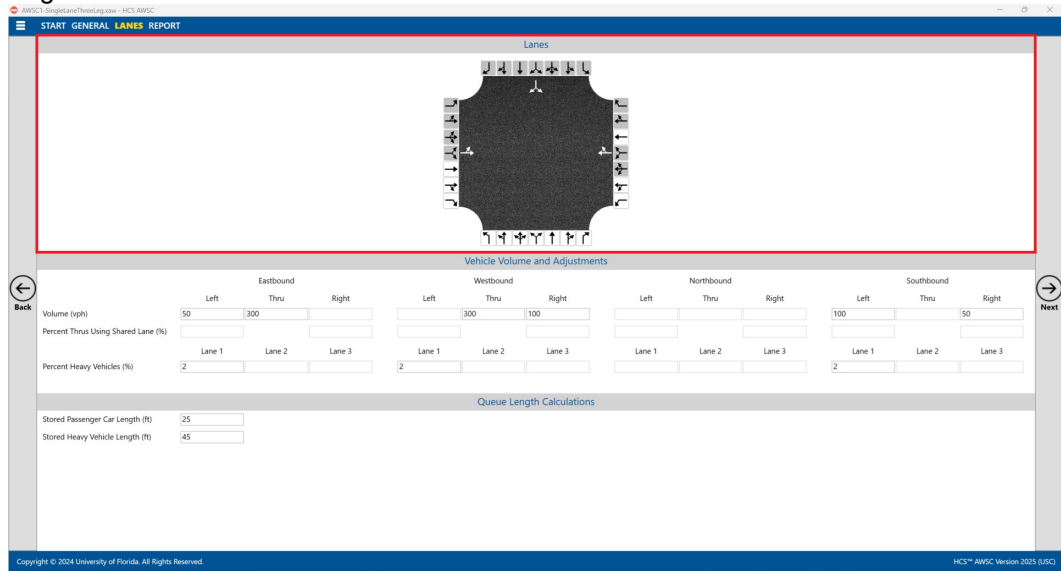
b. Keyboard Shortcuts

- i. Page View: keyboard shortcut is “F9”
- ii. Full View with report on the right of the screen: keyboard shortcut is “F10”
- iii. Full View with report on the bottom of the screen: keyboard shortcut is “F11”

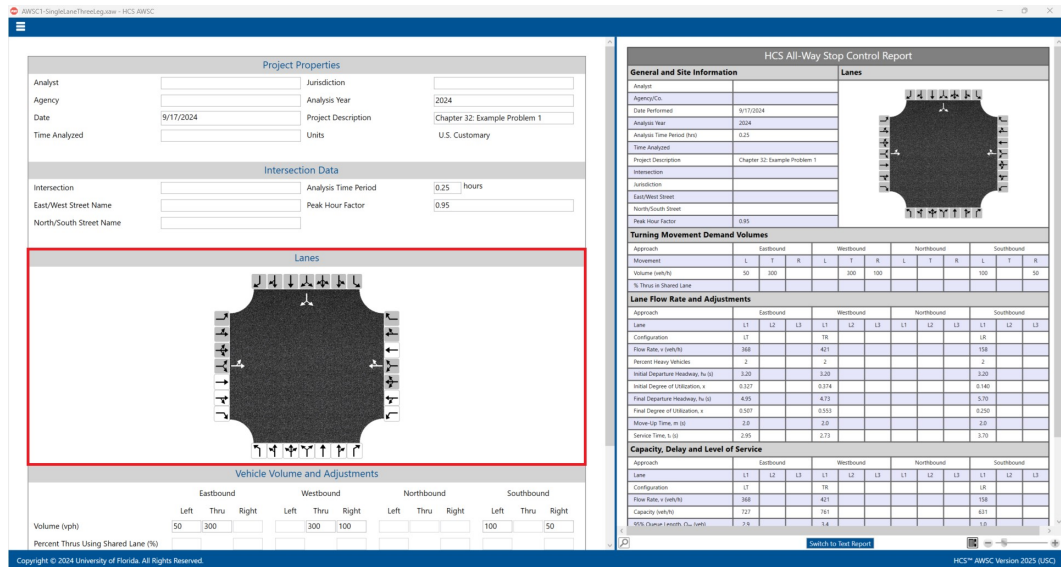
Change the Lane Configuration

1. When a new file is created or an existing file is opened, the lane configuration can be changed under the Lanes sections. This can be found on the Lanes page if using Page View or the input portion of the split screen if using Full View

a. Page View

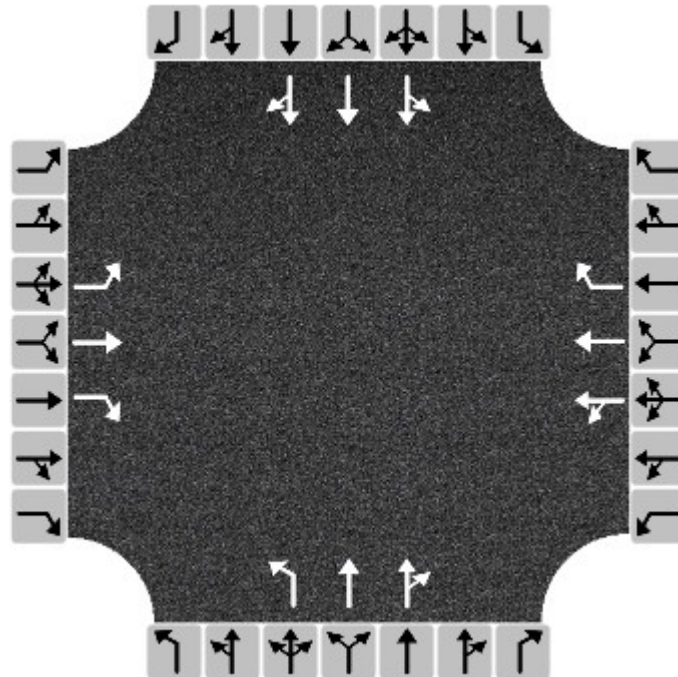


b. Full View

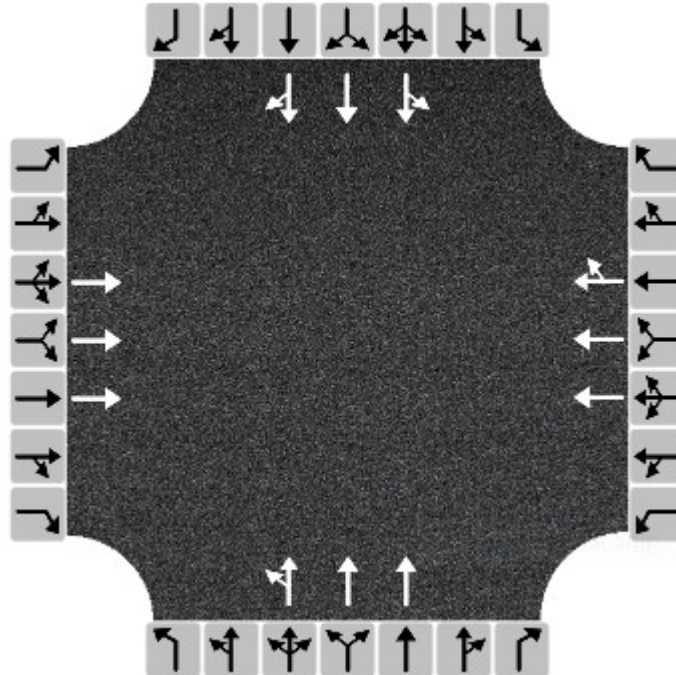


- To add lanes, click on the lane buttons (black arrows) on the edges of the lanes graphic. If the background of a lane button is white, the lane is available to add to the corresponding approach. If the background of a lane button is gray, it is disabled and cannot be added to the corresponding approach based on the current lane configuration.

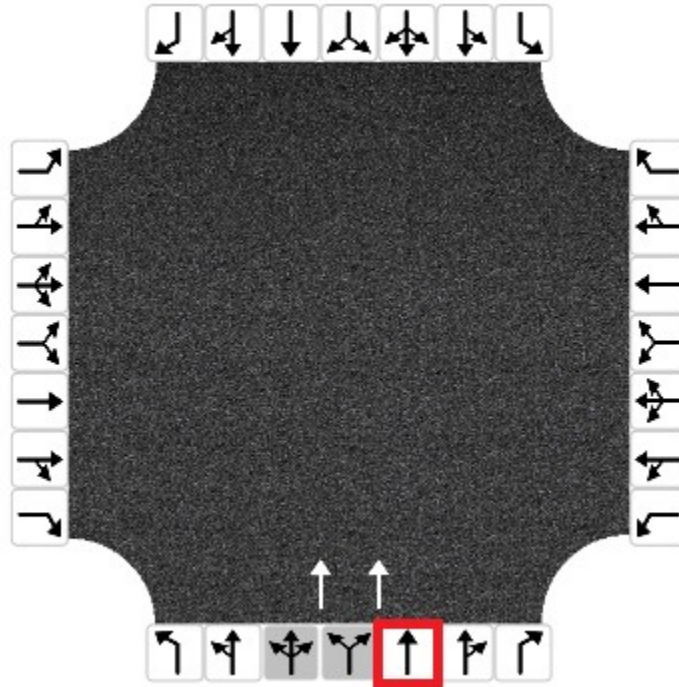
a. Each approach allows up to three lanes to be added



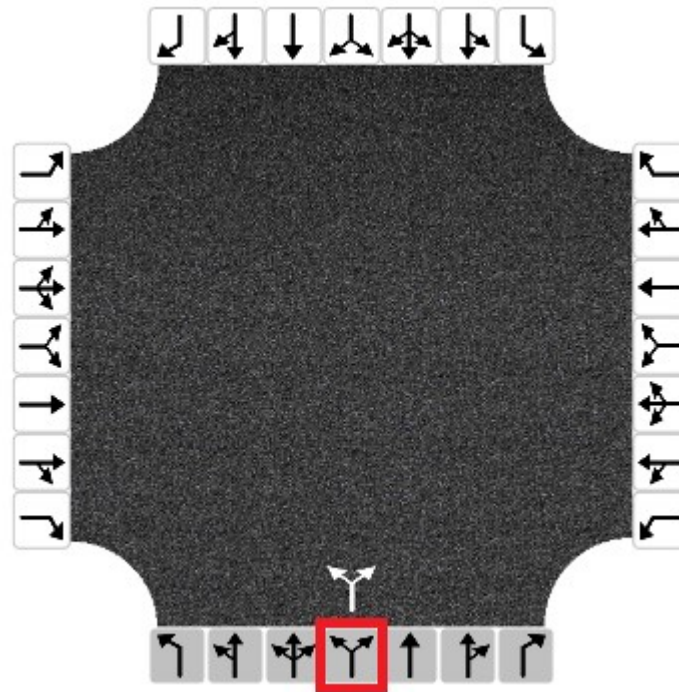
b. Each approach allows up to three thru (exclusive or shared) lanes to be added



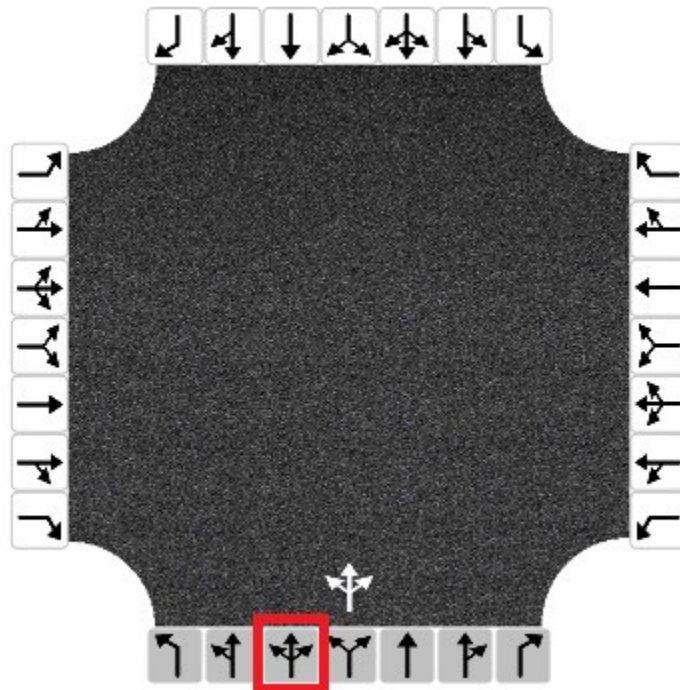
- c. Adding one or two exclusive thru (T) lanes will disable the shared left-thru-right (LTR) and shared left-right (LR) lanes



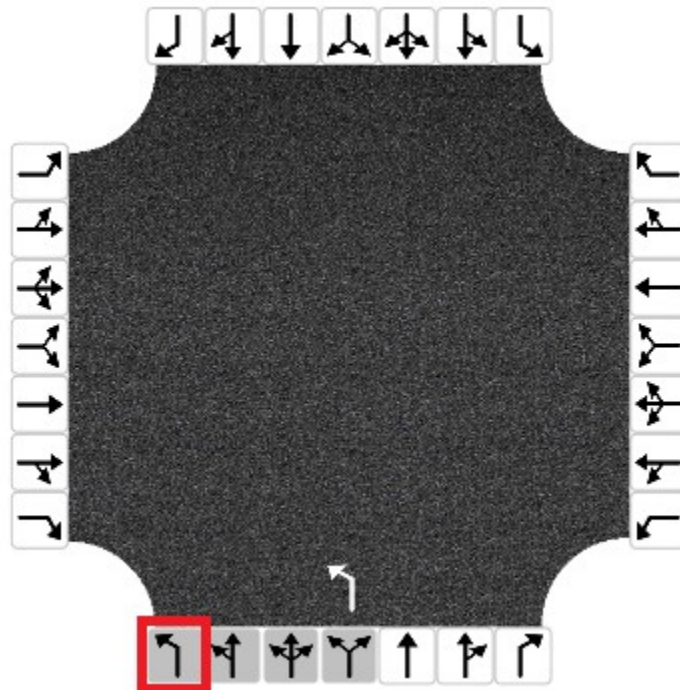
- d. Adding a shared left-right (LR) lane will disable all other lanes



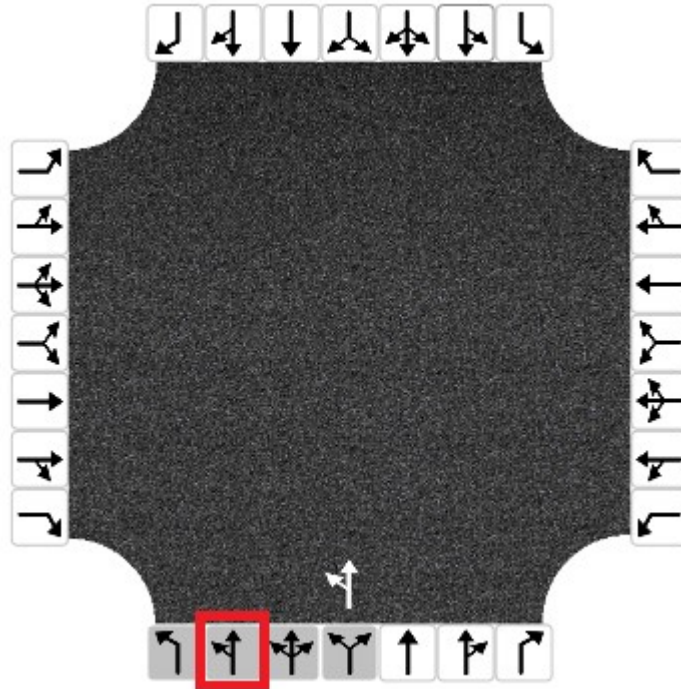
- e. Adding a shared left-thru-right (LTR) lane will disable all other lanes



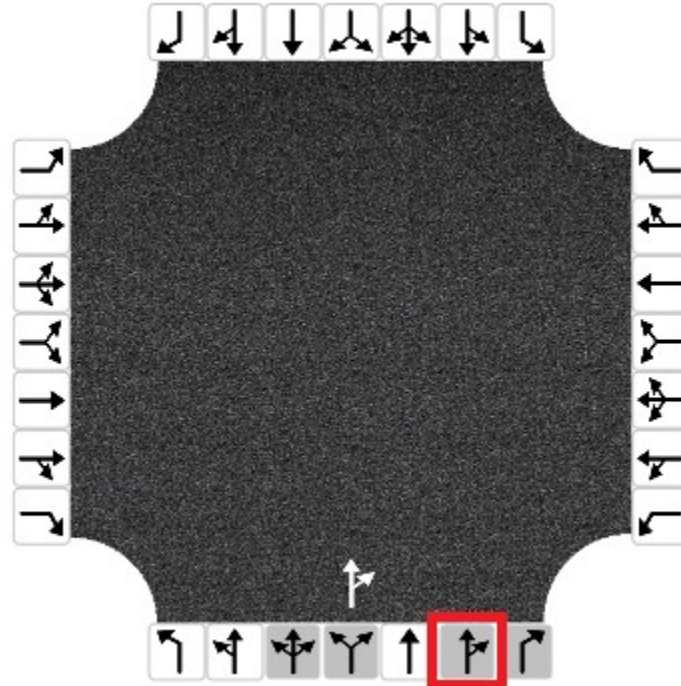
- f. Adding an exclusive left (L) lane will disable the exclusive left (L), shared left-thru (LT), shared left-thru-right (LTR), and shared left-right (LR) lanes



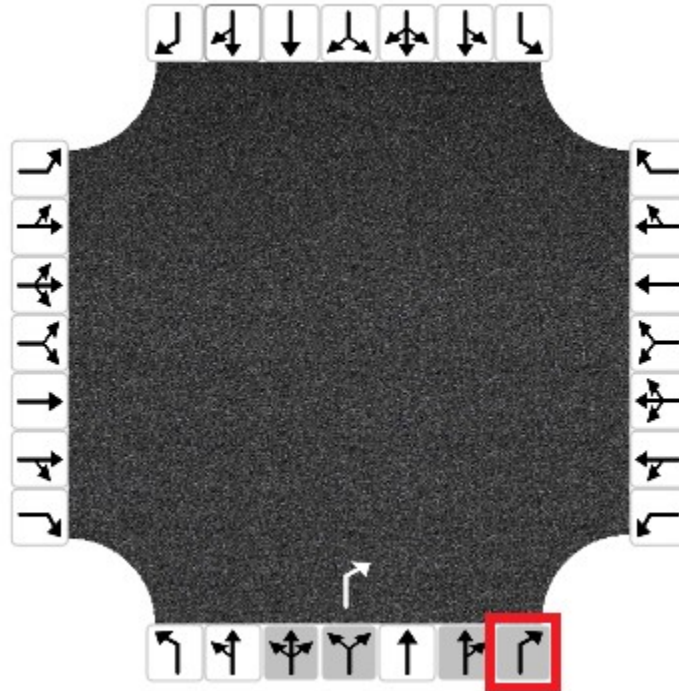
- g. Adding a shared left-thru (LT) lane will disable the exclusive left (L), shared left-thru (LT), shared left-thru-right (LTR), and shared left-right (LR) lanes



- h. Adding a shared thru-right (TR) lane will disable the shared left-thru-right (LTR), shared left-right (LR), shared thru-right (TR), and exclusive right (R) lanes



- i. Adding an exclusive right (R) lane will disable the shared left-thru-right (LTR), shared left-right (LR), shared thru-right, and exclusive right (R) lanes



3. To remove lanes, click on the lanes within the center of the lanes graphic (white arrows). Clicking on an arrow will immediately remove the lane and change which lane buttons are enabled/disabled for the corresponding approach.
4. Changes to the lane configuration on the lanes graphic in the input screen will be reflected on the lanes graphic in the formatted report and the lane information in both the formatted and text reports.

Enable and Edit the Percent Thrus Using Shared Lane Fields

- To enable the 'Percent Thrus Using Shared Lane (%)' field(s) for a specific approach, the lane configuration for the approach should have at least two thru lanes and one of the thru lanes must be a shared thru lane.

The screenshot shows the 'LANES' configuration screen in the HCS AWSC software. At the top, there is a diagram of a four-way intersection with lane configurations for each approach. Below the diagram is a table for 'Vehicle Volume and Adjustments' with columns for Eastbound, Westbound, Northbound, and Southbound, each subdivided into Left, Thru, and Right lanes. A red box highlights the 'Percent Thrus Using Shared Lane (%)' row. Below this is a 'Queue Length Calculations' section with input fields for 'Stored Passenger Car Length (ft)' and 'Stored Heavy Vehicle Length (ft)'.

	Eastbound			Westbound			Northbound			Southbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume (vph)	0	0		0	0	0	0	0	0	0	0	0	
Percent Thrus Using Shared Lane (%)	50			50		50			33		33		33
Percent Heavy Vehicles (%)	2	2		2	2		2	2	2	2	2	2	

- To enable the Left field for 'Percent Thrus Using Shared Lane (%)' field, the lane configuration for the approach should include one of the following:
 - LT, T
 - LT, T, T
 - LT, T, TR
 - LT, T, R
 - LT, TR
- To enable the Right field for 'Percent Thrus Using Shared Lane (%)' field, the lane configuration for the approach should include one of the following:
 - T, TR
 - L, T, TR
 - LT, T, TR
 - T, T, TR

- v. LT, TR
2. The percentage defaults populated in the 'Percent Thrus Using Shared Lane (%)' fields is dependent on the number of thru lanes coded.
 - a. If there are two thru lanes coded for an approach, the corresponding percentage would be 50.
 - i. LT, T: Left = enabled, 50; Right = disabled
 - ii. LT, T, TR: Left = enabled, 50; Right = disabled
 - iii. T, TR: Left = disabled; Right = enabled, 50
 - iv. L, T, TR: Left = disabled; Right = enabled, 50
 - v. LT, TR: Left = enabled, 50; Right = enabled, 50
 - b. If there are three thru lanes coded for an approach, the corresponding percentage would be 33.
 - i. LT, T, T: Left = enabled, 33; Right = disabled
 - ii. LT, T, TR: Left = enabled, 33; Right = enabled, 33
 - iii. T, T, TR: Left = disabled; Right = enabled, 33
 3. The range for the 'Percent Thrus Using Shared Lane (%)' is from 0 to 100.
 4. The percentages can be edited and will maintain a maximum total of 100% for the approach.
 - a. Lane Configuration: LT, TR (both Left and Right fields are enabled)
 - i. If one field is edited that will cause the total of the two fields to exceed 100, the other field will automatically adjust according to the initial field edited. For example: if both fields are set at 50, one is edited to 70, the other will automatically be set to 30.
 - ii. When there are only two thru lanes, the total of the two fields must equal 100. For example: if both fields are set at 50, one is edited to 25, the other will automatically be set to 75.
 - b. Lane Configuration: LT, T, TR
 - i. The total of the two fields can be less than 100. For example, if both fields are set at 33, one is edited to 20, the other will remain at 33.
 - ii. When there are three thru lanes, the total of the two fields cannot exceed 100. For example, if both fields are set at 33, one is edited to 80, the other will automatically be set to 20.

View Results of the Analysis

- After editing all the necessary inputs, results of the analysis can be found in the form of reports. Reports can be found on the Report page if using Page View or on the results portion of the split screen if using Full View.

- Page View with Report page displayed

HCS All-Way Stop Control Report

General and Site Information

Analyst	
Agency/Cs.	
Date Performed	9/17/2024
Analysis Year	2024
Analysis Time Period (hrs)	0.25
Time Analyzed	
Project Description	Chapter 32: Example Problem 1
Intersection	
Jurisdiction	
East/West Street	
North/South Street	
Peak Hour Factor	0.95

Lanes

Turning Movement Demand Volumes

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh/h)	50	300		300	100					100		50
% Thru in Shared Lane												

Lane Flow Rate and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	L1					R1						R1
Flow Rate, v (veh/h)	368					421						158
Percent Heavy Vehicles	2					2						2
Initial Departure Headway, h (s)	3.25					3.25						3.25
Initial Degree of Utilization, v	0.327					0.374						0.143
Final Departure Headway, h (s)	4.95					4.73						5.70
Final Degree of Utilization, v	0.207					0.203						0.202
Move-Up Time, h (s)	2.20					2.20						2.20
Service Time, s (s)	2.95					2.73						3.70

Capacity, Delay and Level of Service

Approach	Eastbound			Westbound			Northbound			Southbound		
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	L1					R1						R1
Flow Rate, v (veh/h)	368					421						158
Capacity (veh/h)	727					761						631
95% Chance Length, C ₉₅ (veh)	2.6					3.4						1.0
95% Chance Length, C ₉₅ (veh)	17.1					17.1						17.1

- Full View with the report on the right of the screen

Project Properties

Analyst: Jurisdiction:
 Agency: Analysis Year: 2024
 Date: 9/17/2024 Project Description: Chapter 32: Example Problem 1
 Time Analyzed: Units: U.S. Customary

Intersection Data

Intersection: Analysis Time Period: 0.25 hours
 East/West Street Name: Peak Hour Factor: 0.95
 North/South Street Name:

Lanes

Vehicle Volume and Adjustments

Volume (vph)	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
	50	300		300	100					100		50
Percent Thru Using Shared Lane (%)												

HCS All-Way Stop Control Report

General and Site Information

Analyst	
Agency/Cs.	
Date Performed	9/17/2024
Analysis Year	2024
Analysis Time Period (hrs)	0.25
Time Analyzed	
Project Description	Chapter 32: Example Problem 1
Intersection	
Jurisdiction	
East/West Street	
North/South Street	
Peak Hour Factor	0.95

Lanes

Turning Movement Demand Volumes

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh/h)	50	300		300	100					100		50
% Thru in Shared Lane												

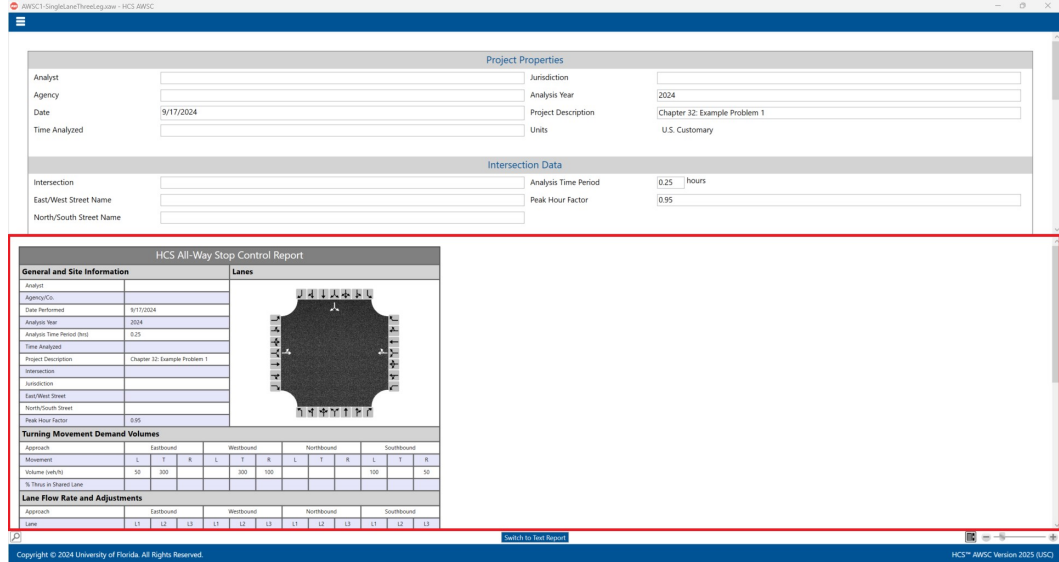
Lane Flow Rate and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	L1					R1						R1
Flow Rate, v (veh/h)	368					421						158
Percent Heavy Vehicles	2					2						2
Initial Departure Headway, h (s)	3.25					3.25						3.25
Initial Degree of Utilization, v	0.327					0.374						0.143
Final Departure Headway, h (s)	4.95					4.73						5.70
Final Degree of Utilization, v	0.207					0.203						0.202
Move-Up Time, h (s)	2.20					2.20						2.20
Service Time, s (s)	2.95					2.73						3.70

Capacity, Delay and Level of Service

Approach	Eastbound			Westbound			Northbound			Southbound		
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	L1					R1						R1
Flow Rate, v (veh/h)	368					421						158
Capacity (veh/h)	727					761						631
95% Chance Length, C ₉₅ (veh)	2.6					3.4						1.0
95% Chance Length, C ₉₅ (veh)	17.1					17.1						17.1

c. Full View with the report on the bottom of the screen



2. There are two options for reports: Formatted and Text

a. Formatted reports show the most important results in a presentable format

HCS All-Way Stop Control Report

General and Site Information		Lanes											
Analyst													
Agency/Co.													
Date Performed	8/15/2022												
Analysis Year	2022												
Analysis Time Period (hrs)	0.25												
Time Analyzed													
Project Description	Chapter 32: Example Problem 1												
Intersection													
Jurisdiction													
East/West Street													
North/South Street													
Peak Hour Factor	0.95												
Turning Movement Demand Volumes													
Approach	Eastbound			Westbound			Northbound			Southbound			
Movement	L	T	R	L	T	R	L	T	R	L	T	R	
Volume (veh/h)	50	300		300	100					100		50	
% Thrus in Shared Lane													
Lane Flow Rate and Adjustments													
Approach	Eastbound			Westbound			Northbound			Southbound			
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3	
Configuration	LT			TR						LR			
Flow Rate, v (veh/h)	368			421						158			
Percent Heavy Vehicles	2			2						2			
Initial Departure Headway, h _s (s)	3.20			3.20						3.20			
Initial Degree of Utilization, x	0.327			0.374						0.140			
Final Departure Headway, h _s (s)	4.95			4.73						5.70			
Final Degree of Utilization, x	0.507			0.553						0.250			
Move-Up Time, m (s)	2.0			2.0						2.0			
Service Time, t _s (s)	2.95			2.73						3.70			
Capacity, Delay and Level of Service													
Approach	Eastbound			Westbound			Northbound			Southbound			
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3	
Configuration	LT			TR						LR			
Flow Rate, v (veh/h)	368			421						158			
Capacity (veh/h)	727			761						631			
95% Queue Length, Q ₉₅ (veh)	2.9			3.4						1.0			
95% Queue Length, Q ₉₅ (ft)	73.7			86.4						25.4			
Control Delay (s/veh)	12.9			13.4						10.6			
Level of Service, LOS	B			B						B			
Approach Delay (s/veh) LOS	12.9		B	13.4		B				10.6		B	
Intersection Delay (s/veh) LOS	12.8									B			

b. Text reports show a more detailed analysis in plain text

HCS All-way stop-control Text Report

File name: ALL-WAY STOP CONTROL (AWSC) Analysis
 Agency: AWSCL-SinghLaneThreeLanes.kam
 Date Performed: 8/15/2022
 Time Analyzed:
 Jurisdiction:
 Analysis Year: 2022
 Project Description: Chapter 32: Example Problem 1
 Unit/Location name: v.s. customary
 E/W Street Name:
 N/S Street Name:
 Analysis Time Period (Hrs): 0.25
 Peak Hour Factor: PkF: 0.95

Vehicle Volumes and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	50	300		300	100		100			100		50
% Thrus in shared Lane												
Flow Rate, v/h	53	316		316	105					105		53

Step 2: LANE FLOW RATES

Approach	Eastbound			Westbound			Northbound			Southbound		
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Lane Configuration	LT			TR			LR			LR		
Lane Flow Rate	368			421						158		
% Heavy Vehicles	2			2						2		

Step 3: GEOMETRY GROUPS

Approach	Eastbound	Westbound	Northbound	Southbound
Approach No. of Lanes	1	1	1	1
Opposing No. of Lanes	1	1	1	1
Conflicting No. of Lanes	0	1	1	0
Geometry Group	Group1	Group1	None	Group1
Possible Occ. Combinations, I	64			

Step 4: SATURATION HEADWAY ADJUSTMENTS

Approach	Eastbound			Westbound			Northbound			Southbound		
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
H _{L1} Adj	0.20			0.20			0.20			0.20		
H _T Adj	-0.60			-0.60			-0.60			-0.60		
H _R Adj	1.10			1.10			1.10			1.10		
Prop. Eff. P _{L1}	0.06			0.06			0.06			0.06		
Prop. Eff. P _T	0.00			0.00			0.00			0.00		
Prop. Eff. P _R	0.00			0.00			0.00			0.00		
Headway Adj., h _{adj}	0.06			-0.12			-0.03			-0.03		

Steps 5-11: DEPARTURE HEADWAY ITERATIONS FOR CONVERGENCE

Approach	Eastbound			Westbound			Northbound			Southbound		
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Lane Flow Rate	368			421						158		
N _d (critical)	3.00			3.00			3.00			3.00		
x (initial)	0.327			0.374			0.140			0.140		
h _d (second to last)	0.88			4.60			2.59			2.59		
x (second to last)	0.50			0.54			0.25			0.25		
h _d (final)	4.95			4.71			5.70			5.70		
x (final)	0.507			0.553			0.250			0.250		
No. of Iterations				3								
Convergence?				Yes								

Steps 12-16: CAPACITY, DELAY AND LEVEL OF SERVICE

Approach	Eastbound			Westbound			Northbound			Southbound		
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Lane Flow Rate	368			421			158			158		
Move-up Time, s	2.0			2.0			2.0			2.0		
Service Time, L/s	2.95			2.73			3.73			3.73		
Degree of utilization, x	0.507			0.553			0.250			0.250		
Departure headway, h _d	4.95			4.71			5.70			5.70		
Capacity	727			761			691			691		

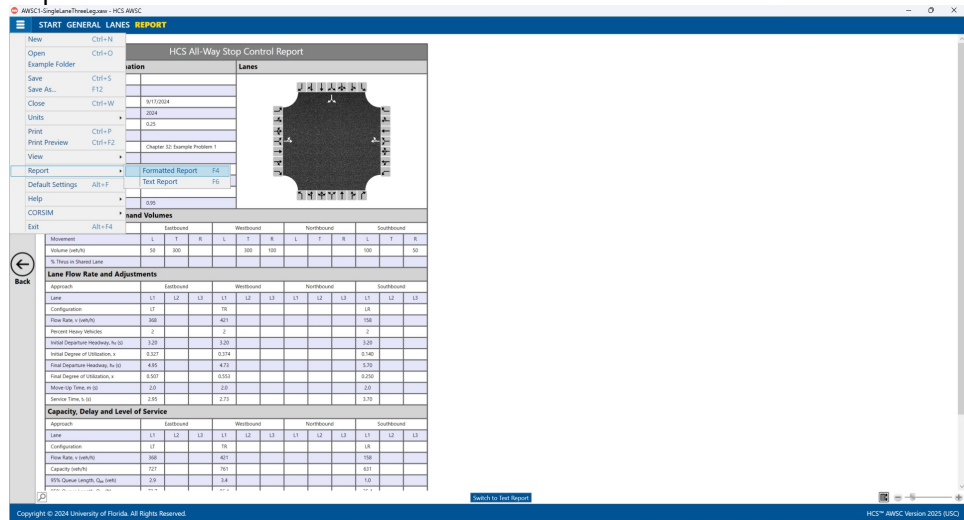
v/c Ratio	0.5	0.6	0.3
Avg Queue Spacing, (P _q /veh)	21.4	21.4	21.4
95% Queue Len. Q ₉₅ , (veh)	21.9	66.4	21.0
95% Queue Len. Q ₉₅ , (ft)	71.7	218.4	71.4
Lane Control Delay	11.9	86.4	10.6
Lane LOS	B	C	B
Approach Delay	12.9	13.4	6
Approach LOS	B	B	B
Intersection Delay	12.6		
Intersection LOS	B		

This AWSC text report was created in HCS AWSC version 2024 on 10/15/2023 5:25:31 PM

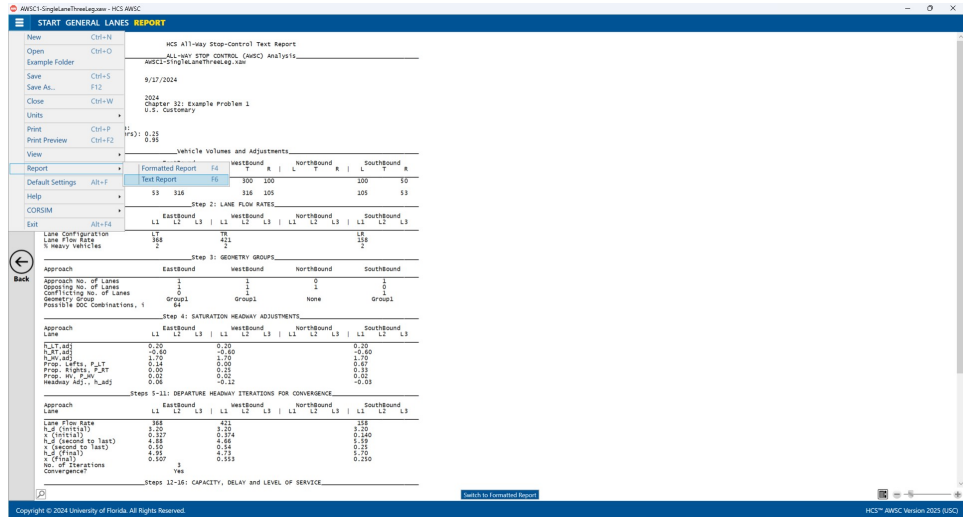
3. The type of report displayed can be changed by using the main menu items, keyboard shortcuts, or toggle buttons found under the report

a. Main Menu Items

- i. To switch to the Formatted Report, select *File > Report > Formatted Report* from the main menu; this can be found by selecting the three lines in the top left-hand corner of the screen, hovering over “Report”, and then selecting “Formatted Report”.



- ii. To switch to the Text Report, select *File > Report > Text Report* from the main menu; this can be found by selecting the three lines in the top left-hand corner of the screen, hovering over “Report”, and then selecting “Text Report”.

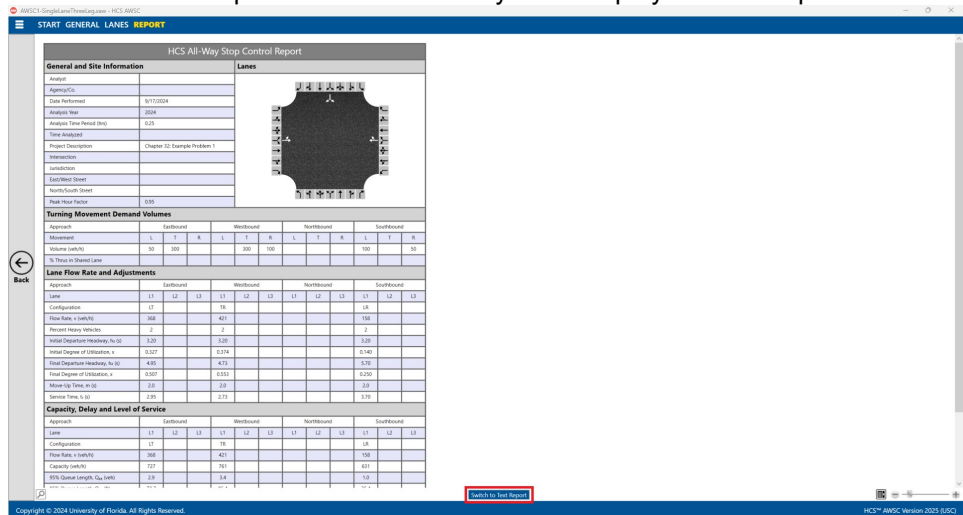


b. Keyboard Shortcuts

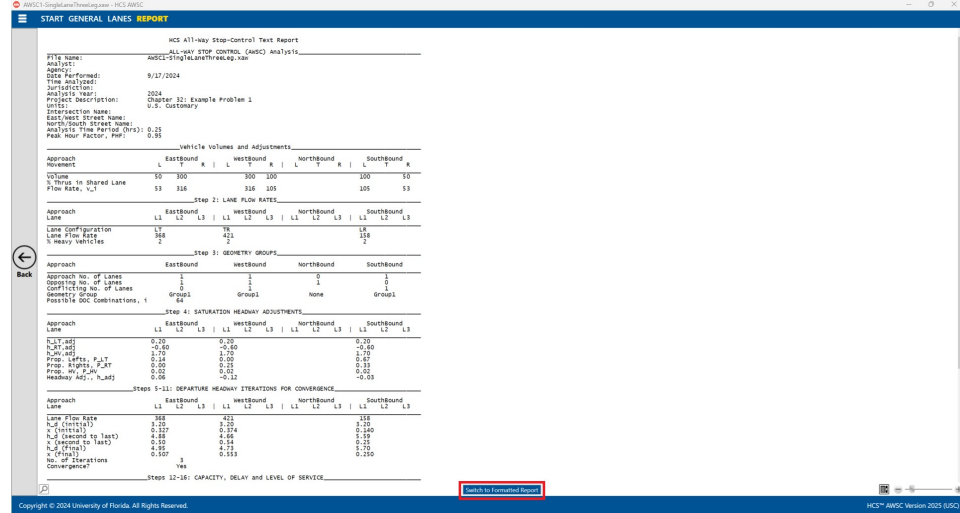
- i. Formatted Report: keyboard shortcut is “F4”
- ii. Text Report: keyboard shortcut is “F6”

c. Report Toggle Buttons

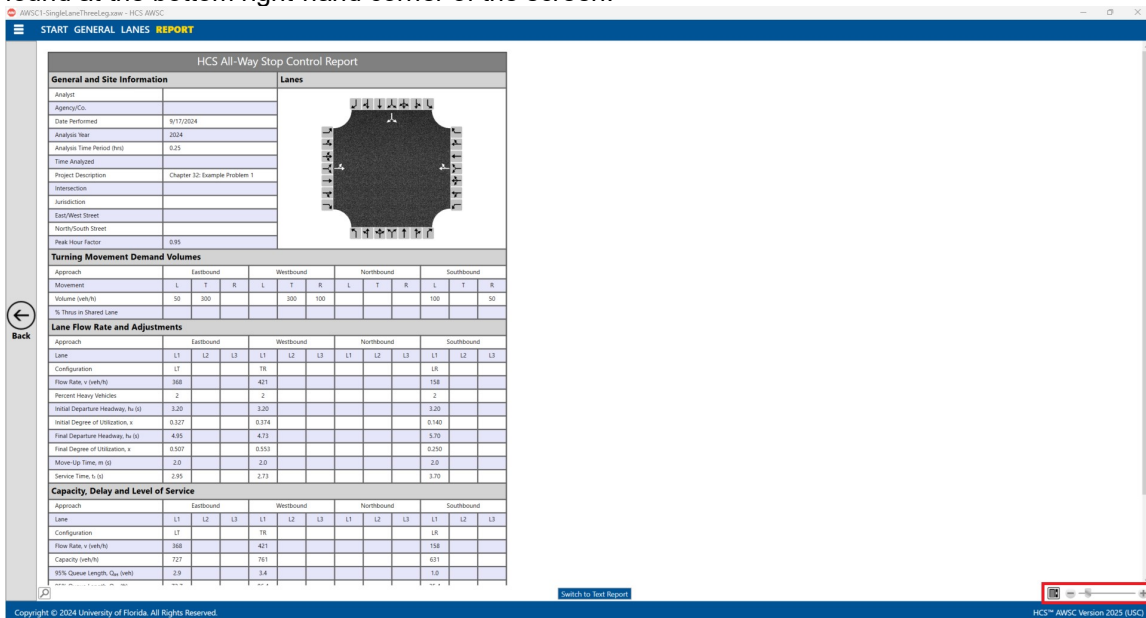
- i. Whether viewing the report in Page View or Full View, a toggle button will be available at the bottom of the screen underneath the report.
- ii. If the formatted report is currently being displayed, the toggle button will say “Switch to Text Report” which will allow you to display the text report if clicked.



- iii. If the text report is currently being displayed, the toggle button will say “Switch to Formatted Report” which will allow you to display the formatted report if clicked.



4. The magnification of the report currently being displayed can be changed using the zoom slider found at the bottom right-hand corner of the screen.

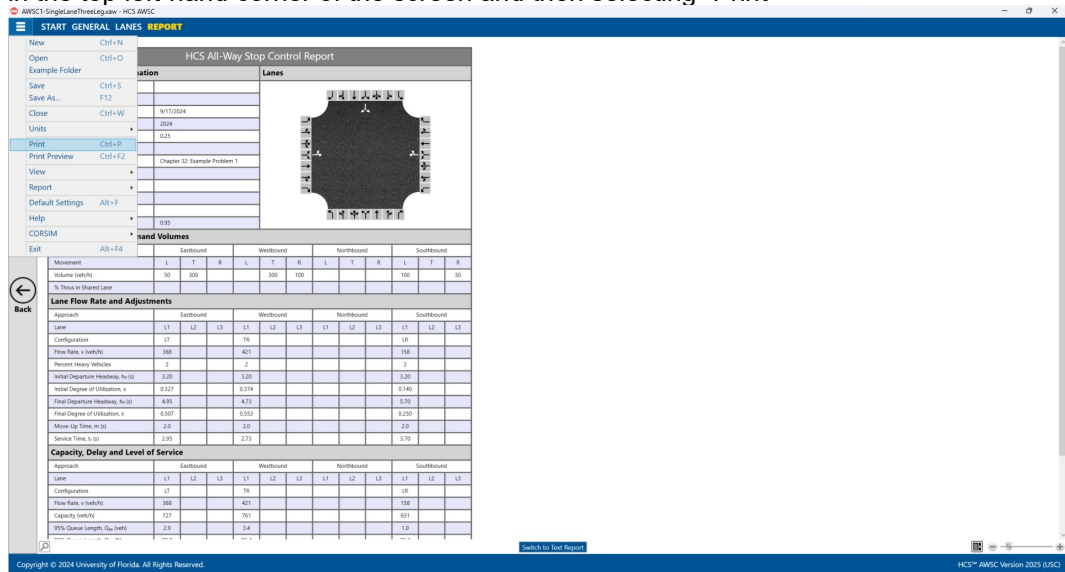


- a. To zoom in, drag the slider to the right; to zoom out, drag the slider to the left
- b. Clicking the plus (+) button will zoom in; clicking the minus (-) button will zoom out

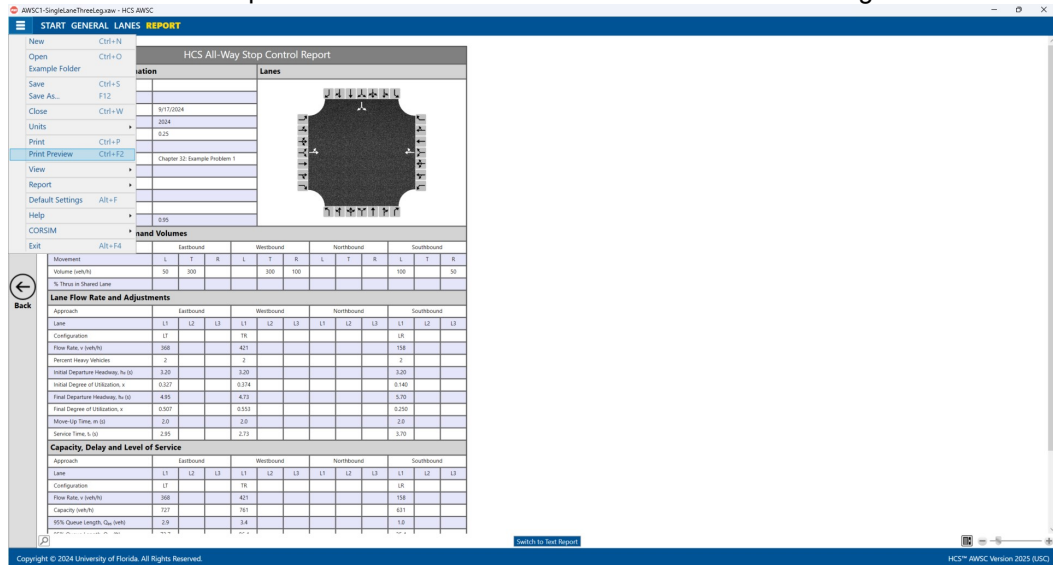
- c. Holding down “ctrl” on the keyboard and scrolling up on the mouse wheel will zoom in; holding down “ctrl” on the keyboard and scrolling down on the mouse wheel will zoom out

Print a Report

1. There are four options for printing a report:
 - a. Selecting *File > Print* from the main menu; this can be found by selecting the three lines in the top left-hand corner of the screen and then selecting “Print”



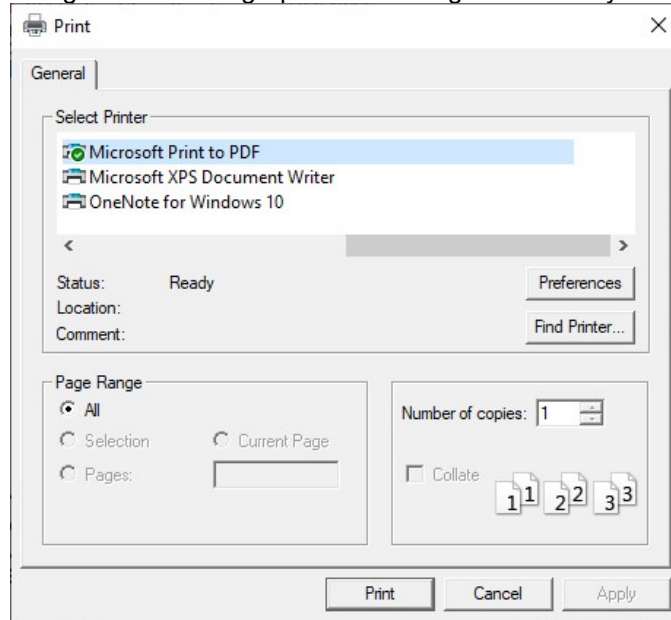
- b. Selecting *File > Print Preview* from the main menu; this can be found by selecting the three lines in the top left-hand corner of the screen and then selecting “Print Preview”



- c. Using keyboard shortcut “Ctrl+P” for Print
- d. Using keyboard shortcut “Ctrl+F2” for Print Preview

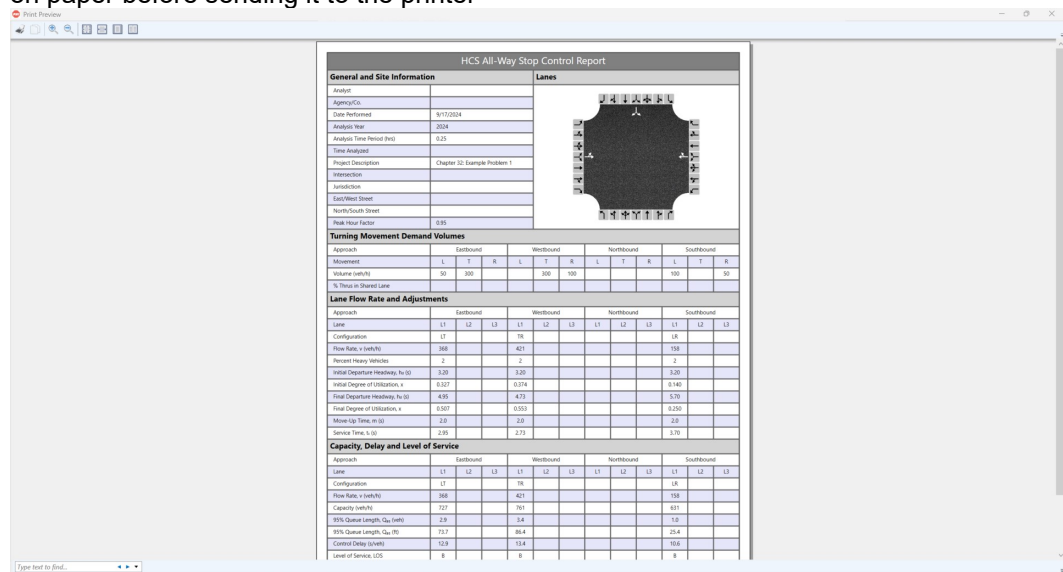
2. Print

- a. Using Print will bring up a Print dialog box where you can select which printer to print to



3. Print Preview

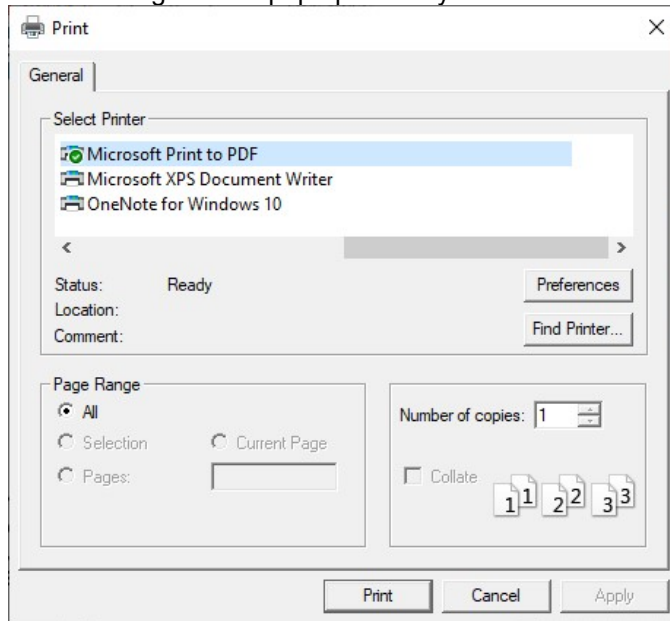
- a. Using Print Preview will bring up a window where you can view how the report will look on paper before sending it to the printer



- b. The print icon in the toolbar found in the top left-hand corner can then be selected



- c. A Print dialog box will pop up where you can select which printer to print to



Glossary of Terms

Agency

This field is provided to document the agency or company associated with this analysis or project.

Analysis Time Period

The length of time (T) the peak flow remains constant (usually 0.25 hours) and is used in the delay equations. If v/c exceeds 0.90, control delay may be significantly affected by the value of T. The range is 0.25 hrs to 3.00 hours. The default is 0.25 hours.

Analysis Year

This field is provided to document the year for which the analysis is being performed.

Analyst

The field is provided to document the individual performing the analysis.

Capacity

Capacity is the maximum hourly rate at which persons or vehicles can be reasonably expected to traverse a point or uniform segment of a lane or roadway during a given time period under prevailing roadway, traffic, and roadway conditions.

Control Delay

Control Delay is the portion of total delay attributed to traffic control measures, either traffic signals or stop signs.

Date Performed

The date will default to the computer's date, but may be edited. The format of the date is determined by the user's 'Short date style' preferences (regional setting icon on the Control Panel).

Delay

The difference between the travel time actually experienced and the reference travel time that would result during conditions with ideal geometric characteristics and in the absence of incidents, control, and traffic.

East/West Street Name

The name of the east/west intersecting street is coded to document the intersection being analyzed.

Intersection

The name of the intersection, usually defined by the two intersecting streets, is coded to document the intersection being analyzed and will be printed on the report.

Jurisdiction

The field is provided to document any jurisdiction convention or project related information.

Lanes

Lanes is a graphic data entry screen for coding lane configuration data. Lane combinations can be selected by clicking on the appropriate arrows to place them on the central diagram for each approach. Clicking on an arrow on the central diagram will remove it. As arrows are selected, others may become disabled as appropriate.

Note: As stipulated in the HCM methodology, each approach can have up to three lanes.

Level of Service (LOS)

A level of service is a letter designation that describes a range of operating conditions on a particular type of facility. Six levels of service are defined, using the letters A through F. Level of service A represents the best level of service, and generally describes operation of free flow and very low delay. Level of service F represents the worst operating conditions.

LOS criteria for AWSC intersections are given in the exhibit below. As the exhibit notes, LOS F is assigned if the volume-to-capacity (v/c) ratio of a lane exceeds 1.0, regardless of the control delay. For assessment of LOS at the approach and intersection levels, LOS is based solely on control delay.

Control Delay (s/veh)	LOS by Volume-to-Capacity Ratio ^a	
	v/c ≤ 1.0	v/c > 1.0
0–10	A	F
>10–15	B	F
>15–25	C	F
>25–35	D	F
>35–50	E	F
>50	F	F

Note: ^a For approaches and intersectionwide assessment, LOS is defined solely by control delay.

Movement Volume

The value of movement volume is a number between 0 and 9999 veh/h. The default value is 0 veh/h.

North/South Street Name

The name of the north/south intersecting street is coded to document the intersection being analyzed.

Peak-Hour Factor

The hourly volume during the analysis hour divided by the peak 15-min flow rate within the analysis hour; a measure of traffic demand fluctuation within the analysis hour. The peak-hour factor (PHF) is entered for the intersection to compute peak flow rates.

Percent Heavy Vehicles

The percentage of heavy vehicles is entered for each movement. This value is used in the calculation of headway adjustment.

Percent Thrus Using Shared Lane

When there is a shared left-thru or shared thru-right lane coded beside a thru lane(s), this field is activated to provide for the percentage traffic split.

Project Description

This field is provided for the user to document the analysis with any information for identification purposes.

Queue Length

Queue Length is the number of vehicles in queue.

Stored Heavy Vehicle Length

The lane length in feet, or meters in metric, occupied by a queued heavy vehicle; this affects the computation of queue length

Stored Passenger Car Length

The lane length in feet, or meters in metric, occupied by a queued passenger car; this affects the computation of queue length

Time Analyzed

Documenting the time frame of the analysis as morning peak, afternoon peak, existing conditions, future projections, etc.

Traffic Volume

The hourly volumes (V) for each movement are coded in vehicles per hour (veh/h).

v/c Ratio

The v/c Ratio is the volume capacity ratio, which is the volume of one movement (or shared-lane movements) divided by the movement capacity of the movement (or shared-lane movements).

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