

USER GUIDE

UF Transportation Institute MCTrans

STOP

(+ WAY)

Contents

Intro	oduction	1
	License Agreement	
	Acknowledgements	
	Trademarks and Copyrights	
Gett	ing Started	5
	System Requirements	5
	Getting Started	
Gen	eral Controls	6
	Menu Items	6
Two	-Way STOP Control (TWSC) Intersections	8
	HCM Chapter 20	8
	Operational Data	
	TWSC Report	
Pede	estrian Mode	12
	HCM Chapter 20	
	Operational Data	12
	TWSC Pedestrian Report	
Alte	rnative Intersections	14
	HCM Chapter 23	
	Modeling Capability in HCS	
	Creating New Alternative Intersection Datasets	
	Steps to Build an RCUT with Stop Signs Steps to Build an RCUT with Merges	
How		20
110 1		-
	Create a New File Open an Existing File	
	Save a File	
	Close a File	
	Exit the Program	
	Edit the Default Settings	
	Change the View Change the Lane Configuration	
	Enable and Edit the Headway Fields	
	View Results of the Analysis	
	Print a Report	
Glos	ssary of Terms	59
Inde	YX	70
		10

Introduction

License Agreement

HIGHWAY CAPACITY SOFTWARE™ (HCS2024™) AND TRANSYT-7F™

HCS2024[™] END USER LICENSE AGREEMENT

Copyright © 2023 University of Florida. All rights reserved.

This is an agreement between you and the University of Florida Board of Trustees for the benefit of the McTrans Center.

BY USING THE SOFTWARE PROGRAMS WITHIN THE ELECTRONIC TRANSMITTED PACKAGE OR DIRECT DOWNLOAD ("SOFTWARE"), YOU AGREE TO BE BOUND BY THE TERMS OF THIS LICENSE AGREEMENT. DO NOT USE THE SOFTWARE WITHOUT FIRST READING AND UNDERSTANDING THE TERMS OF THIS LICENSE AGREEMENT.

If you do not agree with the terms of this license, discontinue use, delete, and/or return the unused Software immediately to the distributor from which it was obtained.

1. LICENSE: In consideration of the required license fee, the University of Florida McTrans Center (hereinafter called "McTrans") hereby grants you (hereinafter called "End User") a nonexclusive license to use the enclosed HIGHWAY CAPACITY SOFTWARE (HCS2024) (hereinafter called "Software") as described in the applicable portion of section 3 for a period in which the End User pays the subscription fee established by McTrans.

2. OWNERSHIP: This license is not a sale of the Software; it is a license to use the Software under the terms of this License Agreement.

3. USE: The Software is licensed to End Users for a particular use, depending on the particular license that is designated on order and described in this Section.

a. Single Office License. The End User may use the Software on any number of computers within the End User's immediate office, defined as a single organizational unit with a unique function, comprising one or more contiguous rooms in a single location. All persons using the Software are also End Users. End Users may also use the Software on portable computers, such as laptops, while on official travel and on home computers, AS LONG AS ALL SUCH USE IS ON BEHALF OF THE OFFICE FOR WHICH THIS SOFTWARE LICENSE WAS PURCHASED. This Software License does not authorize the use of the Software at any offices related to that single organizational unit but not located at the same geographic location, even if the Software is stored on a portable computer. If you have any questions as to the validity of your End User License, contact McTrans. The End User may use the Software directly on the

computer that has been installed. The end User may not use the Software remotely via any technology, such as a remote desktop (see section 4). The End User should consult with section 13 of this EULA on other restrictions for the Software's use.

b. Academic License. The End User may use the Software only within a laboratory within the End User's immediate school, which is defined as a single school unit having a unique function, comprising one or more contiguous rooms in a single location, up to the permitted (purchased) number of copies, provided the use is supervised in a classroom setting for teaching or research purposes, and appropriate protection is in place against students copying the Software and taking it out of the lab. The responsibility for ensuring this protection of the Software rests with the End User. Multiple laboratories require multiple licenses. The Software may not be installed or used on any computer outside of the licensed laboratory under the Academic License, including (but not limited to) any office, home, networked, or portable computer. If you have any questions as to the type or validity of your End User License, contact McTrans. The End User may use the Software directly on the computer that has been installed. The End User may not use the Software remotely via any technology, such as a remote desktop (see also section 4). The End User should consult with section 13 of this EULA on other restrictions for the Software's use.

c. Single Computer License. The End User may use the Software on a single computer, a desktop, a PC, or a portable laptop. All persons using the Software are also End Users. The End User may use the Software anywhere, such as a business office, home office, travel, etc. The End User should consult with section 13 of this EULA on other restrictions for the Software's use. End User is only allowed to use the Software directly on the computer that has been installed. End User may not use the Software remotely via any technology (see also Section 4), such as remote desktop.

WARNING! If this license is a Single Office or Single Computer License for use in traffic and transportation applications, the Software may not be used for classroom or workshop instruction without the express, written consent of McTrans. (Contact McTrans for an Academic License.) If this license is an Academic License for use in training or educational applications, the Software may not be used for traffic and transportation applications or other similar purposes without the express, written consent of McTrans. (Contact McTrans for an Academic License) is used for traffic and transportation applications or other similar purposes without the express, written consent of McTrans. (Contact McTrans for an Applications License.)

4. VIRTUALIZATION AND REMOTE ACCESS: The End User may not use this Software in a virtualized environment. All installations under any available license types discussed in section 3 should be performed on a physical computer such as a desktop, PC, or laptop. The End User may use the Software directly on the computer that has been installed. End User may not use the Software remotely via any technology, such as remote desktop.

VIRTUALIZATION FOR VIRTUAL CLASSROOMS: Under academic license, the End User may ask permission to utilize a virtual environment to install and use the Software only with written consent from McTrans.

5. NETWORK USE: No network use is permitted, including but not limited to using the Software either directly or through commands, data, or instructions from or to a computer not already licensed and part of the internal network for Internet or web hosting services or by any user not licensed to use this copy of the Software through a valid license from McTrans. The Software is not designed for network use, and such use is not supported. McTrans is not able to provide technical support for issues resulting from network incompatibilities.

6. COPY RESTRICTIONS: Unauthorized copying, distribution, or dissemination of the Software is expressly prohibited. End User may be held legally responsible for any copyright infringement that is caused, encouraged, or enabled by failure to abide by the terms of this license. Subject to these restrictions, the End User may make copies of the Software for backup purposes and for use of the Software on any computers located within its office complex, as described in paragraph 3. Under no circumstances may the Software or associated printed documentation be copied for sale, distribution, or dissemination, except as provided in paragraph 3, without the express, written consent of McTrans. End User may reproduce the associated documentation as necessary to use within the geographic location for

which the license is granted. End User may not modify, adapt, translate, reverse engineer, decompile, disassemble, or create derivative work from the Software or any associated written materials without the prior written consent of McTrans. ANY SUCH ACTIVITY OR PRODUCT BECOMES THE PROPERTY OF McTRANS.

7. TRANSFER RESTRICTIONS: The Software is licensed only to the End User, and this License Agreement may not be assigned or transferred to anyone without the prior written consent of McTrans. Any authorized transferee of this License Agreement shall be bound by the terms of this License Agreement. End User may not transfer, assign, rent, lease, sell, or otherwise dispose of the Software except as expressly provided in this License Agreement.

8. REGISTRATION AND SUPPORT: This license is automatically registered to the person or entity that purchased it. If the End User wishes to change the registration, he or she must provide in writing the registration information. McTrans may, from time to time, revise or update the Software to correct bugs or add minor improvements. McTrans will supply, at its discretion, minor updates to the End User without additional charge and will provide reasonable telephone or email support to the End User during the normal business hours of McTrans for the period for which the End User pays the subscription fee established by McTrans. McTrans reserves the right to determine the extent of the support. McTrans reserves the right to make substantial revisions and enhancements to the Software and to market such substantially revised versions as separate products. End User shall not be entitled to receive such separate products without additional charge. Upon release of any such revised version of the Software, the obligation to provide the above-described technical support services to the End User shall cease unless the End User chooses to pay to license the enhanced version of the Software, whether or not the End User has previously requested or received support on the prior version.

9. LIMITED WARRANTY AND LIMITATIONS OF REMEDIES: End User agrees that it is the responsibility of End User to understand fully the limitations of and assumptions underlying the Software and not to make use of the Software without the assistance of personnel with appropriate expertise. The End User accepts all responsibility for the program output's review, interpretation, application, and use and accepts all responsibility for ensuring that the output meets any applicable design code, standard, or project specification provisions.

Except as provided above, the product is provided "AS IS" without warranty of any kind, either expressed or implied, including, but not limited to, implied warranties of merchantability and fitness for a particular purpose. McTrans does 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 or error-free. The entire risk as to the quality and performance of the product is with the End User. In no event will McTrans be liable to the End User for any damages, including any lost profits, lost savings, or other incidental or consequential damages arising out of the use of or inability to use the Software, even if McTrans has been advised of the possibility of such damages, or for any claim by any other party. The above warranty gives the End User specific legal rights, and the End User may also have other rights in the United States, which vary from state to state. Use of the Software where the End User believes or has reason to believe that damage may occur is a violation of any and all warranties. McTrans has no knowledge of the hardware or Software configurations of the End User and assumes no liability for their damage.

10. TERMINATION: This license is effective from the date the End User receives the Software until this License Agreement is terminated. End User may terminate it by returning or destroying all copies of the Software and associated documentation in End User's possession or control. If the End User breaches any terms of this license, the license shall terminate immediately.

11. GOVERNING LAW: This License Agreement shall be governed by the laws of the State of Florida, U.S.A. Venue for all disputes related to this License Agreement shall be in the United States District Court of the Northern District of Florida, Gainesville Division, or in the Circuit Court of the Eighth Judicial Circuit for Alachua County, Florida.

12. U.S. GOVERNMENT RESTRICTED RIGHTS: The Software and associated documentation are provided with RESTRICTED RIGHTS. Use, duplication, or disclosure by the U.S. Government is subject to restrictions as set forth in subdivision (c)(1)(ii) of The Rights in Technical Data and Computer Software clause at 52.227-7013 or subparagraphs (c)(1) and (2) of the Commercial Computer Software - Restricted Rights at 48CFR52.227-19. The contractor is McTrans, University of Florida, PO Box 116585, Gainesville, FL 32611-6585.

13. EXPORT REGULATION: The Software may be subject to U.S. export control laws, including the U.S. Export Control Reform Act and its associated regulations. End User will not directly or indirectly export, re-export, or release the Software to, or make the Software accessible from, any country, jurisdiction, or person to which export, re-export, or release is prohibited by applicable law. End User will comply with all applicable laws and complete all required undertakings (including obtaining any necessary export license or other governmental approval) prior to exporting, re-exporting, releasing, or otherwise making the Software available outside the U.S.

14. INTEGRATION: This License Agreement is the complete and exclusive statement of the agreement between End User and McTrans and supersedes any proposal or prior agreement, oral or written, and any other communications between End User and McTrans relating to the subject matter of this License Agreement. This License Agreement may only be modified by a written agreement made subsequent to the date hereof and signed by both parties.

15. SEVERABILITY: If any portion of this License Agreement shall be declared void or a nullity by a court of competent jurisdiction, then the remainder shall survive and remain in full force. Should you have any questions concerning this license, you may contact the McTrans Center, University of Florida, PO Box 116585, Gainesville, FL 32611-6585, U.S.A., [1] (800) 226-1013.

Acknowledgements

McTrans Center, University of Florida Transportation Institute PO Box 116585, Gainesville FL 32611-6585 Telephone: 1-800-226-1013 Fax: 352-392-6629 Web: mctrans.ce.ufl.edu Email: mctrans@ce.ufl.edu

We acknowledge the Transportation Research Board (TRB), the USDOT's Federal Highway Administration (FHWA), the American Traffic Safety Services Association (ATSSA), the Institute of Transportation Engineers (ITE), and the American Association of State Highway and Transportation Officials (AASHTO) for all text, figures, and references included in HCS and express our sincere appreciation for permission to include this information.

Trademarks and Copyrights

- Microsoft(R), MS-DOS(R), and Windows(TM) are registered trademarks of Microsoft Corporation.
- McTrans(TM), HCS(TM), HSS(TM), TSIS-CORSIM(TM), and TRANSYT-7F(TM) are registered trademarks of the University of Florida.
- HCS, HCS2024, HCS2023, HCS2022, HCS7, HCS 2010, HCS+, HSS, HSS2024, TRANSYT-7F, and T7F are copyright University of Florida.
- TSIS-CORSIM, TSIS-CORSIM2024, TSIS-CORSIM2023, TSIS-CORSIM2022, TSIS, CORSIM, NETSIM, FRESIM, TRAFED, TRAFVU, and TShell are copyright University of Florida, with portions copyright ITT Industries, Inc., Systems Division.

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 File then New (or the "New File..." from the Start screen). 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. Tabbing, clicking to a new field, or pressing the Enter key will trigger a recalculation and update the Report pane in Full View.

Two-Way Stop-Controlled (TWSC) Analysis

Two-Way Stop-Controlled (TWSC) 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 20 procedures.

General Controls

Menu Items

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

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

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

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

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

Close - Closes an existing TWSC file (*.xtw); 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 a TWSC 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

RCUT Report – Displays formatted report for an RCUT analysis; shortcut is F7

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 glossary

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

HCQS 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

E-mail 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 TWSC file (*.xtw) 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; shortcut is Ctrl+Shift+T

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

Two-Way STOP Control (TWSC) Intersections

HCM Chapter 20

Two-way STOP-controlled (TWSC) intersections are common in the United States. One typical configuration is a four-leg intersection, where one street—the *major street*—is uncontrolled, while the other street—the *minor street*—is controlled by STOP signs. The other typical configuration is a three-leg intersection, where the single minor-street approach (i.e., the stem of the T configuration) is controlled by a STOP sign. Minor street approaches can be public streets or private driveways. **Chapter 20, Two-Way STOP-Controlled Intersections,** presents concepts and procedures for analyzing these types of intersections.

LIMITATIONS OF THE METHODOLOGY

The methodologies in this chapter apply to TWSC intersections with up to three through lanes (either shared or exclusive) on the major-street approaches and up to three lanes on the minor-street approaches (with no more than one exclusive lane for each movement on the minor-street approach). Effects from other intersections are accounted for only in situations in which a TWSC intersection is located on an urban street segment between coordinated signalized intersections. In this situation, the intersection can be analyzed by using the procedures in Chapter 18, Urban Street Segments. The methodologies do not apply to TWSC intersections with more than four approaches.

The methodologies do not include a detailed method for estimating delay at YIELD-controlled intersections; however, with appropriate changes in the values of key parameters (e.g., critical headway and follow-up headway), the analyst could apply the TWSC method to YIELD-controlled intersections.

All 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 or capacity state to another. Analysts interested in that kind of information should consider applying alternative tools.

Operational Data

GENERAL

First, the user enters the General Information into the respective fields: Analyst, Agency, Date, and Time Analyzed, as well as site information for Jurisdiction, Analysis Year, Project Description, Intersection and Street Names.

The Major Street Direction is selected as either East-West or North-South form the drop-down menu options.

Analysis Time Period is the length of time (T) the peak flow remains constant (usually 0.25 hr) 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 Peak Hour Factor (PHF) for the intersection is coded under the Intersection Data. The HCM no longer permits PHF by movement.

The Median Type is coded for the major street, either Undivided, Thru & Left, or Left Only. A raised, striped or two-way left-turn lane (TWLTL), often causes a special gap acceptance phenomenon known as two-stage gap acceptance where a significant proportion of the minor-street drivers cross part of the major-street then pause in the median to wait for a gap on the other approach.

Undivided is selected when there is no median storage, disabling that field. Thru & Left is selected if the geometry permits both thrus and lefts from the minor street to store in the median for two-stage movements. Left Only is selected if only left turns (not thrus) can be stored, in a TWLTL for example.

If a median type other than Undivided is selected, the Median Storage field will enable coding the number of vehicles able to be stored.

In Page View, the Back and Next arrows on the left and right margins allow navigation between screens. This can also be done by selecting screens from the menu bar at the top among Start, General, Lanes, Traffic Headway, Adjustment, and Report.

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.

Note: As stipulated in the HCM methodology, each major-street approach can have up to three thru lanes and one exclusive right- and/or left-turn lane (five lanes maximum). Each minor-street approach can have up to three lanes, a maximum of one exclusive lane for each movement.

Enter the Percent Grade for each approach with positive values for upgrades and negative values for downgrades. These values are used to compute adjustment factors used in the computation of critical headway and follow-up headway.

The Right Turn Channelized box is checked when the right-turning traffic from the major road is separated by a triangular island and has to comply with a stop or yield sign. This is a special case of an exclusive right-turn lane, which is coded in Lanes.

The Flared Minor-Street Approaches box is checked when two vehicles may occupy or depart from the stop line simultaneously as a result of a large curb radius, a tapered curb, or a parking prohibition. This geometry may result in a greater capacity than if turning and through movement share only one lane. The magnitude of this effect depends in part on the turning-movement flow rates and the resultant probability of there being two vehicles simultaneously at the stop line, and in part on the storage length available to feed the second position at the stop line. The Flared Minor-Street Storage is the number of spaces for right turning passenger cars that can queue at the stop line without obstructing the access to the stop line for other movements.

TRAFFIC

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. Note that U-turns off the major street are now analyzed.

Enter the Percent Heavy Vehicles for each movement. These values are used to compute adjustment factors used in the computation of critical headway and follow-up headway.

The Short Left-Turn Pocket box is checked if present and the Left-Turn Storage is coded for computing the delay to Rank 1 vehicles if the estimated queue exceeds the storage.

If no exclusive left-turn lane is provided on the major street, it is possible for major-street thru (and possibly right-turning) traffic to be delayed by left-turning vehicles waiting for an acceptable gap. In this situation, the Saturation Flow Rate and Percent Thrus Using Shared Lane for the appropriate major street thru and right turn movements are required to compute the probability that there will be no queue in the respective major-street shared lanes.

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

For calibration needs, a conflicting flow factor table is provided to adjust conflicting flow calculations.

HEADWAY

The Critical Headway is defined as the minimum time interval in the major-street traffic stream that allows intersection entry to one minor-street vehicle. The Base Critical Headway is obtained from HCM defaults for each movement for two-lane, four-lane, or six-lane major roads. Adjustments are made to account for the presence of heavy vehicles, approach grade, T-intersections and two-stage gap acceptance.

Follow-Up Headway is the time span between the departure of one vehicle from the minor street and the departure of the next vehicle using the same major-street headway under a condition of continuous queuing on the minor street. The Base Follow-Up Headway is obtained from HCM defaults for each movement for either two-lane, four-lane, or six-lane major roads.

Calibration of these values for local condition is strongly advised. If smaller values are observed, capacity will be increased. If larger values are used, capacity will be decreased.

ADJUSTMENT

Pedestrian Flows are the pedestrians crossing each approach (i.e., "Eastbound" pedestrians are those crossing the Eastbound vehicular approach) and are counted somewhat differently than vehicle flows. If a pedestrian crosses the intersection individually, then each pedestrian should be counted individually in the pedestrian flows. If pedestrians tend to cross in the groups, the number of groups should be counted in the pedestrian flow. The pedestrian volume is the sum of pedestrians crossing individually and groups of pedestrians crossing together during the time period of study. Minor-street traffic streams must yield to pedestrian streams.

The Lane Width is entered as the average width for all lanes in the approach.

The Pedestrian Walking Speed is entered to calculate the pedestrian blockage factor, or proportion of time that one lane on an approach is blocked during the analysis period.

The Pedestrian Blockage Factor is automatically computed on the basis of the pedestrian flow rate, pedestrian walking speed, and the lane width.

The Upstream Signal box is checked for the existence of a nearby upstream signalized intersection. An upstream signalized intersection usually causes vehicles to arrive at the subject intersection in platoons, which may cause an increase in the minor-street capacity compared with the case of random arrivals. The greater the number of vehicles traveling in platoons, the higher the minor-street capacity for a given opposing flow because there is a greater proportion of large gap sizes that can be used by more than one minor-street vehicle.

To evaluate the impact of coordinated upstream signals, the urban street segments methodology is used to estimate the proportion of time that each Rank 2 or lower movement will be effectively blocked by a platoon. With these values, the proportion of the analysis period that is blocked for each minor movement can be computed.

Results

Control Delay	LOS by Volume-to-Capacity Ra		
(s/veh)	$v/c \leq 1.0$	v/c > 1.0	
0-10	A	F	
>10-15	В	F	
>15-25	С	F	
>25-35	D	F	
>35-50	E	F	
>50	F	F	

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

Note: The LOS criteria apply to each lane on a given approach and to each approach on the minor street. LOS is not calculated for major-street approaches or for the intersection as a whole.

Control Delay and LOS are computed for each movement and approach.

TWSC Report

The report can be displayed in either Page or Full View. If displayed in Page View, the results will automatically update when the user switches to the Report page. From the Report page, the user can then switch between the formatted report and the text report using the button found at the bottom of the page. The formatted report shows the most important results in a presentable format, while the text report shows a detailed step-by-step analysis in plain text.

If displayed in Full View, the report can be displayed along with the input screen. The user has the choice of displaying the report to the right of the input screen or below the input screen. The report is dynamic and reacts to changes in the input screen. Like the Report page in Page View, the user can switch between the formatted report and the text report using the button found at the bottom of the report.

All or a portion of the reports can be copied to the Windows clipboard for insertion into other files by rightclicking into the Report pane and selecting Copy. The user can also change the display of the report through File Menu or with the use of shortcuts. See *General Controls*.

Pedestrian Mode

HCM Chapter 20

This methodology applies to TWSC intersections and midblock crossings at which pedestrians cross up to four through lanes on the major street. It is applied through a series of steps requiring input data related to vehicle and pedestrian volumes, geometric conditions, and motorist yield rates to pedestrians.

LIMITATIONS OF THE METHODOLOGY

The pedestrian methodology's limitations differ from the limitations of the motorized vehicle mode because the methods were developed in separate research efforts. The pedestrian methodology does not apply to undivided streets with more than four lanes, although it can accommodate up to four lanes in each direction separated by a median. It does not account for interaction effects of upstream signalized intersections, and it assumes random arrivals on the major street and equal directional and lane distribution on the major street.

The methodology does not take into account pedestrian cross flows (i.e., pedestrian flows approximately perpendicular to and crossing another pedestrian stream), and it assumes the pedestrian will reach the crossing without delay from pedestrians traveling parallel to the major street. Under high pedestrian volumes, this assumption may not be reasonable.

The method is for steady state conditions (i.e., the demand and capacity conditions are constant during the analysis period); it is not designed to evaluate how fast or how often the facility transitions from one demand or capacity state to another.

Operational Data

ADJUSTMENT

In addition to the inputs mentioned for the motorized procedure, the following inputs are available for the pedestrian mode procedure: Crosswalk Length, Median Refuge, Start-Up and End Clearance Time, Crosswalk Markings, Crossing Treatment, Motorist Yield Rate, Rectangular Rapid-Flashing Beacon, Pedestrian Platooning, and Crosswalk Width. These inputs along with the lane configuration, traffic volume, pedestrian flow, lane width, and walking speed, are used in determining the average pedestrian delay and level of service. There is also a checkbox provided to indicate whether or not to show pedestrian delay and LOS. Checking this will add pedestrian mode related results to both the formatted and text reports.

Results

Level of Service (LOS) criteria for TWSC intersections:

LOS	Condition	Comments
A	$P_D < 0.05$	Nearly all pedestrians would be satisfied
В	$0.05 \le P_D < 0.15$	At least 85% of pedestrians would be satisfied
C	$0.15 \le P_D < 0.25$	Fewer than one-quarter of pedestrians would be dissatisfied
D	$0.25 \le P_D < 0.33$	Fewer than one-third of pedestrians would be dissatisfied
E	$0.33 \le P_D < 0.50$	Fewer than one-half of pedestrians would be dissatisfied
F	$P_D \ge 0.50$	The majority of pedestrians would be dissatisfied

Note: PD = proportion of pedestrians giving a "dissatisfied" rating or worse.

TWSC Pedestrian Report

The report can be displayed in either Page or Full View. If displayed in Page View, the results will automatically update when the user switches to the Report page. From the Report page, the user can then switch between the formatted report and the text report using the button found at the bottom of the page. The formatted report shows the most important results in a presentable format, while the text report shows a detailed step-by-step analysis in plain text.

If displayed in Full View, the report can be displayed along with the input screen. The user has the choice of displaying the report to the right of the input screen or below the input screen. The report is dynamic and reacts to changes in the input screen. Like the Report page in Page View, the user can switch between the formatted report and the text report using the button found at the bottom of the report.

On the input screen, checking 'Show Pedestrian Delay and LOS' will add pedestrian mode related results to both the formatted and text reports.

All or a portion of the reports can be copied to the Windows clipboard for insertion into other files by rightclicking into the Report pane and selecting Copy. The user can also change the display of the report through File Menu or with the use of shortcuts. See *General Controls*.

Alternative Intersections

HCM Chapter 23

The procedure in this chapter can be used to estimate the capacity and level of service (LOS) of interchange ramp terminals and alternative intersections. Alternative intersection LOS is dictated by the experienced travel time (ETT) of origin-destination movements.

Restricted Crossing U-Turn (RCUT) Intersections

RCUTs can be controlled by traffic signals, STOP control on the minor-street approach, or merges and diverges. The core computational methodology in Section 3 of the chapter can evaluate all three types of control, at RCUTs and MUTs with three or four approaches. RCUTs and MUTs with signals are typically built in urban or suburban areas with higher traffic demands, while those with STOP signs or merges are typically built in rural areas on high-speed roadways with lower minor-street traffic demands. RCUTs with signals or stop signs typically have 450 to 800 feet (or 137.2 to 243.8 meters in metric) from the main junction to a U-turn crossover. RCUTs with merges typically have more than 800 feet (or 243.8 meters in metric) from the main junction to a U-turn crossover, to make the weaving maneuvers easier.

Modeling Capability in HCS

HCS has the capability of modeling five types of alternative intersections supported by HCM:

- Restricted Crossing U-Turn Intersections (RCUT) with Signals
- Restricted Crossing U-Turn Intersections (RCUT) with Stop Signs
- Restricted Crossing U-Turn Intersections (RCUT) with Merges
- Median U-Turn Intersections (MUT) with Stop Signs
- Partial Displaced Left-Turn Intersections (DLT)

The computations procedure for each type of alternative intersection can be used to estimate the control delay, extra distance travel time (EDTT), and experienced travel time (ETT) per origin-destination (O-D) demand movement. The level of service (LOS) for alternative intersections is dictated by the ETT value. RCUT with Stop Signs and RCUT with Merges are applicable to the TWSC module. MUT with Stop Signs requires both the use of the Streets module and the TWSC module.

Creating New Alternative Intersection Datasets

Steps to Build an RCUT with Stop Signs

To conduct an RCUT with stop signs analysis, the Two-Way Stop Control module is used. One TWSC (.xtw) file is necessary to serve as the main intersection file, and one or two separate TWSC (.xtw) files to serve as the upstream/downstream junctions. The upstream/downstream junctions will be attached in the main intersection file. HCS supports three-legged and four-legged RCUT intersections with stop signs. *Note: TWSC does not redistribute conventional volumes. These values must be determined prior to input.*

1. Create a new TWSC (.xtw) file and check the RCUT Alternative Intersection checkbox found in Intersection Data. This file will serve as the main intersection.

Project Properties							
Analyst		Jurisdiction					
Agency		Analysis Year	2021				
Date	11/28/2021	Project Description					
Time Analyzed		Units	U.S. Customary				
	Intersec	tion Data					
Intersection		Analysis Time Period	0.25 hours				
Major Street Direction	East-West ~	Peak Hour Factor	0.92				
East/West Street Name		North/South Street Name					
Major Street Median Type	Undivided v	Major Street Median Storage					
RCUT Alternative Intersection		Intersection Type					
MUT/RCUT Crossover Intersection		Annual K-Factor	0.10				

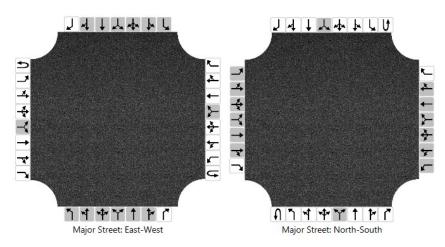
2. The Intersection Type dropdown will now become editable. The default selection is RCUT with Stop Signs. Note: Activating the RCUT Alternative Intersection checkbox adds three new input sections to TWSC titled Conventional Intersection, RCUT Main Intersection, and U-Turn Crossovers, as displayed below.

			Conventior	al Intersection			
	Ea	stbound	We	stbound	Northbound	5	Southbound
	Left	Thru Right	Left	Thru Right	Left Thru Right	Left	Thru Right
Volume (vph)	150 0	160	0 0	0	170 900 0	0	800 140
			RCUT Mai	n Intersection			
	Ea	stbound	We	stbound	Northbound	5	Southbound
	Left	Right	Left	Right	Left Right	Left	Right
Storage Length (ft)	0	400	0	0	400 0	0	0
Major Street Free-Flow Speed (mi/h)	60						
			U-Turn	Crossovers			
Open North Crossover File				O	pen South Crossover File		
Distance from Main Intersection to North	Crossover (ft)	0 Distance from Main In		n Intersection to South Crossover (ft)	700	700	
U-Turn Crossover Storage Length (ft)		0	U-Turn Crossover Storage Length (ft)		400		

a. In Page View, these fields may be found in the newly enabled RCUT tab.

START GENERAL LANES TRAFFIC RCUT HEADWAY ADJUSTMENT REPORT

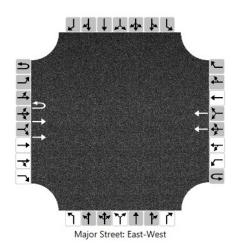
- b. In Full View, these fields may be found by scrolling midway down the page.
- 3. Code the inputs for Quick Lanes, Vehicle Volume and Adjustments, Critical Headway and Follow-Up Headway, and Pedestrian Volumes and Adjustments as would typically be done.
 - a. Quick Lanes will disable the restricted side-street left-turn and through movements.



- b. The volume entered in the Vehicle Volumes and Adjustments section should be the redistributed conventional volume. As previously mentioned, this must be determined manually. TWSC does not currently automate volume redistribution.
- 4. Code the RCUT specific inputs in the sections Conventional Intersection, RCUT Main Intersection, and U-Turn Crossovers. *Note: The conventional intersection volume is only used for final ETT calculations.*
- 5. If the crossover junctions have already been coded, skip ahead to Step 6. If not, the upstream and downstream TWSC files will be coded in this step. These files will then be attached in the U-Turn Crossovers section of the main intersection file.
 - a. Open a new TWSC module. There is no need to check the RCUT Alternative Intersection checkbox for the U-Turn crossover files. However, the MUT/RCUT Crossover Intersection checkbox must be checked to indicate the intersection is an MUT/RCUT crossover. Code the crossover junction as would be done for a typical TWSC file.

	Project P	roperties	
Analyst		Jurisdiction	
Agency		Analysis Year	2021
Date	11/28/2021	Project Description	
Time Analyzed		Units	U.S. Customary
	Intersect	ion Data	
Intersection		Analysis Time Period	0.25 hours
Major Street Direction	East-West v	Peak Hour Factor	0.92
East/West Street Name		North/South Street Name	
Major Street Median Type	Undivided v	Major Street Median Storage	
RCUT Alternative Intersection		Intersection Type	
MUT/RCUT Crossover Intersection		Annual K-Factor	0.10

Note: It is however necessary that the crossover junction only has major street through movements and one major street U-Turn movement. The main intersection attachment will not accept the file otherwise. A sample configuration of an East-West major street crossover file is presented in the image below.



- b. Repeat Step 5a to create a second crossover file if a four-legged RCUT intersection is being constructed.
- 6. Return to the main intersection file and navigate to the U-Turn Crossovers section. To attach the crossover files, click the buttons in blue.

U-Turn Crossovers							
Open South Crossover File							
700 Distance from Main Intersection to South Crossover (ft)	700						
400 U-Turn Crossover Storage Length (ft)	400						
	Open South Crossover File 700 Distance from Main Intersection to South Crossover (ft)						

7. To view the RCUT report, press the F7 key. Alternatively, use the menu icon and navigate to Report > RCUT Report. *Note: The RCUT report is only accessible after at least one crossover file has been attached.*

Steps to Build an RCUT with Merges

To conduct an RCUT with merges analysis, the Two-Way Stop Control module is used. One TWSC (.xtw) file is necessary to serve as the main intersection file. The minor street movements will be treated as merges and therefore the only movements experiencing control delay are the major street left-turns. *Note: TWSC does not redistribute conventional input volumes. These values must be determined prior to input. The RCUT with Merges engine will however calculate upstream and downstream junction demands, which are displayed in the Demand section of the RCUT Report.*

1. Create a new TWSC (.xtw) file and check the RCUT Alternative Intersection checkbox found in Intersection Data.

	Project P	Properties	
Analyst		Jurisdiction	
Agency		Analysis Year	2021
Date	11/28/2021	Project Description	
Time Analyzed		Units	U.S. Customary
Intersection		Analysis Time Period	0.25 hours
Major Street Direction	East-West ~	Peak Hour Factor	0.92
East/West Street Name		North/South Street Name	
Major Street Median Type	Undivided ~	Major Street Median Storage	
RCUT Alternative Intersection		Intersection Type	
neo i vitemative intersection			

2. The Intersection Type dropdown will now become editable. Select RCUT with Merges.

RCUT Alternative Intersection	Intersection Type	RCUT with Merges	¥
	incorpection type	RCOT with merges	

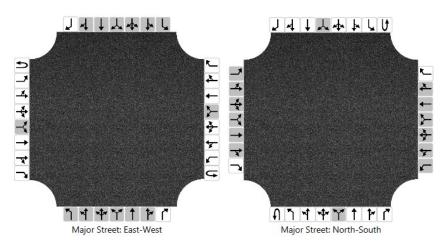
Note: Activating the RCUT Alternative Intersection checkbox adds three new input sections to TWSC titled Conventional Intersection, RCUT Main Intersection, and U-Turn Crossovers, as displayed below.

	Conventio	onal Intersection							
Volume (vph) Percent Heavy Vehicles (%)	EastboundLeftThru Right000000	Westbound Left Thru Right 0 0 0 0 0	Northbound Left Thru Right 0 0 0 0 0	Southbound Left Thru Right 0 0 0 0 0					
	RCUT Ma	ain Intersection							
Eastbound Westbound Northbound Southbound									
	Left Right	Left Right	Left Right	Left Right					
Storage Length (ft)	0 0	0 0	0 0	0 0					
Major Street Free-Flow Speed (mph)	60								
	U-Tur	n Crossovers							
Distance from Main Intersection to Wes	t Crossover (ft) 700	Distance from Main	Intersection to East Cros	ssover (ft) 700					

a. In Page View, these fields may be found in the newly enabled RCUT tab.

START GENERAL LANES TRAFFIC RCUT HEADWAY ADJUSTMENT REPORT

- b. In Full View, these fields may be found by scrolling midway down the page.
- 3. Code the inputs for Quick Lanes, Vehicle Volume and Adjustments, Critical Headway and Follow-Up Headway, and Pedestrian Volumes and Adjustments as would typically be done.
 - a. Quick Lanes will disable the restricted side-street left-turn and through movements.



- b. The volume entered in the Vehicle Volumes and Adjustments section should be the redistributed conventional volume. As previously mentioned, this must be determined manually. TWSC does not currently automate volume redistribution.
- 4. Code the RCUT specific inputs in the sections Conventional Intersection, RCUT Main Intersection, and U-Turn Crossovers. *Note: The conventional intersection volume is used to check the zero merging delay assumption, and to calculate ETT values.*
 - a. If the demand combinations do not fall within the 'insignificant delay' constraints, an input error message will appear.
- 5. To view the RCUT report, press the F7 key. Alternatively, use the menu icon and navigate to Report > RCUT Report.
 - a. If changing the conventional input volumes is necessary, first navigate away from the RCUT report. Since the zero delay assumption is checked after each volume input, failing to do so may result in an input error message appearing before editing is finished with the volume 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"

		Ctrl+N	
Save As F12 Close Ctrl+W Units - P Print Preview Ctrl+F2 View - Ctrl+F2 View Report - P Default Settings Alt+F Help - CORSIM - + Exit Alt+F4		Ctrt+O	
Units Print Preview Ctrl+P Print Preview Ctrl+F2 View Print Preview Ctrl+F2 View Print Preview Ctrl+F2 View Ct			
Units Print Ctrit+P Print Proview Ctrit+Z View Ctrit+Z View Perint Proview Ctrit+Z View Perint Proview Ctrit+Z View Att+F4	Close Ct	Etrl+W	Help
HILL CUI+F2 View Cui+F2 View A Report A Default Settings AIX+F Help CorsiM A Exit AIX+F4	Units	TIM	
Hint Prefere LUFPE HCS Overview View MCTrans Websi MCTrans Websi Default Settings Alt+F HCM/HCS Trait Heip + E-mail MCTrans CORSIM + About HCS			
Report Att+F Help • CORSIM • Edit Att+F4	Print Preview Ct	Ctrl+F2	
Report > Default Settings Alt+F Help > CORSIM > Exit Alt+F4	View	, TWSC	
telp E-mail McTrans coRSIM About HCS	Report	,	
CORSIM Alt+F4	Default Settings Ali	Nt+F	HCM/HCS Training
Sxit Alt+F4	Help	•	E-mail McTrans
	CORSIM	۶	About HCS
MCS2024	Exit Ali	Nt+F4	
MCS2024	Help)))(t+F4	E-mail M
		HCS 2024	
		UF Transportation Institute McTrans	

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

	C1.xtw - HCS TWSC						-	٥	×
=	START GENERAL LANES	TRAFFIC	HEADWAY	ADJUSTMENT	REPORT				i
Eack	Analyst Agency Date Time Analyzed Intersection Major Street Direction East/West Street Name Major Street Median Type RCUT Alternative Intersection MUT/RCUT Crossover Intersection	East-Wes	23 t			roperties Jurisdiction Analysis Year Project Description Units ion Data Analysis Time Period Peak Hour Factor North/South Street Name Major Street Median Storage Intersection Type Annual K-Factor	2023 U.S. Customary		(→) Next
Copyri	ight © 2023 University of Florida. All Righ	its Reserved					HCS™ TWSC Vers	ion 2024	I (USC)
Ful	View								

						1	HCS -	Two-	May	C1
	Pro	oject Properties		General Informati			N.J	1 WO	way	-
Analyst		Jurisdiction			ion					_
			2023	Analyst Agency/Co.						-
Agency		Analysis Year	2023	Date Performed	10/15	/2023				-
Date	10/15/2023	Project Description		Analysis Year	2023					-
Time Analyzed		Units	U.S. Customary	Time Analyzed						-
Time Analyzed		Units	U.S. Customary	Intersection Orientation	East-	West				
				Project Description						_
	Int	tersection Data		Lanes						
Intersection Major Street Direction East/West Street Name Major Street Median Type RCUT Alternative Intersection MUT/RCUT Crossover Intersection	East-West Undivided	Analysis Time Period Peak Hour Factor North/South Street Name Major Street Median Storage Intersection Type Annual K-Factor	0.25 hours					111144111	n H Ma	i statistica de la constatistica de la constatisti constatistica de la constatistica d
MUT/RCUT Crossover Intersection		Annual K-Factor	0.10	Vehicle Volumes a	nd Adjustme	nts				
				Approach		Easti	oound			
		Lanes		Movement	U	L	T	R	U	Γ
				Priority						Г
		Lattes			10	1	2	3	4U	4
	J	4 J A A F L		Number of Lanes Configuration	0	1	2	3	40	t

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"



C HCS TWSC		– 🗆 X
Start	TW	Help
New File		Topics
Open File	TWSC	HCS Updates
Example Folder		HCS Overview
Recent		McTrans Website
		HCM/HCS Training
		E-mail McTrans
	MCS2024	About HCS
	UF Transportation Institute McTrans	
Copyright © 2023 University of Florida. All Rights Res	served.	HCS™ TWSC Version 2024

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

CS TWSC		- 0
Start New File	тw	Help Topics
Open File	· • • • • • • • • • • • • • • • • • • •	HCS Updates
Example Folder	TWSC	HCS Overview
Recent	TWSC	McTrans Website
TWSC1-ThreeLegInter		HCM/HCS Training
TWSC2 A-PedCrossU		E-mail McTrans
TWSC2 B-PedCrossM		About HCS
TWSC2 C-PedCrossM		
TWSC3-FlaredApproa		
	HCS 2024	
	MC52024	
	UR Transportation Institute MCTrans	S.C.
right © 2023 University of Florida. All Rights Reserved.		HCS™ TWSC Version

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',



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 TWSC program.

C HCS TWSC		- 🗆 X
=		
Start	TW	Help
New File	TIMEC	Topics
Open File	TWSC	HCS Updates
Example Folder		HCS Overview
Recent		McTrans Website
		HCM/HCS Training
		E-mail McTrans
	MCS2024	About HCS
UF	Transportation Institute UNIVERSITY of FLORIDA	
Copyright © 2023 University of Florida. All Rights Reserved.		HCS™ TWSC Version 2024

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

which will open the example file in the TWSC program.

a. Page View

b.

	START	GENERAL	LANES	TRAFFIC	HEADWAY	ADJUSTMENT	REPORT					1
Eack	East/We Major St RCUT Al		pe ection	East-Wef	st			Properties Jurisdiction Analysis Year Project Description Units Ction Data Analysis Time Period Peak Hour Factor North/South Street Name Major Street Median Storage Intersection Type Annual K-Factor	2022 Chapter 32: Example Problem 1 U.S. Customary 0.25 hours 1.00			→ Next
Copyri	ight © 202	3 University of F	orida. All Rig	hts Reserved	L					HCS™ TWSC	Version	2024

	E	Project Properties					HCS T	wo-\	Way
				General Informat	ion				
Analyst		Jurisdiction		Analyst					
Agency		Analysis Year	2022	Agency/Co.					
				Date Performed	8/1	5/2022			
Date	8/15/2022	Project Description	Chapter 32: Example Problem 1	Analysis Year	202	2			
Time Analyzed		Units	U.S. Customary	Time Analyzed					
				Intersection Orientation		-West			
				Project Description	Cha	pter 32: E	xample P	roblem 1	1
	1	Intersection Data							2.4
Major Street Direction	East-West	Analysis Time Period Peak Hour Factor	1.00					110	
East/West Street Name Major Street Median Type RCUT Alternative Intersection	Undivided	Peak Hour Factor North/South Street Name Major Street Median Storage Intersection Type						14474970 7	L.H.
Major Street Direction East/West Street Name Major Street Median Type RCUT Alternative Intersection MUT/RCUT Crossover Intersection	Undivided	Peak Hour Factor North/South Street Name Major Street Median Storage	0.10	Vehicle Volumes	and Adjustm	ents			n H
East/West Street Name Major Street Median Type RCUT Alternative Intersection	Undivided	Peak Hour Factor North/South Street Name Major Street Median Storage Intersection Type		Vehicle Volumes Approach	and Adjustm		cound		n H
East/West Street Name Major Street Median Type RCUT Alternative Intersection	Undivided	Peak Hour Factor North/South Street Name Major Street Median Storage Intersection Type Annual K-Factor			and Adjustm		cound	ALL RATE ALL R	n H Ma
East/West Street Name Major Street Median Type RCUT Alternative Intersection	Undivided	Peak Hour Factor North/South Street Name Major Street Median Storage Intersection Type		Approach Movement Priority	U 1U	Eastb L 1	T 2	3	U 4U
East/West Street Name Major Street Median Type RCUT Alternative Intersection	Undivided	Peak Hour Factor North/South Street Name Major Street Median Storage Intersection Type Annual K-Factor Lanes		Approach Movement Priority Number of Lanes	U	Eastb	T	3	U
East/West Street Name Major Street Median Type RCUT Alternative Intersection	Undivided	Peak Hour Factor North/South Street Name Major Street Median Storage Intersection Type Annual K-Factor		Approach Movement Priority	U 1U	Eastb L 1	T 2	3	U 4U

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"

SC1.xtw - HCS TW START		LANES	TRAFFIC	HEADWAY	ADJUSTMENT	REPORT				0	(
lew	Ctrl+N						Properties				
) pen xample Folder	Ctrl+O						Jurisdiction				1
ave	Ctrl+S						Analysis Year	2023			
ave As	F12		10/15/20	23			Project Description				
lose	Ctrl+W						Units	U.S. Customary			
nits											
int int Preview	Ctrl+P Ctrl+F2					Interse	ction Data				l
iew							Analysis Time Period	0.25 hours			
eport		+	East-Wes	st			 Peak Hour Factor 	0.92			
efault Settings	Alt+F						North/South Street Name				(
elp		+	Undivide	d			 Major Street Median Storage 				`
ORSIM							Intersection Type				
kit	Alt+F4		_					[a + a			
WOTACOT	crossover m	resection	י 🗆				Annual K-Factor	0.10		_	l
inht @ 2023 Un	iversity of Flo	rida. All R	ights Reserved					нся	™ TWSC Versio	on 202	4

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..."

/SC1.xtw - HCS TW	sc								-	0	×
START G	ENERAL	LANES	TRAFFIC	HEADWAY	ADJUSTMENT	REPORT					i
New	Ctrl+N					Project	Properties				
Open Example Folder	Ctrl+O						Jurisdiction				
ave	Ctrl+S						Analysis Year	2023			
Save As	F12		10/15/20	23			Project Description				
lose	Ctrl+W						Units	U.S. Customary			
Units							- Child	olor customary			
Print Print Preview	Ctrl+P Ctrl+F2					Intersed	ction Data				
/iew		•					Analysis Time Period	0.25 hours			
Report			East-Wes	st			Peak Hour Factor	0.92			
Default Settings	Alt+F						North/South Street Name				(-
Help			Undivide	d			Major Street Median Storage				Ne
ORSIM				-			Intersection Type				INC.
Exit	Alt+F4										
WOTACOTA	TOSSOVELI	nersection	n 🗌				Annual K-Factor	0.10			
yright © 2023 Un									HCS™ TWSC Versi		

- 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"

sample Folder save save As F12 lotting Inits rint Ctrl+Se rint Ctrl+Se rint Ctrl+Se rint Ctrl+Se rint Ctrl+Se rint Ctrl+Se Intersection Data Ctrl+Se Sebault Settings Alt+F felp Undivided Major Street Median Storage Undivided Intersection Type	SC1.xtw* - HCS TWSC				PEDOPT					
Open Ctrl+O isawe Ctrl+S isawe & Ctrl+S isawe & F12 close Ctrl+W ints Intersection Data ifew Ctrl+P ifew Ctrl+S ifew Ctrl+S ifew Ctrl+R ifew Ctrl+W ifew Ctrl+R ifew Ctrl+R ifew Ctrl+R ifew North/South Street Name ifeded Major Street Median Storage intersection Type intersection Type		LANES TRA	FFIC HEADWAY	ADJUSTMENT						
awe Ctrl+V Close Ctrl+W Joits Units Vrint Ctrl+P Intersection Data Report Analysis Time Period OEsa Versult Settings Alt+F4 Unitived Major Street Median Storage Unitived North/South Street Median Storage Intersection Type					Project	Jurisdiction				1
Jints , Vint Ctrl+P2 Vint Ctrl+P2 Major Analysis Time Period 0.25 hours Report , Default Settings Alt+F4 Undivided Major Street Median Storage Undivided Intersection Type		10/	/15/2023			,	2023			
Intersection Data Inter	Close Ctrl+W Units	•				Units	U.S. C	ustomary		
Very of the set					Interse					l
Jundivided Major Street Median Storage OxStit Alt+F4	View	•				Analysis Time Period	0.25	hours		
Help Undivided Major Street Median Storage CORSIM Intersection Type	Report	• Eas	st-West			 Peak Hour Factor 	0.92			
CoRSIM Constitution of the section Type	Default Settings Alt+F					North/South Street Name				
CORSIM n Intersection Type	Help	• Un	divided			 Major Street Median Storage 				
xit Alt+F4	CORSIM	•								
		ersection					0.10			
		rida. All Rights Re							S™ TWSC Versi	

- 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"

HCS TWSC		
	1 IS	
Start	TW	Help
New File		<u>Topics</u>
Open File	TWSC	HCS Updates
Example Folder		HCS Overview
Recent		McTrans Website
		HCM/HCS Training
		E-mail McTrans
	MCS2024	About HCS
	UF Transportation Institute MCTrans	
Copyright © 2023 University of Florida. All Rights Re	scopied	HCS™ TWSC Version 20

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"

New	Ctrl+N		
Open Example Folder	Ctrl+O		
Save Save As	Ctrl+S F12		
Close	Ctrl+W		Help
Units	Þ	ТW	Topics
Print Print Preview	Ctrl+P Ctrl+F2		HCS Updates
View	Þ	TWSC	HCS Overview
Report	Þ	TWSC	McTrans Website
Default Settings	Alt+F		HCM/HCS Training
Help	•		E-mail McTrans
CORSIM	Þ		About HCS
Exit	Alt+F4		
		HCS 2024	
		UF ITANSPORTATION INSTITUTE MCTRANS	S.C.

- b. Using the keyboard shortcut "Alt+F"
- 2. Opening the Default Settings will cause a Default Settings window to pop up:

Analyst Agency Jurisdiction	
Units • USC O Metric	
ОК	Cancel

- 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.

C TWS	1-ThreeLegIntersection.xtw - HCS TWSC			- 0	9 >	×
=	START GENERAL LANES	TRAFFIC HEADWAY ADJUSTMENT REPORT			i	i
-	Analyst Agency Date		t Properties Jurisdiction Analysis Year Project Description	2022 Chapter 32: Example Problem 1		
	Time Analyzed		Units	U.S. Customary		
	Intersection Data					
	Intersection		Analysis Time Period	0.25 hours		\rightarrow
(Back	Major Street Direction	East-West	 Peak Hour Factor 	1.00	_	
	East/West Street Name		North/South Street Name		(-	>)
	Major Street Median Type	Undivided	 Major Street Median Storage 			ext
	RCUT Alternative Intersection		Intersection Type			
	MUT/RCUT Crossover Intersection		Annual K-Factor	0.10		
Соруг	ight © 2023 University of Florida. All Rigl	hts Reserved.		HCS™ TWSC Ver	rsion 202	24

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.
• TWSCI-THREE AUGMENT

											i		
				^			Н	ICS T	wo-	Way	^ Stop-		
	Project Properties					General Information							
Analyst		Jurisdiction		Analyst						-			
		Analysis Year	2022	Agency/G	°0	-					-		
Agency		Analysis fear	2022	Date Perf		8/15/2022							
Date	8/15/2022	Project Description	Chapter 32: Example Problem 1	Analysis 1	Year	2022							
Time Analyzed		Units	U.S. Customary	Time Ana	ilyzed	ion East-West							
Third Fundigied		ond	olo: customary	Intersecti	on Orientation								
				Project D	escription	Chapt	er 32: Ex	ample P	roblem	1	_		
	Intersection Data						Lanes						
Intersection Major Street Direction East/West Street Name Major Street Median Type RCUT Alternative Intersection MUT/RCUT Crossover Intersection	East-West ~ Undivided ~	Analysis Time Period Peak Hour Factor North/South Street Name Major Street Median Storage Intersection Type Annual K-Factor	0.25 hours										
	Vehicle Volumes and Adjustments Approach Earthourd								Westbo				
			Movemen		U	L	T	R	U	Westbo			
		Lanes		Priority		10	1	2	3	40	4		
		1441		Number	of Lanes	0	0	1	0	0	1		
	24	****		Configura	ation				TR		L		
				Volume (veh/h)			240	40		160		
	5	R. C.		<							>		
		— 入		~ P	Swit	th to Tex	t Repor	t =	-8-				
right © 2023 University of Florida. All Rights Reserved. HCS** TWSC Version 2024													

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 view of the input screen and results report.

			Project Pro	operties			
Analyst			h	lurisdiction			
Agency			Α	Analysis Year	2022		
Date	8/15/2022		P	Project Description	Chapter 32: Example Problem 1		
Time Analyzed				Jnits			
					U.S. Customary		
neral Information	HCS Two-Way St	Site Information	1				
alyst		Intersection					
alyst ency/Co.		Intersection Jurisdiction					
alyst ency/Co. te Performed	8/15/2022 2022	Intersection		_			
alyst ency/Co.	8/15/2022	Intersection Jurisdiction East/West Street	1.00				
alyst ency/Co. te Performed alysis Year	8/15/2022	Intersection Jurisdiction East/West Street North/South Street	1.00				
alyst ency/Co. te Performed alysis Year ne Analyzed	8/15/2022 2022	Intersection Jurisdiction East/West Street North/South Street Peak Hour Factor					
alyst ency/Co. to Performed alysis Year ne Analyzed ersection Orientation	4/15/2022 2022 East-West Chapter 32: Example Problem 1	Intersection Jurisdiction East/West Street North/South Street Peak Hour Factor Analysis Time Period (hrs)					
alyst ency/Co. to Performed alysis Year ne Analyzed ersection Orientation sject Description	4/15/2022 2022 East-West Chapter 32: Example Problem 1	Intersection Jurisdiction East/West Street North/South Street Peak Hour Factor					

- 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".

START GENERAL LANE	IS TRAFFIC HEADWAY ADJUSTMENT REPORT	
ew Ctrl+N	Project Properties	
pen Ctrl+O ample Folder	Jurisdiction	
we Ctrl+S	Analysis Year 2022	
ive As F12	8/15/2022 Project Description Chapter 32: Example Problem 1	
ose Ctrl+W	Units U.S. Customary	
nits +		
int Ctrl+P	Intersection Data	
int Preview Ctrl+F2		-
ew		
eport +	reak flour ractor	
efault Settings Alt+F	North/South Street Name	(
elp •	Undivided v Major Street Median Storage	
DRSIM • n	Intersection Type	~
Alt+F4	ion Annual K-Factor 0.10	

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".

	Ctrl+N				^					
Open	Ctrl+O	Pr	oject Properties					ICS T		Nay
xample Folder					General Information					
save	Ctrl+S		Jurisdiction		Analyst					
Save As	F12		Analysis Year	2022	Agency/Co.					
Close	Ctrl+W	8/15/2022	Project Description	Chapter 32: Example Problem 1	Date Performed	8/15/2	2022			
Inits		0/15/2022	Project Description	Chapter 52. Example Problem 1	Analysis Year	2022				
Print	Ctrl+P		Units	U.S. Customary	Time Analyzed Intersection Orientation	East-V	No.			
Print Print Preview					Project Description		ter 32: Ex	amole 5	rohiem	
/iew	Ctrl+F2	Page View F9	ersection Data		Lanes					
Default Settings Help	Alt+F	East-West	Report -> Bottom F11 Peak Hour Factor North/South Street Name	1.00					444 L L	
CORSIM Exit RCUT Alternativ	Alt+F4 re Intersection	Undivided	Major Street Median Storage Intersection Type Annual K-Factor	0.10				_	1 1 1	ng Mg
CORSIM ixit RCUT Alternativ	e Intersection		 Major Street Median Storage Intersection Type 	0.10	Vehicle Volumes and	Adjustmer			1 7 6	n H Ma
CORSIM Exit RCUT Alternativ	e Intersection		 Major Street Median Storage Intersection Type Annual K-Factor 	0.10	Approach		Eastbo	_		
CORSIM Exit RCUT Alternativ	e Intersection		 Major Street Median Storage Intersection Type 	0.10		Adjustmer U		ound T	R	NH Mi U 4U
CORSIM Exit RCUT Alternativ	e Intersection		Major Street Median Storage Intersection Type Annual K-Factor Lanes	0.10	Approach Movement	U	Eastbo	т	R	U
CORSIM Exit RCUT Alternativ	e Intersection		 Major Street Median Storage Intersection Type Annual K-Factor 	0.10	Approach Movement Priority	U 10	Eastbo L 1	T 2	R 3	U 4U

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".

New Ctrl+N Open Ctrl-S Sample Folder Analysis Year Save A. F12 Close Ctrl+O Otso Analysis Year Close Ctrl+O Vinits Analysis Year Print Preview Ctrl+P Print Preview Ctrl+P View Page View PP Propert -> Bight F10 Default Settings Alt+F4 Exit Analysis Time Anolg Imp Exit Alt+F4 Exit Market Analysis Time Anolg Imp	WSC1-ThreeLegIntersection.	axtw - HCS	TWSC				5 i	- 0	×
Open Cirl O Save AL. Cirl S Save AL. F12 Close Cirl P Print Cirl P Project Description Chapter 32: Example Problem 1 Units U.S. Customary									(
Eample Folder Project Properties Save A. Ctrl 5 Save A. Project Percepties Units 202 Close Ctrl 4 With Sove A. Project Description Drater 32: Example Problem 1 Units Units U.S. Customary	New C	trl+N							
Analysis Year See AL F12 Close Ctrl W Units	Open C Example Folder	trl+O			Proje	ct Properties			Ĩ.
Close Chi HW Midyas tea Luca Units Project Description Chapter 32: Example Problem 1 Print Preview Project Description Chapter 32: Example Problem 1 Vew Project Description Units View Project Control Chapter 32: Example Problem 1 Default Settings Alt+F Project Problem 1 Project Alt+F Project Problem 1 Default Settings Alt+F Province Project Alt+F Province Project Alt+F Province Project Alt+F Province Project Alt+F Province Province Provinc							2022		
Units Units U.its U.S. Customary Print Preview Ctrl PP Page View PP p. Constral Report U.its U.S. Customary View Page View PP p. Constral Report Full View Report > Report > Report >> Repo			8/15/2022						
Print Curle P2 Print Preview Curle F2 View Curle F2 View P Page View P9 P-Control Report > Right F10 Default Settings Alt+F View Alt+F4 CoRSIM CORSIM CORSIM CORSIM Compare Lawrence I Page View P9 Page View P9 Page View P9 Page View P1 Page View View View P1 Page View View View P1 Page View View View View View View View Vie	Units								
View Page View View Page View Page View Page View View						Units	U.S. Customary		
Report Full View Report -> Right F10 Default Strings Alt + F Anderée Help		trl+F2							
Report -> Bottom F11 Help + 22 - But/Weit Swite - CORSIM + Hell Net Hoot Part - Poet Hoot Part - Exit Alt+F4 - Poet Hoot Part - Net Hoot Part - Poet Hoot Part - Poet Hoot Part - P	View	•							
Default Setting Alt + F Heip CoSISM Heip C	Report		Full View						
The p bar bar Mark Street COSIM Instruction Theorem Exit All + 64 Prais Norr Report Table Developer Lasy Network 2.33	Default Settings A	lt+F	-		F11				
CORSIM 22 End Wind Street Exit Alt + F4 Peak toor facor Marketor Directory 0.0 Image: Directory Casper 32: Early if Polem 1 The Directory of the Street is the Street	Help		-	Jurisdiction					
Evit Alt+F4 Interview Park Nor Factor 0.0 Park Nor Factor 0.25			022						
Satisfue To Tool Report									
Ingent Bachpiton Chapter 25: Sample Problem 1			Vest						
Set i A de De Set	Project Description	_							
Switch to Text Report	anes								
winht © 2023 University of Florida All Rights Received HCS ^W TMSC Version 2			The contract of the second sec		Sv	vitch to Text Report			
	nvright @ 2023 University	v of Florid	a All Rights Received					HCS™ TWSC Versio	n 21

- 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 section. 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

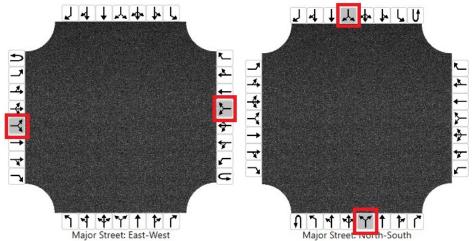
b.

		Lanes			
	Eastbound	Major Street: East-We Westbound		hbound	Southbound
Percent Grade (%)			0		
Right Turn Channelized	Yes	Yes		Yes	Yes
Flared Minor-Street Approach	Yes	Yes] Yes	Yes
Flared Minor-Street Storage (veh)					
View	Reserved.				HCS" TWSC Versi
View			^		- 0
View	Lanes	N TD		General Information	
View		FC.		General Information	- 0
View 1-ThreeLegintersection.stw - HCS TWSC	Lanes			Analyst Agency/Co.	– d
View 1-ThreeLegintersection.stw - HCS TWSC	Lanes			Analyst Agency/Co. Date Performed Analysis Year	- 0
View 1-ThreeLegintersection.stw - HCS TWSC	Lanes			Analyst Agency/Co. Date Performed Analysis Year Time Analyzed	- 0 HCS Two-Way
View 1-ThreeLegintersection.stw - HCS TWSC	Lanes			Analyst Agency/Co. Date Performed Analysis Year	- a HCS Two-Way
ight © 2023 University of Florida. All Rights I View C1-ThreeLegintersectionativ - HCS TWSC	Lanes			Analyst Agency/Co. Date Performed Analysis Year Time Analyzed Intersection Orientation	- C HCS Two-Way 015/2022 2022 East-Was Chapter 32: Example Problem 1
View 11-Threet egintersection.stw - HCS TWSC	Lanes			Analyst Agency/Co. Date Performed Analysis Year Time Analysed Intersection Orientation Project Description	- 0 HCS Two-Way 8/15/2022 2022 5as-West
View 1: Threel egintersection stw - HCS TWSC	Lanes	Vat La Va	Southbound	Analyst Agency(fc). Date Berformed Analysis Year Time Analyzed Immanction Orientation Project Description Lanes	- C
Priese (gintersection stw - HCS TWSC	Lanes	West tbound Northbound 0		Analyst Agency/Co. Date Performed Analysis Year Time Analysed Intersection Orientation Project Description	- C
View 1-ThreeLegintersectionativ - HCS TWSC 	Lanes	West West West West West West West West	Yes	Analyst Agerog(c6. Date Berformed Analysis Year Time Analysed Instruction Orientation Project Description Lanes Vehicle Volumes and J Apprach Movement	
View 1-ThreeLegintersectionativ - HCS TWSC 	Lanes	West tbound Northbound 0		Analyst Agency(Go. Date Berformed Analysis Year Time Analysed Insersection Orientation Project Description Lanes Vehicle Volumes and A Approach	HCS Two-Way HCS Two-Way Agustments Entitional

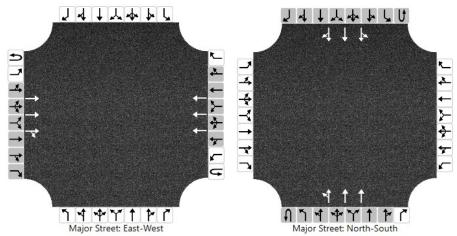
- 2. To add lanes, click on the lane buttons (black arrows) on the edges of the lanes graphic. If the background of a lane button is white, the lane is available to add to the corresponding approach. If the background of a lane button is gray, it is disabled and cannot be added to the corresponding approach based on the current lane configuration.
 - a. The 'Major Street Direction' must be specified to determine which lanes can be added for each of the approaches. This can be found under the 'Intersection Data' section on the General page if using Page View or the input portion of the split screen if using Full View.

=	START	GENERAL	LANES	TRAFFIC	HEADWAY	ADJUSTMENT	REPORT				i
							Project	Properties			
	Analyst							Jurisdiction			
	Agency							Analysis Year	2022		
	Date			8/15/202	2			Project Description	Chapter 32: Example Problem 1		
	Time Ana	alyzed						Units	U.S. Customary		
							Interse	ction Data			
	Intersect	ion						Analysis Time Period	0.25 hours		
\sim	Major St	reet Direction		East-Wes				 Peak Hour Factor 	1.00		
(\leftarrow)	East/Wes	st Street Name		East-Wes				North/South Street Name			(\rightarrow)
Back	Major St	reet Median Type	e	North-Sc Undivide				Major Street Median Storage			Next
	RCUT Alt	ternative Intersec	tion					Intersection Type		2	
	MUT/RC	UT Crossover Int	ersection					Annual K-Factor	0.10		

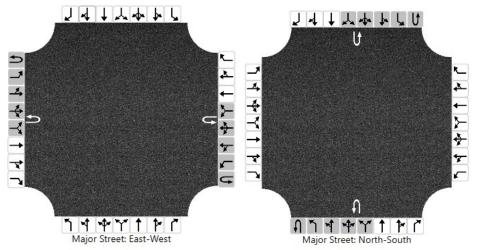
- i. The default is 'East-West'.
- ii. Choices include: East-West, North-South
 - East-West indicates the major street approaches are eastbound (EB) and westbound (WB); the minor street approaches are northbound (NB) and southbound (SB)
 - North-South indicates the major street approaches are northbound (NB) and southbound (SB); the minor street approaches are westbound (WB) and eastbound (EB)
- b. Major Street Approaches
 - i. Major Street approaches do not allow shared left-right (LR) lanes; this lane is always disabled



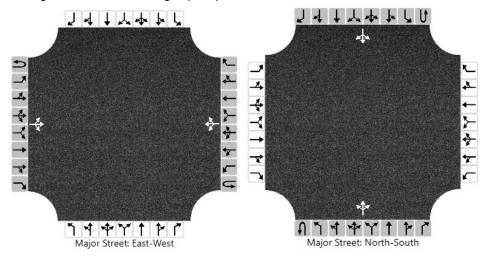
ii. Each approach allows up to three thru (either exclusive or shared) lanes to be added



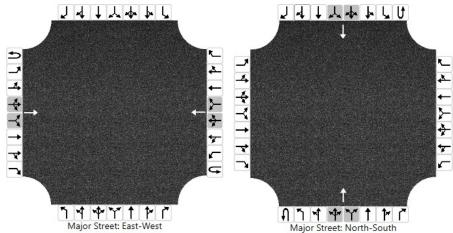
iii. Adding a U-turn (U) lane will disable the U-turn (U), exclusive left-turn (L), shared left-thru (LT), and shared left-thru-right (LTR) lanes; the shared left-right (LR) lane should already be disabled



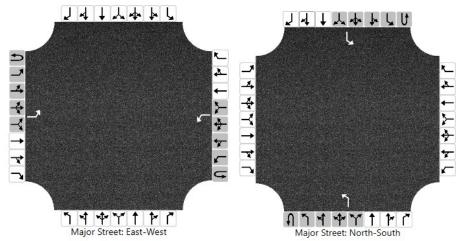
iv. Adding a shared left-thru-right (LTR) lane will disable all lanes



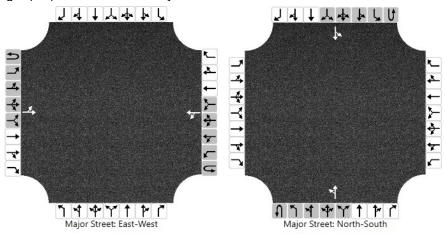
v. Adding an exclusive thru (T) lane will disable the shared left-thru-right (LTR) lane; the shared left-right (LR) lane should already be disabled



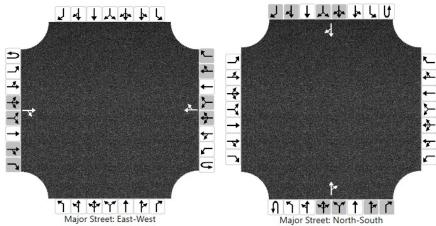
vi. Adding an exclusive left-turn (L) lane will disable the U-turn (U), exclusive leftturn (L), shared left-thru (LT), and shared left-thru-right (LTR) lanes; the shared left-right (LR) lane should already be disabled



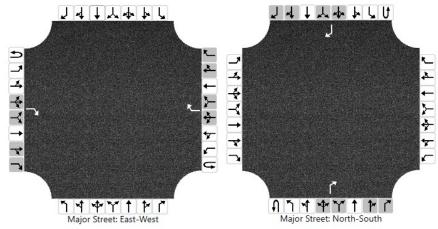
vii. Adding a shared left-thru (LT) lane will disable the U-turn (U), exclusive left-turn (L), shared left-thru (LT), and shared left-thru-right (LTR) lanes; the shared left-right (LR) lane should already be disabled



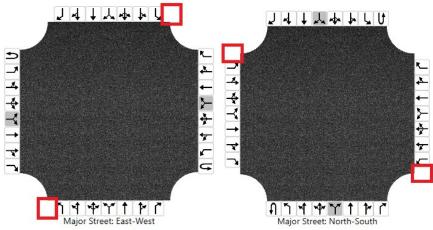
viii. Adding a shared thru-right (TR) lane will disable the shared left-thru-right (LTR), shared thru-right (TR), and exclusive right-turn (R) lanes; the shared left-right (LR) lane should already be disabled



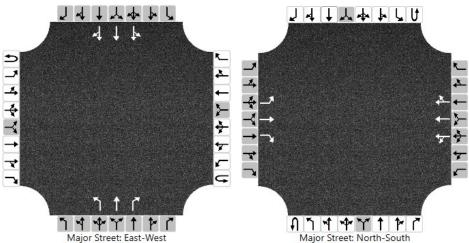
ix. Adding an exclusive right-turn (R) lane will disable the shared left-thru-right (LTR), shared thru-right (TR), and exclusive right-turn (R) lanes; the shared left-right (LR) lane should already be disabled



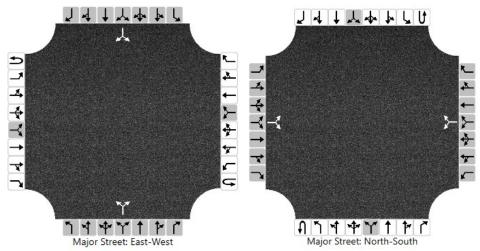
- c. Minor Street Approaches
 - i. Minor Street approaches do not allow U-turn (U) lanes; there is no U-turn button available



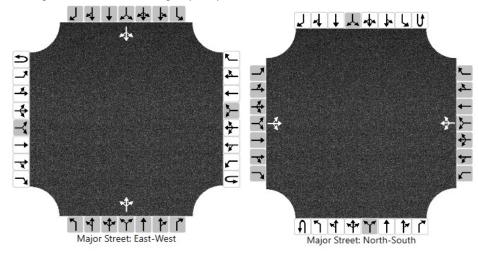
ii. Each approach allows up to three lanes (with no more than one exclusive lane for each movement on the minor-street approach)



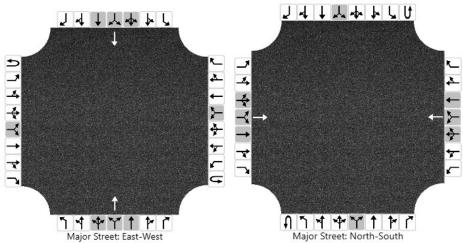
iii. Adding a shared left-right (LR) lane will disable all lanes



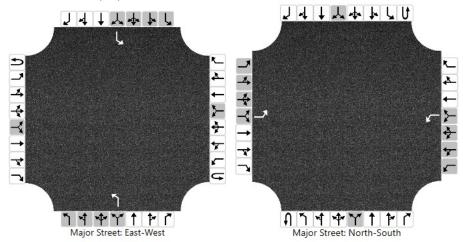
iv. Adding a shared left-thru-right (LTR) lane will disable all lanes



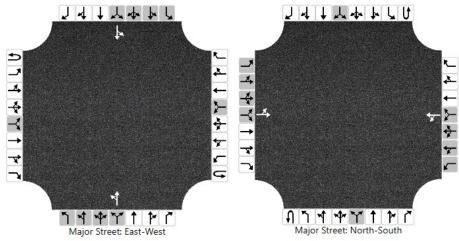
v. Adding an exclusive thru (T) lane will disable the shared left-thru-right (LTR), shared left-right (LR), and exclusive thru (T) lanes



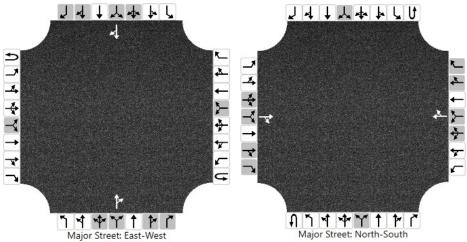
vi. Adding an exclusive left-turn (L) lane will disable the exclusive left-turn (L), shared left-thru (LT), shared left-thru-right (LTR), and shared left-right (LR) lanes



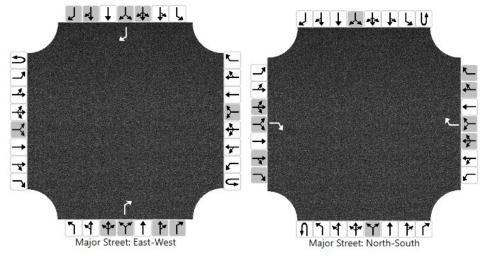
vii. Adding a shared left-thru (LT) lane will disable the exclusive left-turn (L), shared left-thru (LT), shared left-thru-right (LTR), and shared left-right (LR) lanes



viii. 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-turn (R) lanes



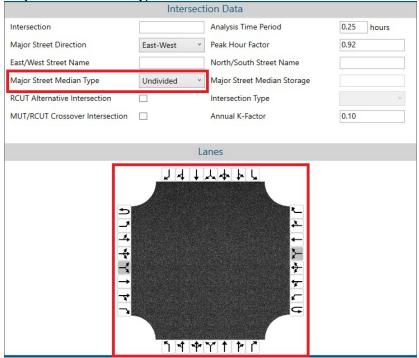
ix. Adding an exclusive right-turn (R) lane will disable the shared left-thru-right (LTR), shared left-right (LR), shared thru-right (TR), and exclusive right-turn (R) lanes



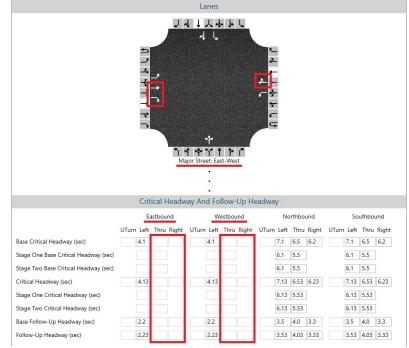
- 3. To remove lanes, click on the lanes within the center of the lanes graphic (white arrows). Clicking on an arrow will immediately remove the lane and change which lane buttons are enabled/disabled for the corresponding approach.
- 4. Changes to the lane configuration on the lanes graphic in the input 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 Headway Fields

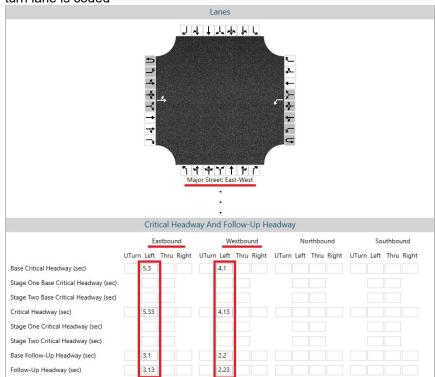
1. Enabling and editing of the different headway fields are dependent on the lane configuration and 'Major Street Median Type'.



2. To enable headways for specific movements of an approach, the movement must exist by adding an appropriate lane to the lane configuration.



a. Thru and Right-turn fields for the major street approaches are always disabled



b. Left-turn fields for a major street approach are enabled if either a shared or exclusive leftturn lane is coded

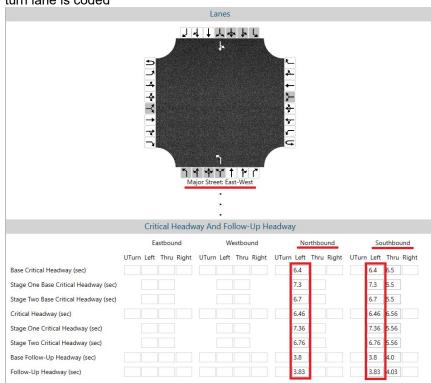


c. U-turn fields for a major street approach will enable if one of the following is true:

- i. The corresponding U-turn lane is coded and at least two opposing thru lanes are coded
- ii. An exclusive left-turn lane is coded in the subject approach, at least two thru lanes are coded in the opposing approach, and the volume for the corresponding U-turn is greater than 0

					La	ines									
		J 4 4 7 4 F A		.	↓ ↓ ↓	↓ し ↑ ۴ Υ ↑	<u>۲</u>								
			Veh	icle V	olume	• and A	djustm	ents							
		Fa	stbou				bound		No	orthbo	ound		So	uthbo	und
	UTurn				UTurn		hru Righ	t UTur				UTur			
Priority	1U	1	2	3	4U	4	5 6		7	8	9		10	11	12
Volume (vph)									0	0	0		0	0	0
Percent Heavy Vehicles (%)									3	3	3		3	3	3
Short Left-Turn Pocket			Yes				Yes			Ye	25			Ye:	
Left-Turn Storage															
Saturation Flow Rate (vph)															
Percent Thrus Using Shared Lane (%)											50				50
		Criti	ical F	leadw	vav And	d Follo	w-Up I	Headw	av						
		Ea	istbou	nd		West	bound		No	orthbo	ound		So	uthbo	und
	UTurn	Left	Thru	Right	UTurn	Left T	hru Righ	t UTur	n Left	Thru	ı Right	UTur	n Left	Thru	Right
Base Critical Headway (sec)									6.4	6.5	7.1		5.4	6.5	7.1
Stage One Base Critical Headway (sec)									7.3	5.5		1	7.3	5.5]
Stage Two Base Critical Headway (sec)									5.7	5.5			5.7	5.5]
Critical Headway (sec)									5.46	6.56	7.16		5.46	6.56	7.16
Stage One Critical Headway (sec)									7.36	5.56		1	7.36	5.56]
Stage Two Critical Headway (sec)									6.76	5.56			6.76	5.56]
Base Follow-Up Headway (sec)									3.8	4.0	3.9		3.8	4.0	3.9
Follow-Up Headway (sec)										1	3.93		-		3.93

d. U-turn fields for the minor street approaches are always disabled



e. Left-turn fields for a minor street approach are enabled if either a shared or exclusive leftturn lane is coded

f. Right-turn fields for a minor street approach are enabled if either a shared or exclusive right-turn lane is coded

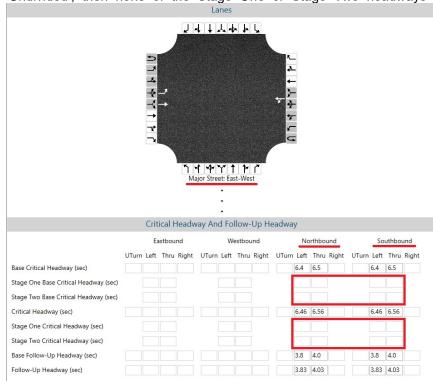


ane is coueu														
					La	ines								
		2 4 t X 4 t C				∳ 1 ₩ 1	• •							
		Crit	ical H	Headw	vay An	d Fo	llow-	Up H	eadwa	y				
			astbou		-		estbou	1000000			rthbound	So	uthbou	ind
	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru Righ	nt UTurn Left	Thru	Right
Base Critical Headway (sec)											6.5	6.4	6.5	7.1
Stage One Base Critical Headway (sec)											5.5	7.3	5.5	
Stage Two Base Critical Headway (sec)														
											5.5	6.7	5.5	
Critical Headway (sec)											5.5 6.56	6.7	5.5 6.56	7.16
Critical Headway (sec) Stage One Critical Headway (sec)														7.16
											6.56	6.46	6.56	7.16
Stage One Critical Headway (sec)											6.56 5.56	6.46	6.56 5.56	7.16
Stage One Critical Headway (sec) Stage Two Critical Headway (sec)											6.56 5.56 5.56	6.46 7.36 6.76	6.56 5.56 5.56 4.0	

g. Thru fields for a minor street approach are enabled if either a shared or exclusive thru lane is coded

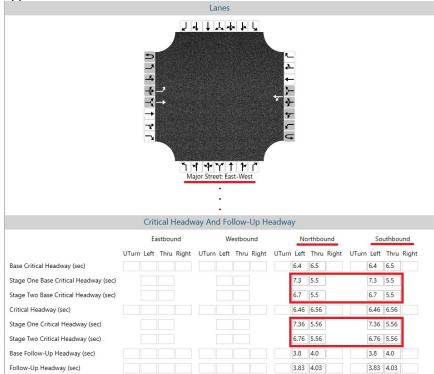
3. To enable Stage One and Stage Two headways, the Major Street Median Type must be specified. Choices include: *Undivided*, *Left* + *Thru*, and *Left Only*. The default selection is 'Undivided'. *Note: Stage One and Stage Two headways will only apply to left and thru fields from the minor street approaches*.

	Intersect	ion Data	
Intersection		Analysis Time Period	0.25 hours
Major Street Direction	East-West ~	Peak Hour Factor	0.92
East/West Street Name		North/South Street Name	
Major Street Median Type	Undivided v	Major Street Median Storage	
RCUT Alternative Intersection	Undivided	Intersection Type	~
MUT/RCUT Crossover Intersection	Left + Thru Left Only	Annual K-Factor	0.10

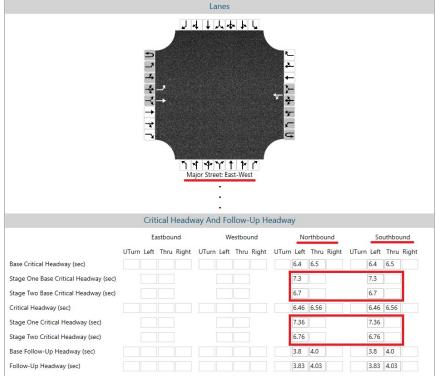


a. If the left and thru movements exist and the 'Major Street Median Type' selected is 'Undivided', then none of the Stage One or Stage Two headways will be enabled.

b. If the left and thru movements exist and the 'Major Street Median Type' selected is 'Left + Thru', then both the Left and Thru fields for Stage One and Stage Two of the minor street approaches will be enabled.



c. If the left and thru movements exist and the 'Major Street Median Type' selected is 'Left Only', then only the Left fields for Stage One and Stage Two of the minor street approaches will be enabled.



- d. If a left movement does not exist, then the corresponding Stage One and Stage Two fields will be disabled regardless of the Major Street Median Type selected.
- e. If a thru movement does not exist, then the corresponding Stage One and Stage Two fields will be disabled regardless of the Major Street Median Type selected.

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. a. Page View with Report page displayed

START GENERAL LA	NES	TRAF	FIC	HEA	DWAY	A	DJUS	TMEN	JT	REPO	RT					
		H	ICS T	wo-\	Way S	top	-Con	trol F	Repo	ort						
General Information	_	_	_	_	_		Site I	nform	atior	1	_	_	_	_	_	
Analyst							Interse	ction								
Agency/Co.							Jurisdi	tion								
Date Performed	8/15/	2022					East/W	est Stree	t							
Analysis Year	2022						North/	South St	reet							
Time Analyzed							Peak H	our Facto	or		1.00					
Intersection Orientation	East-\	West					Analys	s Time P	eriod (P	hrs)	0.25					
Project Description	Chapt	ter 32: Ex	ample P	roblem '	1											
Lanes																
				114410				11								
				14114410	h H .	Y T T	Fr	1144714								
Vehicle Volumes and A	djustme	nts			h H Majari		F.C.	11111111	_							
Vehicle Volumes and A Approach	djustme	nts Eastb	ound		Major		t West	111111		Northbo	ound			South	sound	
	djustme		round T	R 1114 111	Major	φ Υ f	t West	8 1 1 4 1 1 1 1 4 1 1 1 1	U	Northbo	ound	R	U	South	cound T	R
Approach				1471172	Major	Westb	ound	8 6	U		_	R 9	U	South L 10	_	R 12
Approach Movement	U	Eastb	т	8	U	Westb	ound T	_	U	L	т		U	L	т	
Approach Movement Priority	U 1U	Eastb L 1	T 2	R 3 0 TR	U 40 0	Westb L L L	ound T 5 1 T	6	U	L 7 0	T 8	9	U	L 10	T 11	12
Approach Movement Priority Number of Lanes Configuration Volume (veh/h)	U 1U	Eastb L 1	T 2	R 3 0	U 40 0	Westb L L L L L L L L L L L	ound T 5 1	6	U	L 7 0 40	T 8 1	9 0 120	U	L 10	T 11	12
Approach Movement Priority Number of Lanes Configuration	U 1U	Eastb L 1	T 2 1	R 3 0 TR	U 40 0	Westb L L L	ound T 5 1 T	6	U	L 7 0	T 8 1	9	U	L 10	T 11	12

b. Full View with the report on the right of the screen

	Pro	pject Properties					ICS T			
				General Information						
Analyst		Jurisdiction		Analyst						
Agency		Analysis Year	2022	Agency/Co.	_					
Date	8/15/2022	Project Description	Chapter 32: Example Problem 1	Date Performed Analysis Year	8/15/	2022				-
				Time Analyzed	LULL					-
Time Analyzed		Units	U.S. Customary	Intersection Orientation	East-V	Nest				-
				Project Description	Chapt	er 32: E	ample P	roblem	1	
	Int	ersection Data		Lanes						
Intersection Major Street Direction East/West Street Name Major Street Median Type RCUT Alternative Intersection MUT/RCUT Crossover Intersection	East-West Undivided	Analysis Time Period Peak Hour Factor North/South Street Name Major Street Median Storage Intersection Type Annual K-Factor	0.25 hours					1414416	-	
				Vehicle Volumes and	Adjustme		ound			
				Approach	U	Eastb	T	8	U	т
		Lanes		Priority	10	1	2	3	4U	t
		4 4 4 4 4 6		Number of Lanes	0	0	1	0	0	1
		4 + 12 42 42 5		Configuration				TR		1
	A1200.000			Volume (veh/h)			240	40		1

- ø ×

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

			Project Properties			
Analyst			Jurisdiction			1
				2022		
Agency			Analysis Year	2022		
Date	8/15/2022		Project Description	Chapter 32: Example Problem 1		
Time Analyzed			Units	U.S. Customary		
	HCS Two-Way St	op-Control Report				
eneral Information		Site Information				
nalyst		Intersection				
gency/Co.		Jurisdiction				
ate Performed	8/15/2022	East/West Street				
nalysis Year	2022	North/South Street				
ime Analyzed		Peak Hour Factor	1.00			
reject Description	East-West Chapter 32: Example Problem 1	Analysis Time Period (hrs)	0.25			
ines	Chapter 52. Etample Problem 1					
ines	741	442				
		A LEAST PER			II = -5	

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

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

			HCS T	wo-	Way	Stop	-Cor	ntrol	Repo	ort						
General Information							Site	Infor	natio	n						
Analyst	Τ						Inters	ection								
Agency/Co.							Jurisc	liction								
Date Performed	8/15/	2022					East/	Nest Str	eet							
Analysis Year	2022						North	/South	Street							
Time Analyzed							Peak	Hour Fa	ctor		1.00					
Intersection Orientation	East-	West					Analy	sis Time	Period (hrs)	0.25					
Project Description	Chap	ter 32: E	xample F	roblem	1					-						
Lanes																
				J 4 1 1 4 1 4 4 4 4	h š	Y • Y or Street Ea	st-West									
Vehicle Volumes and Adj	ustme	nts														
Approach		Eastb	ound			West	bound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	1	1	0		0	1	0		0	0	0
Configuration				TR		L	Т				LR					
Volume (veh/h)			240	40		160	300			40		120				
Percent Heavy Vehicles (%)						10				10		10				
Proportion Time Blocked																
Percent Grade (%)											0					
Right Turn Channelized																
Median Type Storage				Undi	vided											
Critical and Follow-up H	eadwa	ys														
Base Critical Headway (sec)	T					4.1				7.1		6.2	_	<u> </u>		
Critical Headway (sec)						4.20				6.50		6.30				
Base Follow-Up Headway (sec)				-		2.2				3.5		3.3				
Follow-Up Headway (sec)						2.29				3.59		3.39				
Delay, Queue Length, an	d Leve	l of S	ervice													
Flow Rate, v (veh/h)						160					160					
Capacity, c (veh/h)						1238					521					
v/c Ratio						0.13					0.31					
95% Queue Length, Q ₉₅ (veh)						0.4					1.3					
95% Queue Length, Q ₉₅ (ft)						10.8					35.1					
Control Delay (s/veh)						8.3					15.0					
Level of Service (LOS)						A					В					
		1							1						L	I
Approach Delay (s/veh)						2	.9			15	5.0					

		wo-Way St								Approach Priority Movement			NB 7 L	8	9	1		SB 10 L	11	12
ile Name:	TWO-W TWSC1	AY STOP C -ThreeLeg	ONTROL	(TwSC) A	malysis_					Movement				8 T	9 R			ĩ	11 T	12 R
<pre>ile Name: nalyst: ime Analyzed: ime Analyzed: nalyzets voir: noject Description: nis: int: ajor Street Direction: ajor Street Name: orth/South Street Name; niysis Time period (hrs):</pre>	8/15/									Major Street: Approach Movement	Step			MAND VOI	LUMES AN	D FLOW I	ATES	20		
ime Analyzed: urisdiction:										Movement		10 U	EB 1 L	2 T	3 R		40 U	WB 4 L	S T	6 8
nalysis Year: roject Description:	2022 Chapt	er 32: Ex Customary	tample P	roblem 1						Volume, V_x Flow Rate, v_x			-	240 240	40 40		-	160 160	300 300	
nits: ntersection Name: aior Street Direction:	U.S.									Flow Rate, v_x Minor Street:				240	40				300	
ast/west Street Name: orth/South Street Name:										Minor Street: Approach Movement			NB 7	8 T	9	ī.		SB 10	11 T	12 R
nalysis time Period (hrs):	0.25				2272.25					volume, v x			L 40	т	R 120	1		L	т	R
ajor street: pproach ovement	ve	hicle vol	unes an	d Adjust	ments		WR			volume, v_x Flow Rate, v_x			40 40		120 120					
	10	1 L	2 T	3 R		40 U	W8 4 L	5 T	6 R	Major Street:		Ste		FLICTING	G FLOW R	ATES				
olume eak Hour Factor, PHF ourly Flow Rate, HFR ercent Heavy Vehicles umber of Lanes, and Configuration edian Storage t Channelized? eft-turn Lane Storage pstream Signal?			240	40	1.00		160	300		Major Street: Approach Movement		10 U	EB 1 L	2	3		4U U	WB 4 L	5	6
ourly Flow Rate, HFR ercent Heavy Vehicles			240	40	1.00		160 10 1 L	300		Flow Rate, v_x Conflicting Flow, v_c,x		0		240	40		0	160 280	300	
umber of Lanes ane Configuration	0	0	1	0 TR	Undiv	0 hdad	L	T	0	Conflicting Flow, v_c,x Minor Street:								280		
edian Storage T Channelized?					ondiv	rueu				Approach Movement			NB 7 L	8 T	9 R	Ť.		SB 10	11	12 R
eft-Turn Lane Storage pstream Signal?					NOT P	resent								т		i		L	11 T	R
inor street: pproach ovement		NB					58			Flow Rate, v_x Conflicting Flow, v_c,x			40 880		120 260					
		NB 7 L	8 T	9 R	1		58 10 L	11 T	12 R	CRITICAL HEADWAYS	step	4: CRIT	ICAL HE	DWAYS an	nd FOLLO	W-UP HE	DWAYS			
olume		40		120	1.00				_	Approach Movement	10 E8	1	4U U	4	7	NB 8 T	9 R	10 L	58 11 T	12 R
olume eak Hour Factor, PHF ourly Flow Rate, HFR words theavy Vehicles umber of Lans. Ame Configuration lared Approach storage ercent Grade		40 10 0		120 10 0	1.00						U	L	U	Ĺ	i.	т		L	т	R
umber of Lanes ane Configuration		0	1 LR	0			0	0	0	T_c,base Single Stage Stage II Stage II L_C,HV P_HV T_C,G G				4.1	7.1		6.2			
lared Approach Storage ercent Grade		NO	ł					T.		stage II t_c,HV				1.0	1.0		1.0			
	Pede	strian w		nd adjus	Thents					t_c,G					1.0 0.10 0.2		1.0 0.10 0.1			
pproach ovenent		strian vo	EB 13		WB 14		NB 15		SB 16	G t_3,LT t_c Single stage Stage I Stage II				0.0	0.7		0.0			
low (ped/hr)			0		0		0			Single Stage Stage I				4.20	6.50		6.30			
low (ped/hr) ane width (ft) alking Speed (ft/sec) edestrian Blockage Factor, f_pb										FOLLOW-UP HEADWAYS										
	Delay	Queue Los	noth an	d Level	of Servi	ce				Approach Movement	10 U	1	4U 4U U	4	7	NB 8 T	9 R	10 L	58 11 T	12 R
pproach EB ovement 1U ane Configuration	1	Queue Len WB 4U	4 L	7	NB 8 LR	9	10	SB 11	12		U	L	U	L 2 2	L 3.5	т		L	т	R
					LR					t_f,base t_f,HV P_HV t_f				2.2 0.9 0.10 2.29	3.5 0.9 0.10 3.59		3.3 0.9 0.10 3.39			
low Rate ane Capacity (veh/h) 5% Queue Length (veh) ontrol Delay 05			160 1238 0.13 0.4 8.3		160 521 0.31 1.3 15.0					t_f							3.39			
5% Queue Length (veh) ontrol Delay			0.4 8.3		1.3					NO UPSTREAM SIGNAL EFFE	CTS PRESENT	st		TENTIAL	CAPACIT					
os pproach Delay pproach LOS ntersction Delay			A 2.9		B 15.0					Approach Movement	10 U	1	4U U	4	7	NB 8 T	9 R	10 L	58 11 T	12 R
ntersction Delay	4.1		~		b					v c.x	0		0	-	-					~
ajor Street:		Step 1: M	OVEMENT	PRIORIT	IES					v_c,x t_c,x t_f,x c_p,x				280 4.20 2.29 1238	880 6.50 3.59 308		260 6.30 3.39 760			
pproach riority ovement	1U U	E8 1 L	2 T	3		40 U	WB 4 L	5 T	6 R	c_p,x							760			
ovement inor Street:	U	L	r	R		U	L	т	R	Pedestrian Impedance Approach		step	s 6 - 9:	EB EB	NT CAPAC	WB		NB		SB
nor screet.										Approach						w.o		140		50
edestrin flow mate v.x eswidth, w liking speed, k_p ajor-street Left-Turn Movements orficting Plow, v.c.s edestrian Impedance Factor, p.p. resulting of the speed of the speed address of the speed of the speed address of the speed of the speed address of the speed of the speed the speed of t		ate, p°_0),j		9 260 760 1.000 760 0.842		4 280 1238 1.000 1238 0.871 1.000 12	0		This TWSC Text report w	as createu	IN HCS	Twsc ver	5101 20.	24 ON 10,	/13/202	6 8:40:39	191		
ajor-street U-Turn Movements					10		40													
onflicting Flow, v_c,x otential Capacity, c_p,x apacity adjustment Factor, f_x ovement Capacity, c_m,x hared L/U capacity, c_SH robability of Queue-free State,																				
ovement Capacity, c_m,x hared L/U Capacity, c_SH																				
inor-Street Through Movements					8		11													
onflicting Flow, v_c,x					*		**													
onflicting Flow, v_c,x otential Capacity, c_p,x edestrian Impedance Factor, p_p, apacity Adjustment Factor, f_x ovement Capacity, c_m,x robability of Queue-free State,	x																			
ovement Capacity, c_M,x robability of Queue-free State	p_0,i																			
inor-Street Left-Turn Movements					7		10													
onflicting Flow, v_c,x					880															
onflicting Flow, v_c,x otential Capacity, c_p,x dedstrian Impedance Factor, p_p, apacity Adjustment Factor, f_x ovement Capacity, c_m,x HARED-LANE CAPACITY OF MINOR STR mornach	X	10: 572	AL CARAC	TTY AD	880 308 1.000 0.871 268															
HADED LANE CARACITY OF NINOR CIT	EET APP	ROACHES	7	8 LR	9		10	58 11	12											
ovement ane Configuration			268	160 521	760															
vovement ane Configuration hared Flow Rate, v_y ovement Capacity, c_m,x hared Capacity, c_SH																				
Ovement ane Configuration hared flow Bate, vy owement Capacity, C.s.x hared capacity, c_SH ONTROL DELAY TO RANK 2 THROUGH 4 Oproach 200	MOVEME 1	Step 11 NTS WB 4U	4	7	NB 8	9	10	58 11	12											
overent hared Flow Fate, v_y woment Capacity, c_s, x hared Expacity, c_s, x hared Expacity, c_si hared Expacity, c_si hared Expacts U Tow Fate U Tow Fate hared Capacity hared Capacity hared Capacity hared Capacity	1	40	4 160 1238 L 8.3	7 40 268	8 521 15.0	120 760			12											
ovement ane Configuration hared Flow Rate, V_Y ovement Capacity, C_M,x hared Capacity, C_M,x hared Capacity, C_SH ONTROL DELAY TO RANK 2 THROUGH 4 BD ovement IU Ju: 0.45	1	40	4 160 1238 L 8.3	7 40 268	8 521 15.0	120 760			12											

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

- 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".

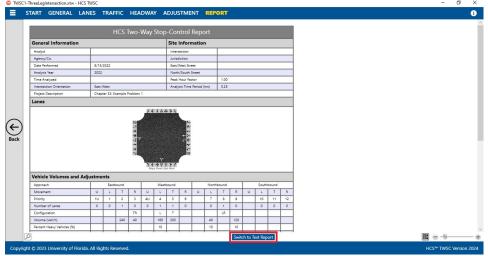
START GENERAL L	ANES	TRAF	FIC	HEA	DWA	Y A	DIUS	TME	NT	REP	ORT					
New Ctrl+N							Site	Infor	natio	1	-	-	-	-	-	-
Open Ctrl+O	17							ection			_					
Example Folder							Jurisc			_						-
Save Ctrl+S		8/15/2022			_		-	West Str	200	_		_	_	_		
Save As F12		2022				_	North	/South	Street							
Close Ctrl+W							Peak	Hour Fa	ctor	_	1.00					
	_	East-West					Analy	sis Time	Period (hrs)	0.25					
Jnits	• 🗖	Chapter 32: Ex	ample	Problem	1											
Print Ctrl+P																
Print Preview Ctrl+F2					U A	124	. NU									
liew							1.35									
		1.0		-				4								
Report	•	Formatt		port	F4			-								
Default Settings Alt+F	_	Text Rep	port		F6			~÷								
Help								×								
CORSIM				5				G								
	•				0.8	Y T	2.0									
Exit Alt+F4	_				Maje	r Street, Ka	z Wost									
Vehicle Volumes and	Adjust	ments														
Approach		Eastb				West	ound			North	bound			South	oound	
Movement		UL	т	R	U	L	т	R	U	L	т	R	U	L	T	R
Priority	_	10 1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	-	0 0	1	0	0	1	1	0		0	1	0		0	0	0
	-		240	TR		L 160	T 300		-	10	LR	120				
Configuration			240	40		160	500			40		120				
Volume (veh/h)						.0		_		10		.0				
Volume (veh/h) Percent Heavy Vehicles (%)	-															
Volume (veh/h)	+			-	_						2					

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".

START	GEN	ERAL	LANES	TRAFFIC	HEADWAY	ADJUSTM	ENT REPO	RT				
2W		Ctrl+N		HCS.	Two-May Sto	p-Control Tex	t Paport					
en		Ctrl+O										
imple Fo	lder			TWO TWS	-WAY STOP CO C1-ThreeLegI	NTROL (TWSC) ntersection.x	Analysis					
ve		Ctrl+S		0.14	5/2022							
ve As		F12		8/1	5/2022							
ose		Ctrl+W		202 Cha	2 nter 32. Eva	mple Problem	1					
its				U.S	. Customary	inpre rrobren	1					
nt		Ctrl+P	1	Eas	t-West							
nt Previe	w	Ctrl+F2	ins)	: 0.2	5							
ew					Vehicle Volu	mes and Adius	tments					
port			•	Formatted R				WB				
fault Set	tings	Alt+F		Text Report	F6	R		1U 4 J L	5	6 R		
lp						240 40	1.00	160	300			
RSIM						240 40	1.00	160 10	300			
t		Alt+F4		0	0	1 0 TR) 1 L	1	0		
RT Ch Left-	n Stora anneliz Turn La eam Sig	ed? ne Stor:	ige				Undivided					
Minor Appro Novem	Street ach ent				NB 7 L	8 9 T R		58 10 L	11 T	12 R		
Volum	Hour Ea	ctor, Pl	1F		40	120	1.00					
Hourl Perce Numbe	y Flow nt Heav r of La Configu anneliz	Rate, H y Vehic nes	R		40 10 0	120 10 1 LR		0	0	0		
2								Switch to For	matted Rep	port		 -9

- 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.

	START	GENERAL	LANES	TRAFFIC	HEADWAY	ADJUSTM		EPORT					
				HCS	5 Two-Way Sto	p-Control Tex	t Report	ŧ					
				TWO	-WAY STOP CO	NTROL (TWSC)	Analysi					_	
	File M Analys	t:		TWS	SC1-ThreeLegI	intersection.	tw						
	Time A	erformed: nalyzed: liction:		8/1	15/2022								
	Analys	is Year: t Descriptio		202 Cha	22 anter 32 - Eva	umple Problem	1						
	Units: Inters	ection Name:		U. 9	5. Customary	and the tribule	1						
	Major East/W	Street Direct	tion:	Eas	st-West								
	North/ Analys	South Street	od (hrs):	0.2	25								
					Vehicle Volu	mes and Adjus	tments_					_	
	Approa Noveme	Street:		10	EB 1	2 3		4U	WB 4	5	6		
-)	Novene	int		0	Ĺ	2 3 T R		U	Ļ	Ť	R		
	Volume Peak H	our Factor.	PHF			240 40	1.0	2	160	300		-	
~	Hourly	our Factor, Flow Rate, it Heavy Vehi	HFR cles			240 40			160 10	300			
	Lane C Median	of Lanes onfiguration		0	0	1 0 TR	the sta	0 ivided	1	1 T	0		
	Median	Storage					Und	Ivided					
	Left-T	urn Lane Sto am Signal?	rage				Not	Present					
	Minor	Street:			NB				SB			-	
	Novene	ent			NB 7 L	8 9 T R			10	11 T	12 R		
	Volume	our Factor,	0.05		40	120	1.0					=	
	Hourly	Flow Rate, Heavy Vehi	HFR		40 10	120 10	1.0						
	Number	of Lanes			0	1 0 LR			0	0	0		
	RT Cha	innelized?							N 1 4 1	matted Rep			

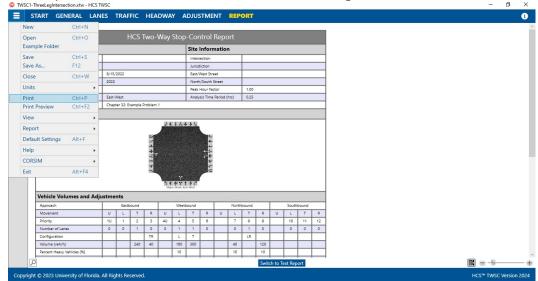
4. The magnification of the report currently being displayed can be changed using the zoom slider found at the bottom right-hand corner of the screen.

SC	1-ThreeLeg	Intersection.xtw	- HCS T	WSC	0														
	START	GENERAL	LAN	ES T	TRAF	FIC	HEA	DWAY	A	DIUS	STME	NT	REP	ORT					
							Two	Way S	ton	Cor	atrol	Pop	ort				_	_	-
							IWO-	way :	stop										
	Gener	al Informatio	on							Site	Inform	natio	n						
	Analyst									Inters	ection								
	Agency	/Co.								Juriso	liction								
		erformed		8/15/2	2022						West Str								
	Analysi			2022							/South :								
	Time A	-									Hour Fac			1.00					
		ction Orientation		East-V						Analy	sis Time	Period	(hrs)	0.25					
		Description		Chapt	ter 32: Ex	xample P	Problem	1											_
	Lanes																		
←) Back	Vehicl	le Volumes an	nd Adju	ustme	nts		74174FC	Р. Н. Мајот	Y Y Y I Stort fo	t West	1417446								
	Approa		-	T		ound	_	<u> </u>	West	ound			North	bound	_		South	bound	
	Movem	hent		U	L	T	R	U	L	T	R	U	L	T	R	U	L	Т	R
	Priority			1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
	Numbe	er of Lanes		0	0	1	0	0	1	1	0		0	1	0		0	0	0
	Configu	aration					TR		L	T				LR					
	Volume	e (veh/h)				240	40		160	300			40		120				
	Percent	t Heavy Vehicles (%))						10				10		10				
	2														Swit	ch to T	ext Rep	ort	
opyri	ght © 2023	3 University of F	Florida.	All Rigi	hts Re	served													

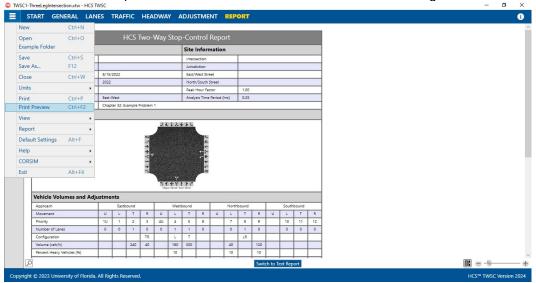
- a. To zoom in, drag the slider to the right; to zoom out, drag the slider to the left
- b. Clicking the plus (+) button will zoom in; clicking the minus (-) button will zoom out
- c. Holding down "ctrl" on the keyboard and scrolling up on the mouse wheel will zoom in; holding down "ctrl" on the keyboard 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

Select Printer	
Microsoft Print to PDF Microsoft XPS Document Writer OneNote for Windows 10	
<	>
Status: Ready	Preferences
Location: Comment:	Find Printer
Page Range	1
• All	Number of copies: 1
C Selection C Current Page	
C Pages:	Collate 11 22 33

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

			HCS T	wo-Wa	ay Stop	o-Cor	ntrol	Report					
General Information		_						nation	_	_	_	_	_
Analyst			_			Inters	ection		T	_	_	_	
Agency/Co.						Jurisd	liction						
Date Performed	8/15	/2022				East/	West Stre	et					
Analysis Year	202	2				North	/South S	treet					
Time Analyzed						Peak	Hour Fac	tor	1.00				
Intersection Orientation	East	-West				Analy	sis Time	Period (hrs)	0.25				
Project Description	Cha	pter 32: E	xample Pr	oblem 1					-				
Lanes													
				4 1 4 4 1 1	14.1.		14444						
				14174510	۲ ۲ ۲ ۹ ۴ ۲	1 2 4	NA NYA NU						
Vehicle Volumes and J	Adjustme	ents		14174510	т 1 4 Ф Ш	1 2 4	D A DYA NUD						
Vehicle Volumes and a Approxch	Adjustme		bound	14174510	۲ ۱۹۹۲ Major Rover F	1 2 4	n a nave a na	Ne	thbound			outhbour	đ
	Adjustm		bound T	14174510	₩est West	1 P C	NA LAANUU L	Ne U L	thbound T	R	U	iouthbour	R
Approach Movement Priority	U 1U	East L 1	T 2	R 114 810 8	Major Street F Wess J L U 4	bound T 5	6	U L	T 8	9	U	L 1 10 1	R 12
Approach Movement	U	East	т	R U 44	Major Street F Wess J L U 4	bound T 5 1	_	UL	T 8 1		U	L 1	R 12
Approach Movement Priority Number of Lanes Configuration	U 1U	East L 1	T 2 1	R L 3 44 0 C	Magar Brock F West J L U 4 D 1 L	1 P 7 bound T 5 1 T	6	U L 7 0	T 8 1 LR	9	U	L 1 10 1	R 12
Approach Movement Priority Number of Lanes Configuration Volume (veh/h)	U 1U	East L 1	T 2	R U 44	Major Brock F West J L U 4 0 1 L L 160	bound T 5 1	6	U L 7 0	T 8 1 LR	9 0 120	U	L 1 10 1	R 12
Approach Movement Priority Number of Lanes Configuration	U 1U	East L 1	T 2 1	R L 3 44 0 C	Magar Brock F West J L U 4 D 1 L	bound T 5 1 T	6	U L 7 0	T 8 1 LR	9	U	L 1 10 1	R 12

- 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

Select Printer	
S Microsoft Print to PDF	
Constant Applied The Windows 10 Microsoft XPS Document Writer The Windows 10	
<	>
Status: Ready Location:	Preferences
Comment:	Find Printer
Page Range	
 All 	Number of copies: 1
C Selection C Current Page	
C Pages:	Collate

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 hr) and is used in the delay equations. If v/c exceeds 0.90, control delay may be significantly affected by the value of T.

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.

Annual K-Factor

The proportion of AADT that occurs during the peak hour

Base Critical Headway

This value is obtained for each movement for two-lane, four-lane or six-lane major streets and is used to calculate the critical headway. See exhibit below.

Vehicle	Base	e Critical Headway, t _{gb}	ase (S)
Movement	Two Lanes	Four Lanes	Six Lanes
Left turn from major street	4.1	4.1	5.3
U-turn from major street	NA	6.4 (wide)ª 6.9 (narrow)ª	5.6
Right turn from minor street	6.2	6.9	7.1
Through traffic on minor street	1 stage: 6.5 2 stage, Stage I: 5.5 2 stage, Stage II: 5.5	1 stage: 6.5 2 stage, Stage I: 5.5 2 stage, Stage II: 5.5	1 stage: 6.5 ^b 2 stage, Stage I: 5.5 ^b 2 stage, Stage II: 5.5 ^b
Left turn from minor street	1 stage: 7.1 2 stage, Stage I: 6.1 2 stage, Stage II: 6.1	1 stage: 7.5 2 stage, Stage I: 6.5 2 stage, Stage II: 6.5	1 stage: 6.4 2 stage, Stage I: 7.3 2 stage, Stage II: 6.7

Notes: NA = not available.

^a Narrow U-turns have a median nose width <21 ft; wide U-turns have a median nose width \geq 21 ft. ^b Use caution; values estimated.

Base Follow-Up Headway

This value is obtained for each movement for two-lane, four-lane or six-lane major roads and is used to calculate the follow-up headway.

	Base Fe	ollow-Up Headway, t	base (S)
Vehicle Movement	Two Lanes	Four Lanes	Six Lanes
Left turn from major street	2.2	2.2	3.1
U-turn from major street	NA	2.5 (wide) ^a 3.1 (narrow) ^a	2.3
Right turn from minor street	3.3	3.3	3.9
Through traffic on minor street	4.0	4.0	4.0
Left turn from minor street	3.5	3.5	3.8

Notes: NA = not available.

^a Narrow U-turns have a median nose width <21 ft; wide U-turns have a median nose width ≥21 ft.

Calibrated Conflicting Flow Factors

Each movement at a TWSC intersection faces a different set of conflicts that is directly related to the nature of the subject movement. HCM exhibits and equations illustrate the computation of the parameter $v_{c,x}$, the conflicting flow rate for movement *x*—that is, the total flow rate (in vehicles per hour) that conflicts with movement *x*.

In the computation of $v_{c,x}$, there are default conflicting flow factors, $f_{c,x,y}$. If the user wishes to calibrate these values, they can choose to check 'Calibrated Conflicting Flow Factors'. If checked, this will enable applicable fields within the 'Conflicting Flow Factor Table'. Editing these fields will change the factors used in the computation of $v_{c,x}$. Unchecking the checkbox will revert the factors back to the HCM defaults.

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.

Critical Headway

<u>Vehicles</u>

The minimum time interval in the major-street that allows intersection entry to one minor-street vehicle. Factors that influence the calculation of critical headway include the number of lanes in each direction on the major street, the proportion of heavy vehicles, percent grade, intersection geometry, and base critical headway values. See *Base Critical Headway* for the HCM default values. Please note that values for U-turns from a four-lane major road depend on whether the median nose is narrow (less than 21 ft, or 6.4 m in metric, or wider).

The following equation is used to calculate critical headway:

 $t_{c,x} = t_{c,base} + t_{c,HV}P_{HV} + t_{c,G}G - t_{3,LT}$

where

- $t_{c,x}$ = critical headway for movement x (s);
- $t_{c,base}$ = base critical headway (s);
- $t_{c,HV}$ = adjustment factor for heavy vehicles (1.0 for major streets with one lane in each direction; 2.0 for major streets with two or three lanes in each direction) (s);
- P_{HV} = proportion of heavy vehicles for movement *x* (expressed as a decimal; e.g., P_{HV} = 0.02 for 2% heavy vehicles);
- $t_{c,G}$ = adjustment factor for grade for given movement (0.1 for Movements 9 and 12; 0.2 for Movements 7, 8, 10, and 11) (s);
- G = percent grade (expressed as an integer; e.g., G = -2 for a 2% downhill grade); and
- $t_{3,LT}$ = adjustment factor for intersection geometry (0.7 for minor-street left-turn movement at three-leg intersections; 0.0 otherwise) (s).

Pedestrians

The minimum headway in the traffic stream that will allow a pedestrian, or group of pedestrians, to cross without the need for vehicles to yield.

Crossing Treatment

The exhibit below provides information on average motorist responses to typical pedestrian crossing treatments summarized from a number of research efforts.

	Yield Rate (%)		Sample Size	
Crossing Treatment	Average	Range	(sites)	
No treatment (unmarked)	24	0-100	37	
Crosswalk markings only (any type)	33	0-95	58	
Crosswalk markings, plus:				
Pedestal-mounted flashing beacon	26	0-52	2	
Overhead sign	35	12-57	2	
Overhead flashing beacon (push-button activation)	51	13-91	14	
Overhead flashing beacon (passive activation)	73	61-76	29	
In-roadway warning lights	58	53-65	11	
Median refuge island	60	0-100	21	
Pedestrian crossing flags	74	72-80	6	
In-street pedestrian crossing signs	76	35-88	20	
Rectangular rapid-flashing beacon (RFFB)	82	31-100	64	
School crossing guard	86	_	1	
School crossing guard and RFFB	92	<u> </u>	1	
Pedestrian hybrid beacon (HAWK)	91	73-99	37	
Mid-block crossing signals, half signals	98	94-100	13	

Sources: Ryus et al. (14), Fitzpatrick et al. (15), Huang et al. (18), Turner et al. (19), Banerjee and Ragland (20), Ellis Jr. et al. (21), Shurbutt et al. (22), Mitman et al. (23), Pécheaux et al. (24), Mitman et al. (25), Ross et al. (26), Brewer and Fitzpatrick (27), Fitzpatrick et al. (28), Nemeth et al. (29), Yang et al. (30), Zheng and Elefteriatou (31), Schneider et al. (32), Al-Kaisy et al. (33), and Hockmuth and Van Houten (34).

Crosswalk Length

The length in feet (or meters in metric) of a pedestrian crosswalk. A pedestrian crosswalk is a connection between pedestrian facilities across sections of roadway used by automobiles, bicycles, and transit vehicles. Crosswalk lengths can be broken up into two stages if there is a median refuge. Crosswalks can be marked or unmarked.

Crosswalk Markings

A checkbox is provided to indicate if the pedestrian crosswalk has any markings or not. Please also see *Marked Crosswalk* and *Unmarked Crosswalk*.

Crosswalk Width

The width in feet (or meters in metric) of a pedestrian crosswalk. A pedestrian crosswalk is a connection between pedestrian facilities across sections of roadway used by automobiles, bicycles, and transit vehicles. Crosswalks can be marked or unmarked.

Date

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.

Distance from Main Intersection to Crossover

The distance in feet (or meters in metric) from the main intersection to the U-Turn crossover. It is used in determining the Extra Distance Travel Time (EDTT).

East/West Street Name

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

Flared Minor-Street Approach

A shared right-turn lane that allows right-turning vehicles to complete their movement while other vehicles are occupying the lane.

This box is checked when two vehicles may occupy or depart from the stop line simultaneously as a result of a large curb radius, a tapered curb, or a parking prohibition. This geometry may result in a greater capacity than if turning and through movement share only one lane. The magnitude of this effect depends in part on the turning-movement flow rates and the resultant probability of there being two vehicles simultaneously at the stop line, and in part on the storage length available to feed the second position at the stop line.

Flared Minor-Street Storage

The number of spaces for right-turning passenger cars that can queue at the stop line without obstructing the access to the stop line for other movements.

Follow-Up Headway

The time between the departure of one vehicle from the minor street and the departure of the next vehicle using the same major-street headway under a condition of continuous queuing on the minor street. Factors that influence the calculation of follow-up headway include the number of lanes in each direction on the major street, the proportion of heavy vehicles, and base follow-up headway values. See *Base Follow-Up Headway* for the HCM default values. Please note that values for U-turns from a four-lane major road depend on whether the median nose is narrow (less than 21 ft, or 6.4 m in metric) or wide (21 ft, or 6.4 m in metric, or wider).

The following equation is used to calculate follow-up headway:

 $t_{f,x} = t_{f,base} + t_{f,HV}P_{HV}$

where

- $t_{f,x}$ = follow-up headway for movement x (s);
- *t_{f,base}* = base follow-up headway (s);
- $t_{f,HV}$ = adjustment factor for heavy vehicles (0.9 for major streets with one lane in each direction; 1.0 for major streets with two or three lanes in each direction) (s), and
- P_{HV} = proportion of heavy vehicles for movement *x* (expressed as a decimal; e.g., P_{HV} = 0.02 for 2% heavy vehicles).

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.

Intersection Type

When the RCUT Alternative Intersection checkbox is checked, the Intersection Type drop down menu will enable. The two RCUT intersection types include: RCUT with Stop Signs and RCUT with Merges.

Jurisdiction

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

Lane Width

The average width for all lanes in the approach is coded. This is measured in feet (or meters in metric).

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.

Note: As stipulated in the HCM methodology, each major-street approach can have up to three through lanes and one exclusive right- and/or left-turn lane (five lanes maximum). Each minor-street approach can have up to three lanes, a maximum of one exclusive lane for each movement.

Left-Turn Storage

If a major-street left-turn lane exists, the storage length must be provided (in vehicles) to determine whether or not the computed queue will exceed the storage, and generate delay to the Rank 1 movements.

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.

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

LOS criteria for the motorized vehicle mode for TWSC intersections are given in the exhibit below.

Note: The LOS criteria apply to each lane on a given approach and to each approach on the minor street. LOS is not calculated for major-street approaches or for the intersection as a whole.

LOS criteria for the pedestrian mode for TWSC intersections are given in the exhibit below.

LOS	Condition	Comments
A	$P_D < 0.05$	Nearly all pedestrians would be satisfied
В	$0.05 \le P_D < 0.15$	At least 85% of pedestrians would be satisfied
C	$0.15 \le P_D < 0.25$	Fewer than one-quarter of pedestrians would be dissatisfied
D	$0.25 \le P_D < 0.33$	Fewer than one-third of pedestrians would be dissatisfied
E	$0.33 \le P_D < 0.50$	Fewer than one-half of pedestrians would be dissatisfied
F	$P_D \ge 0.50$	The majority of pedestrians would be dissatisfied

Note: PD = proportion of pedestrians giving a "dissatisfied" rating or worse.

Major Street Direction / Intersection Orientation

Defines the street with the two approaches that are uncontrolled. The minor street is the other street that is controlled by STOP signs. Select the Major Street Direction between East-West and North-South from the drop-down menu.

Major Street Free-Flow Speed

Free-Flow Speed (FFS) on the major street. FFS is:

- 1. The theoretical speed when the density and flow rate on a study segment are both zero.
- 2. The prevailing speed on freeways at flow rates between 0 and 1,000 passenger cars per hour per lane (pc/h/ln).

Major Street Median Storage

The number of vehicles able to be stored in the median to be used in the two-stage gap acceptance calculations.

Major Street Median Type

The Median Type is coded for the major street, either Undivided, Thru & Left, or Left Only.

A raised, striped or two-way left-turn lane (TWLTL), often causes a special gap acceptance phenomenon known as two-stage gap acceptance where a significant proportion of the minor-street drivers cross part of the major-street then pause in the median to wait for a gap on the other approach.

Undivided is selected when there is no median storage, disabling that field. Thru & Left is selected if the geometry permits both thrus and lefts from the minor street to store in the median for two-stage movements. Left Only is selected if only left turns (not thrus) can be stored, in a TWLTL for example.

If a median type other than Undivided is selected, the Median Storage field will enable coding of the number of vehicles able to be stored.

Marked Crosswalk

Any portion of a roadway at an intersection or elsewhere distinctly indicated as a pedestrian crossing by pavement marking lines on the surface, which might by supplemented by contrasting pavement texture, style, or color.

Median Refuge

When a raised median refuge island is available, pedestrians typically cross in two stages. Determination of whether a median refuge exists may require engineering judgment. The main issue to determine is whether pedestrians cross the traffic streams in one or two stages. When pedestrians cross in two stages, pedestrian delay should be estimated separately for each stage of the crossing.

Motorist Yield Rate

Rate at which motor vehicles yield and allow a pedestrian to cross the street. Motorist yield rates are influenced by a range of factors, including roadway geometry, travel speeds, pedestrian crossing treatments, local culture, and law enforcement practices.

MUT/RCUT Crossover Intersection

A checkbox is provided for the user to indicate whether the dataset is an MUT/RCUT Crossover Intersection. If converting an existing file, a confirmation popup will appear to verify conversion of file to a crossover intersection and invalid side-street movements will be removed from the lanes graphic.

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.

Pedestrian Critical Headway

The minimum time interval in seconds below which a pedestrian will not attempt to begin crossing the street. For a single pedestrian, critical headway is computed with the following equation:

 $t_c = L / S_p + t_s$

where

 t_c = critical headway for a single pedestrian (s),

- S_{ρ} = average pedestrian walking speed (ft/s) (or m/s in metric),
- L = crosswalk length (ft) (or m in metric), and
- t_s = pedestrian start-up time and end clearance time (s).

Pedestrian Flow

The pedestrian volume is the sum of pedestrians crossing each subject approach (i.e., "Eastbound" pedestrians are those crossing the Eastbound vehicular approach) individually, and groups of pedestrians crossing together, during the time period of study in pedestrians per hour.

Pedestrian Platooning

This is checked when a there is a group of pedestrians traveling together as a group, either voluntarily or involuntarily because of geometrics or other factors.

Pedestrian Start-Up Time and End Clearance Time

Start-up time is the average time between when the vehicle forming the start of the critical headway clears the crosswalk and the first waiting pedestrian enters the crosswalk; end clearance time is extra time buffer that pedestrians provide themselves prior to the arrival of the vehicle forming the end of the critical headway.

Percent Grade

The percent grade is entered for each approach to compute the adjustment factor used in the computation of critical headway and follow-up headway.

Percent Heavy Vehicles

The percentage of heavy vehicles is entered for each movement. This value is used in the calculation of critical headway and follow-up headway.

Percent Thrus Using Shared Lane

When there is more than one thru lane coded (shared or exclusive), the fields are activated to provide for the turn proportions.

Project Description

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

Proportion Time Blocked

To evaluate the impact of coordinated upstream signals, the urban streets segments methodology is used to estimate the proportion of time that each Rank 2 or lower movement will be effectively blocked by a platoon. The proportion of time blocked is denoted by $p_{b,x}$ where x is the movement using the movement conventions provided in the following exhibit:

	Proportion Blocked for Movement, pb,x			
Movement(s) x		Two-Stage Movements		
	One-Stage Movements	Stage I	Stage II	
1, 10	<i>Db</i> ,1	NA	NA	
4, 4U	<i>Pb</i> ,4	NA	NA	
7	Pb,7	<i>Pb</i> ,4	Pb,1	
8	Pb,8	Pb,4	Pb,1	
9	<i>Pb</i> ,9	NA	NA	
10	Pb,10	Pb,1	<i>Pb</i> ,4	
11	<i>Pb</i> ,11	Pb,1	<i>Pb</i> ,4	
12	<i>Db</i> ,12	NA	NA	

Note: NA = not applicable.

Coding the values directly into the corresponding fields within TWSC will modify the appropriate conflicting flows to account for the effects of the upstream signals. Because of the effects on the movements, the minor-street left and thru values will always be the same, and the minor-street left and major-street left values will always be the same for each direction.

Queue Length

Queue Length is the number of vehicles in queue.

RCUT Alternative Intersection

RCUT stands for Restricted Crossing U-Turn and is a type of alternative intersection. RCUTs are at-grade intersections at which minor-street left-turn and through movements are rerouted. Major-street left turns are not rerouted.

When there are invalid lanes coded and RCUT Alternative Intersection is checked, a dialog box will pop up asking for confirmation to convert the current file to an RCUT Alternative Intersection. If Yes, Lanes will remove the invalid side street movements.

Checking RCUT Alternative Intersection will also create three sections with additional inputs for the conventional intersection, RCUT main intersection, and the U-Turn crossovers.

RCUT Main Intersection Storage Length

The storage length is specified for left turn lanes on the major street of the main intersection and for right turn lanes on the minor street of the main intersection. Storage length is the length of turn lane available for storing queued vehicles.

Right Turn Channelized

This box is checked when the right-turning traffic from the major road is separated by a triangular island and has to comply with a stop or yield sign. This is a special case of an exclusive right-turn lane, which is coded in Lanes.

Saturation Flow Rate

The equivalent hourly rate at which previously queued vehicles can traverse an intersection approach under prevailing conditions, assuming that green signal is available at all times and no lost times are experienced.

Where there is no separate left-turn lane, the saturation flow rate for major street right-turning and thru traffic is used to compute the probability that there will be no queue in the respective major-street shared lanes.

Short Left-Turn Pocket

This box is checked when indicating that there is no exclusive left-turn lane provided on the major street, but instead a short left-turn pocket is present.

A short storage area for the major street left-turn movement may cause the major-street through (and possibly right-turning) traffic to be delayed by left-turning vehicles waiting for an acceptable gap.

Show Pedestrian Delay and LOS

When this checkbox is checked, results relevant to the HCM Pedestrian LOS procedure will be shown on both the formatted and text reports.

The HCM procedure for pedestrian mode analysis does not apply to undivided streets with more than four lanes, but it can accommodate up to four lanes in each direction separated by a median.

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

This field exists for documenting the time frame of the analysis as morning peak, afternoon peak, existing conditions, future projections, etc.

Unmarked Crosswalk

Absent any pavement markings, the part of the roadway within an intersection formed by the extension of the lateral lines of a sidewalk across the roadway.

Upstream Signal

This box is checked for the existence of a nearby upstream signalized intersection usually causing vehicles to arrive at the subject intersection in platoons, which may cause an increase in the minor-street capacity compared with the case of random arrivals. The greater the number of vehicles traveling in platoons, the higher the minor-street capacity for a given opposing flow because there is a greater proportion of large gap sizes that can be used by more than one minor-street vehicle.

To evaluate the impact of coordinated upstream signals, the urban street segments methodology is used to estimate the proportion of time that each Rank 2 or lower movement will be effectively blocked by a platoon. With these values, the proportion of the analysis period that is blocked for each minor movement can be computed.

U-Turn Crossover

The intersection in an alternative intersection that a driver uses to make a U-Turn to complete a movement through the main intersection of an alternative intersection. For RCUTs, cross street left turn and through traffic from the main intersection makes a U-turn at the crossover. For example, if the major street is East-West and a driver needs to turn left from the south leg of the main intersection, they must first turn right and then make a U-turn at the east crossover and continue driving westbound to complete their movement.

U-Turn Crossover Storage Length

The length of U-Turn crossover lane available for storing queued vehicles.

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).

Volume

The total number of vehicles or other roadway users that pass over a given point or section of a lane or roadway during a given time interval. The volumes (V) for each movement are coded in vehicles per hour (veh/h). An hourly volume is required for any movement to be included in the analysis. Note that U-turns off the major street are now analyzed.

Walking Speed

The average pedestrian walking speed, measured in ft/s (or m/s in metric), is entered to calculate the pedestrian blockage factor.

Index

A

Acknowledgements 4 Agency 59 Alternative Intersections 14 Analysis Time Period 59 Analysis Year 59 Analyst 59 Annual K-Factor 59

В

Base Critical Headway 59 Base Follow-Up Headway 60

С

Calibrated Conflicting Flow Factors 60 Capacity 60 Change the Lane Configuration 34 Change the View 32 Close 6 Close a File 28 Control Delay 60 CORSIM 7 Create a New File 20 Creating New Alternative Intersection Datasets 15 Critical Headway 60 **Crossing Treatment 61** Crosswalk Length 62 **Crosswalk Markings 62** Crosswalk Width 62

D

Date 62 Default Settings 6 Delay 62 Distance from Main Intersection to Crossover 62

Е

East/West Street Name 62 Edit the Default Settings 30 Enable and Edit the Headway Fields 43 Exit 8 Exit the Program 29

F

Flared Minor-Street Approach 62 Flared Minor-Street Storage 63 Follow-Up Headway 63

G

General Controls 6 Getting Started 5 Glossary of Terms 59

Н

Help 7 HCM Chapter 20 8,12 HCM Chapter 23 14 How To 20

I

Intersection 63 Intersection Type 63 Introduction 1

J

Jurisdiction 63

L

Lane Width 63 Lanes 63 Left-Turn Storage 64 Level of Service (LOS) 64 License Agreement 1

Μ

Major Street Direction / Intersection Orientation 64 Major Street Free-Flow Speed 65 Major Street Median Storage 65 Major Street Median Type 65 Marked Crosswalk 65 Median Refuge 65 Menu Items 6 Modeling Capability in HCS 14 Motorist Yield Rate 65 MUT/RCUT Crossover Intersection 65

Ν

New 6 North/South Street Name 66

0

Open 6 Open an Existing File 23 Operational Data 8,12

Ρ

Peak Hour Factor 66 Pedestrian Critical Headway 66 Pedestrian Flow 66 Pedestrian Mode 12 Pedestrian Platooning 66 Pedestrian Start-Up Time and End Clearance Time 66 Percent Grade 66 Percent Heavy Vehicles 66 Percent Thrus Using Shared Lane 67 Print 6 Print a Report 56 Print Preview 6 Project Description 67 Proportion Time Blocked 67

Q

Queue Length 67

R

Report 6 Restricted Crossing U-Turn Intersections 15 RCUT Alternative Intersection 67 RCUT Main Intersection Storage Length 68 Right Turn Channelized 68

S

Saturation Flow Rate 68 Save 6 Save a File 27 Save As... 6 Short Left-Turn Pocket 68 Show Pedestrian Delay and LOS 68 Steps to Build an RCUT with Merges 17 Steps to Build an RCUT with Stop Signs 15 Stored Heavy Vehicle Length 68 Stored Passenger Car Length 68 System Requirements 5

Т

Time Analyzed 68 Trademarks and Copyrights 4 Two-Way STOP Control (TWSC) Intersections 8 TWSC Pedestrian Report 13 TWSC Report 11

U

Unmarked Crosswalk 69 Upstream Signal 69 U-Turn Crossover 69 U-Turn Crossover Storage Length 69

V

v/c Ratio 69 View 6 View Results of the Analysis 50 Volume 69

W

Walking Speed 69