Getting Started:
HCS 2010

Version 1.1
January 16, 2013

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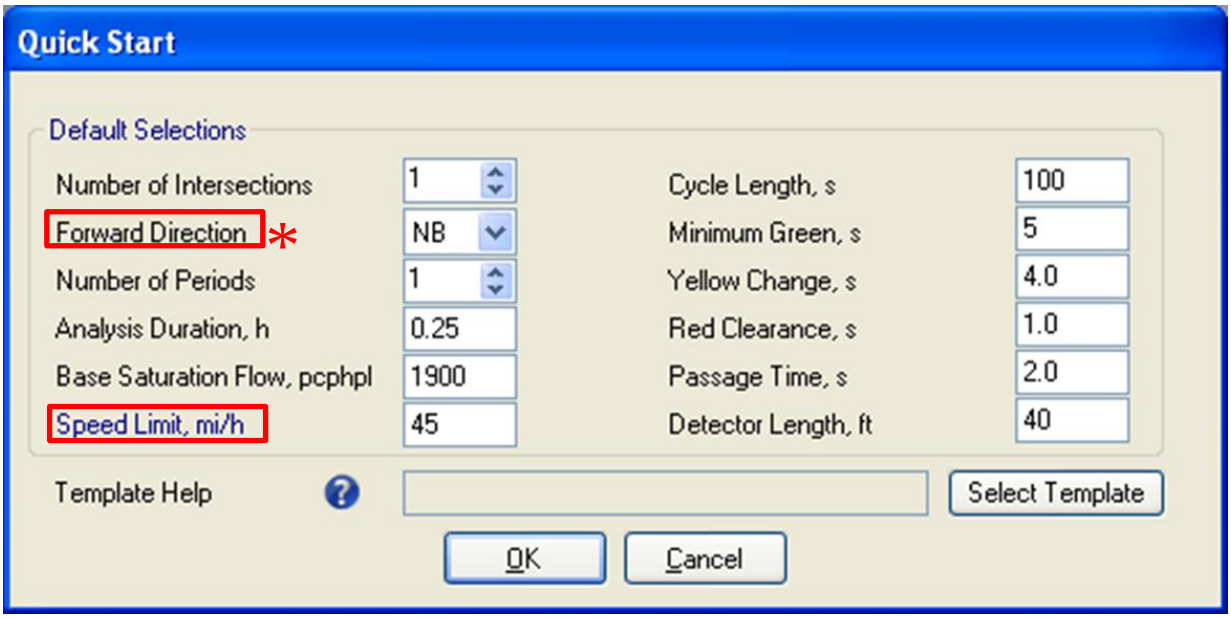
MODULE 1: STREETS

McTrans has provided a video tutorial for the Streets module at mctrans.ce.ufl.edu/hcs

1. Open HCS 2010 

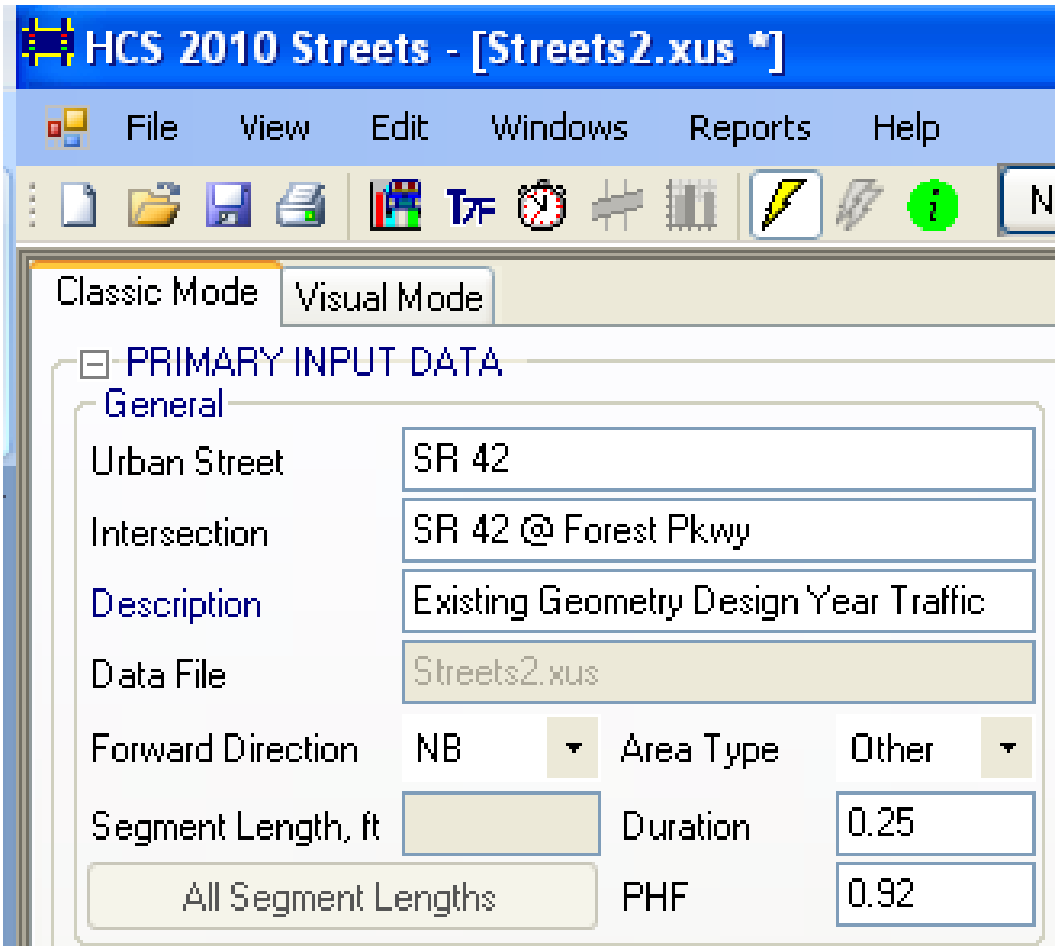
2. Select the Streets icon **Streets now handles signals and signalized corridors*

3. Complete the Quick Start Screen
    a. Change forward direction to NB
    b. Change the speed limit to 45



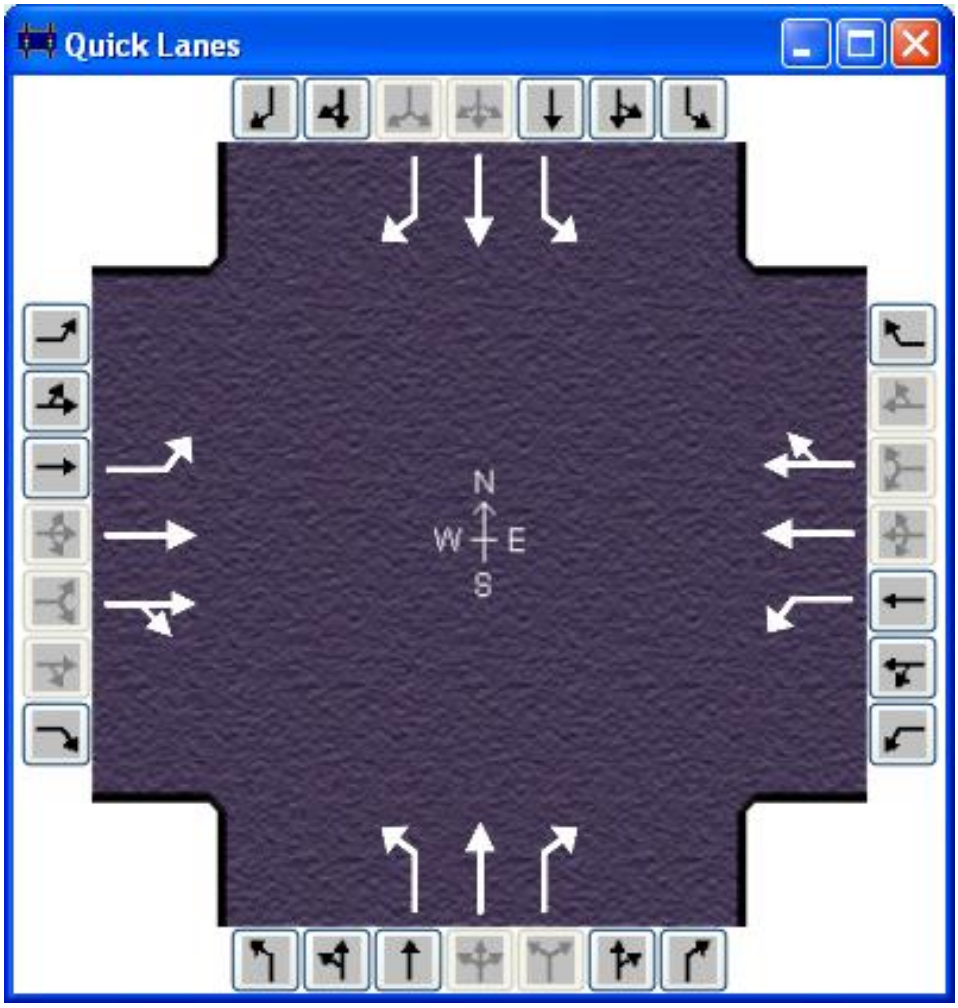
*** Forward direction** = this entry typically specifies the direction of "phase 2" in the timing plan. (i.e. the main road). Reversing the urban street forward direction could cause forward direction segment-specific MOEs (e.g., running speed, travel time) to be reported for the reverse direction, and vice-versa. *you can only change the direction from N to S or from E to W

4. Enter Information in the **General** Section
    a. Street Name
    b. Intersection
    c. Description
    d. PHF (.92 urban .88 rural)

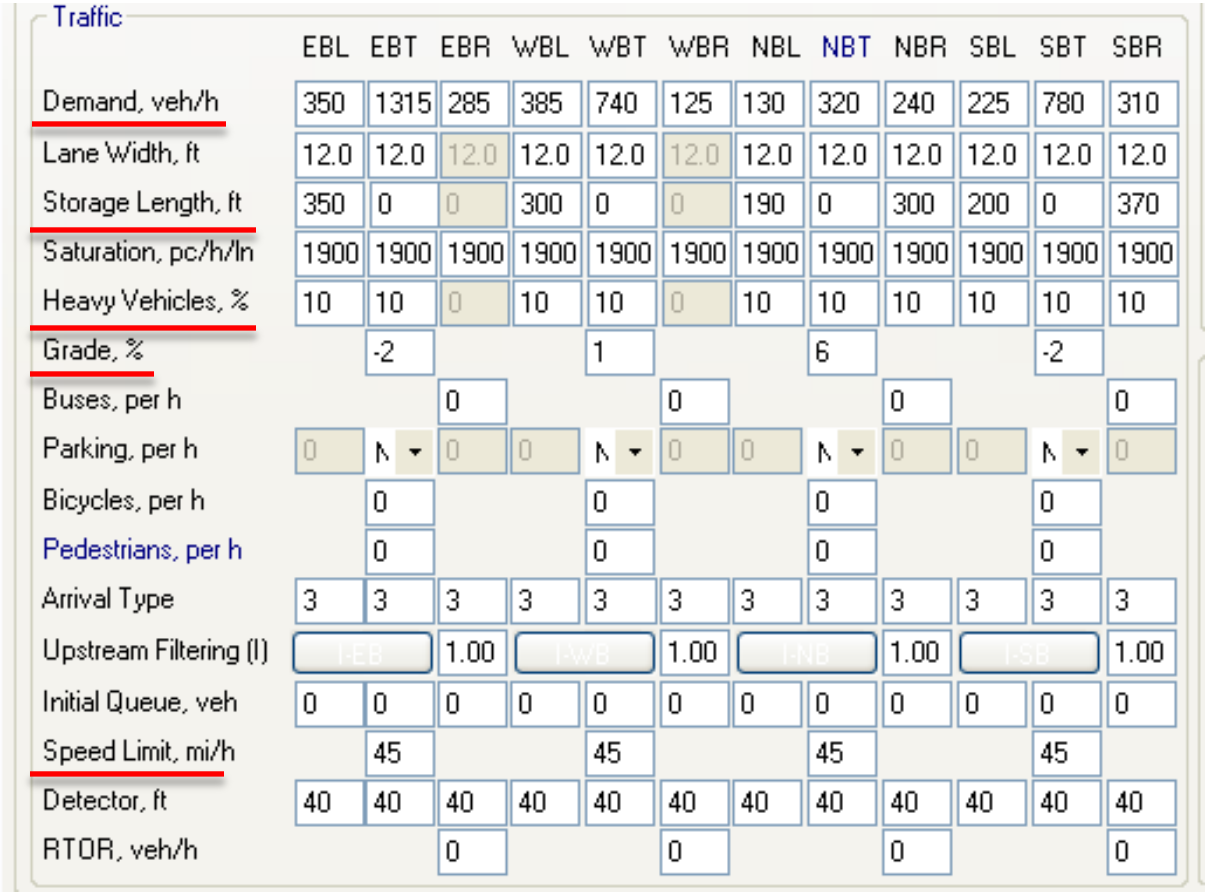


5. Enter **Lane Configuration**

   a. Click  to enlarge the Quick Lanes window
   b. Remove the right turn arrow from the EB and WB approaches
      **To remove a lane from an approach click the white arrow*
   c. Add a thru/right shared arrow for the EB and WB approaches
      **To add a lane to an approach click the black/grey buttons*
   d. Close the window to return to the main screen

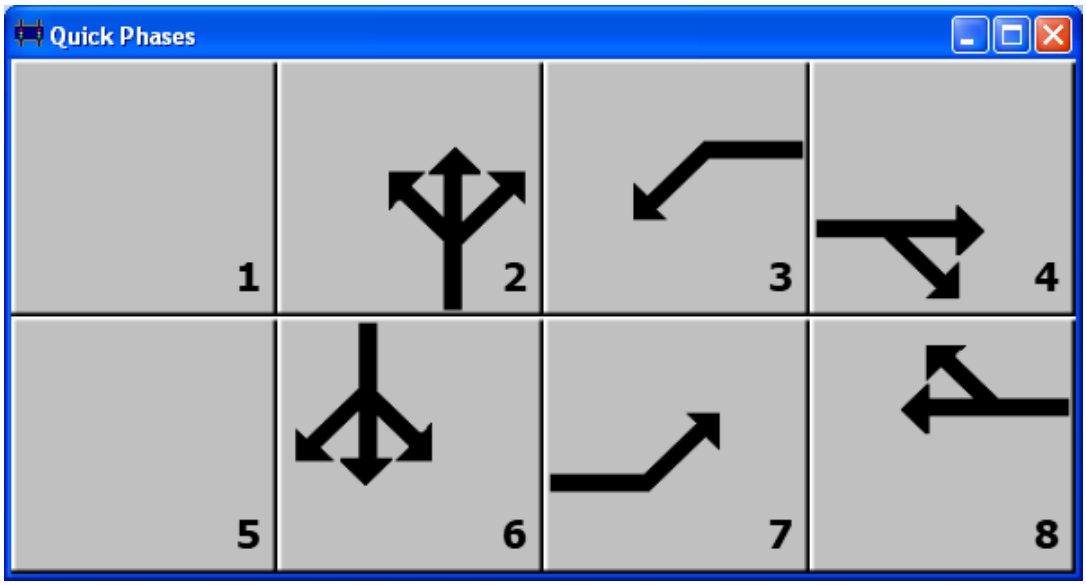


6. Enter **Traffic** Data
    a. Demand (Traffic Volumes)
    b. Storage Length (for turn lanes)
    c. Percent Heavy Vehicles
    d. Grade
    e. Speed limit (may need adjusting if side roads have a different speed limit than mainline)



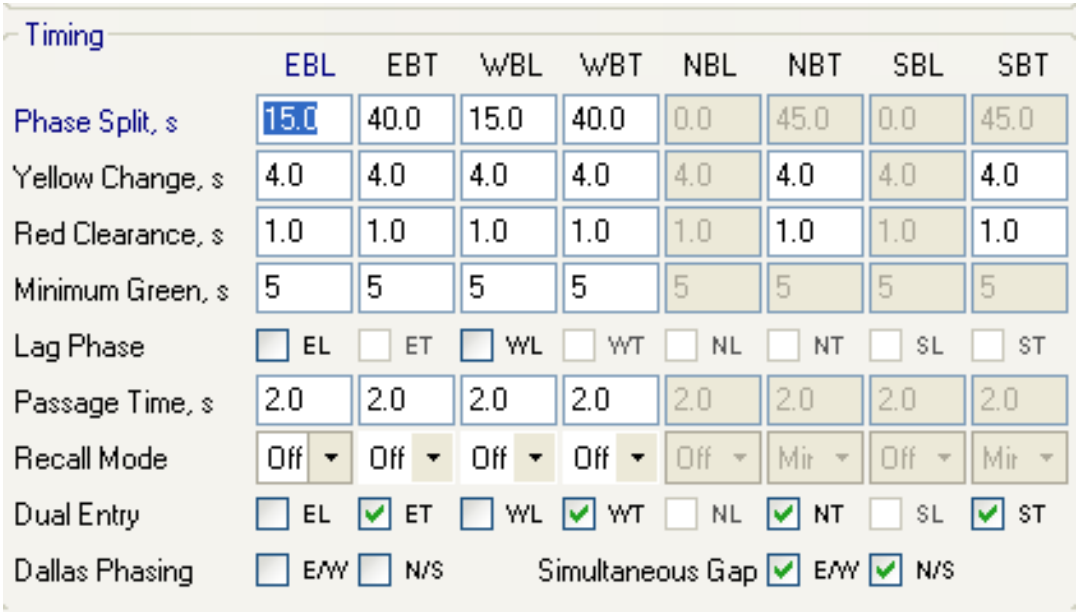
7. Enter **Phasing** data

    a. Click  to enlarge the **Quick Phases** window
    b. Click each phase box to toggle between allowable movements to reflect the phasing plan below.



8. Enter **Timing** (This is new in 2010)
    a. Enter times for each Phase Split

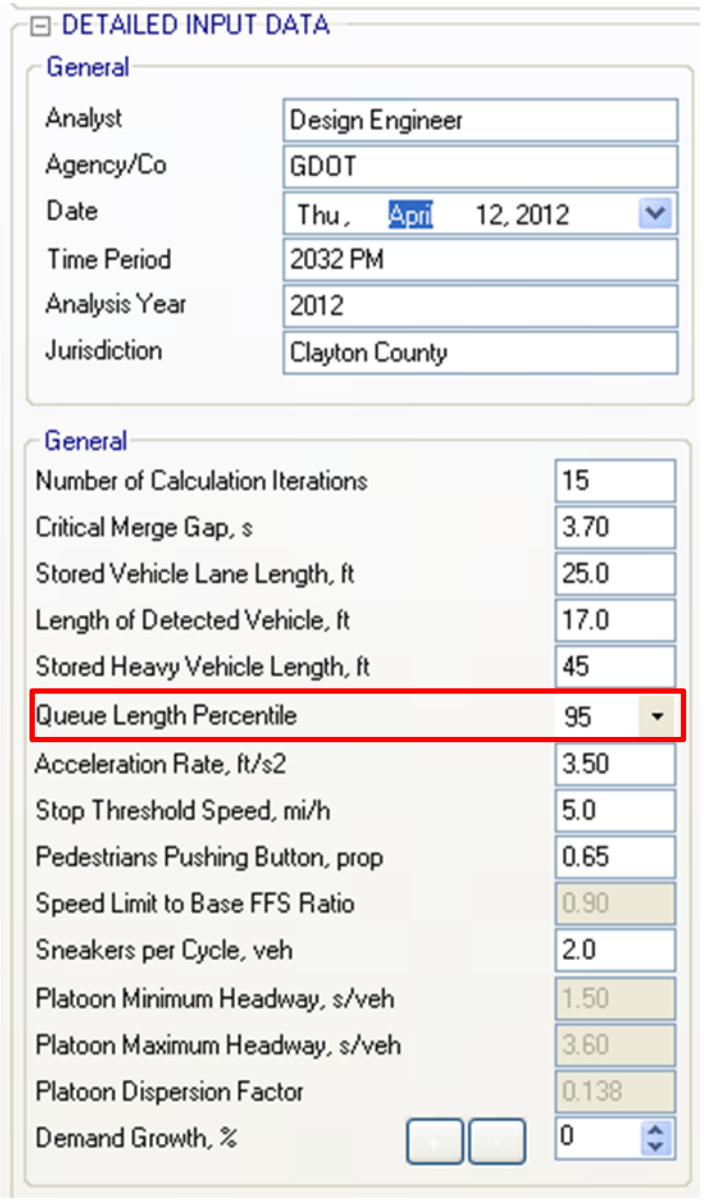
NOTE: the reference phases (2&6) will be grayed out



**Notice that the familiar screen from HCS 2000 can be seen above the new Timing window*

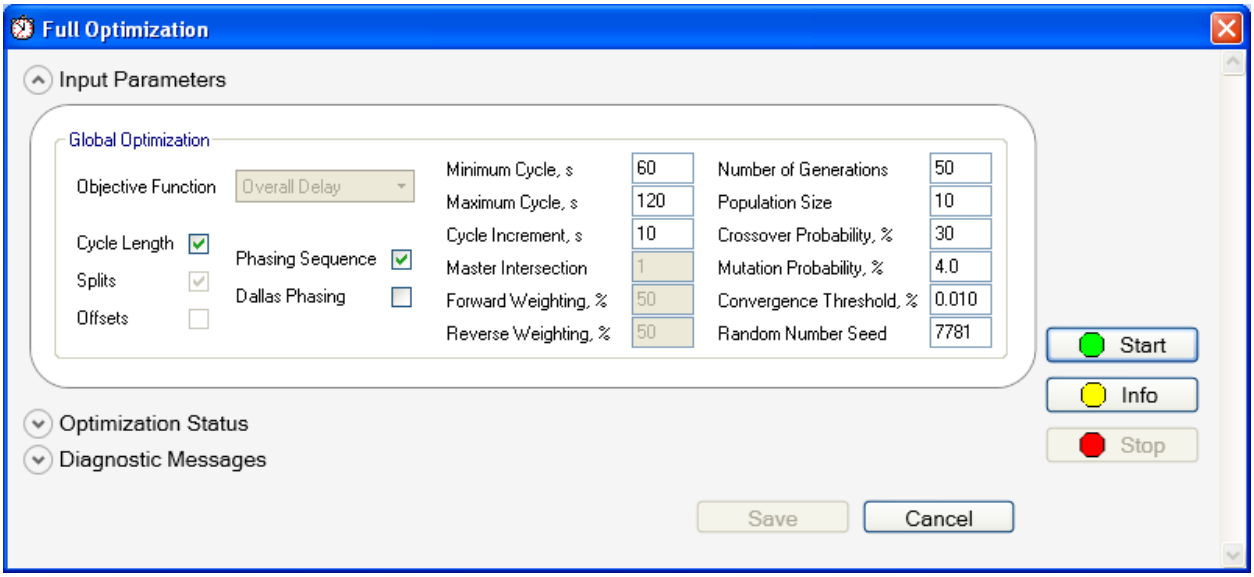
Green	40.0	10.0	35.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	1.0	1.0	1.0	0.0	0.0	0.0

9. Enter the **General** Data
    a. Analyst
    b. Agency
    c. Time Period (year & time)
    d. Jurisdiction (county)
    e. Queue Length Percentile (change to 95)

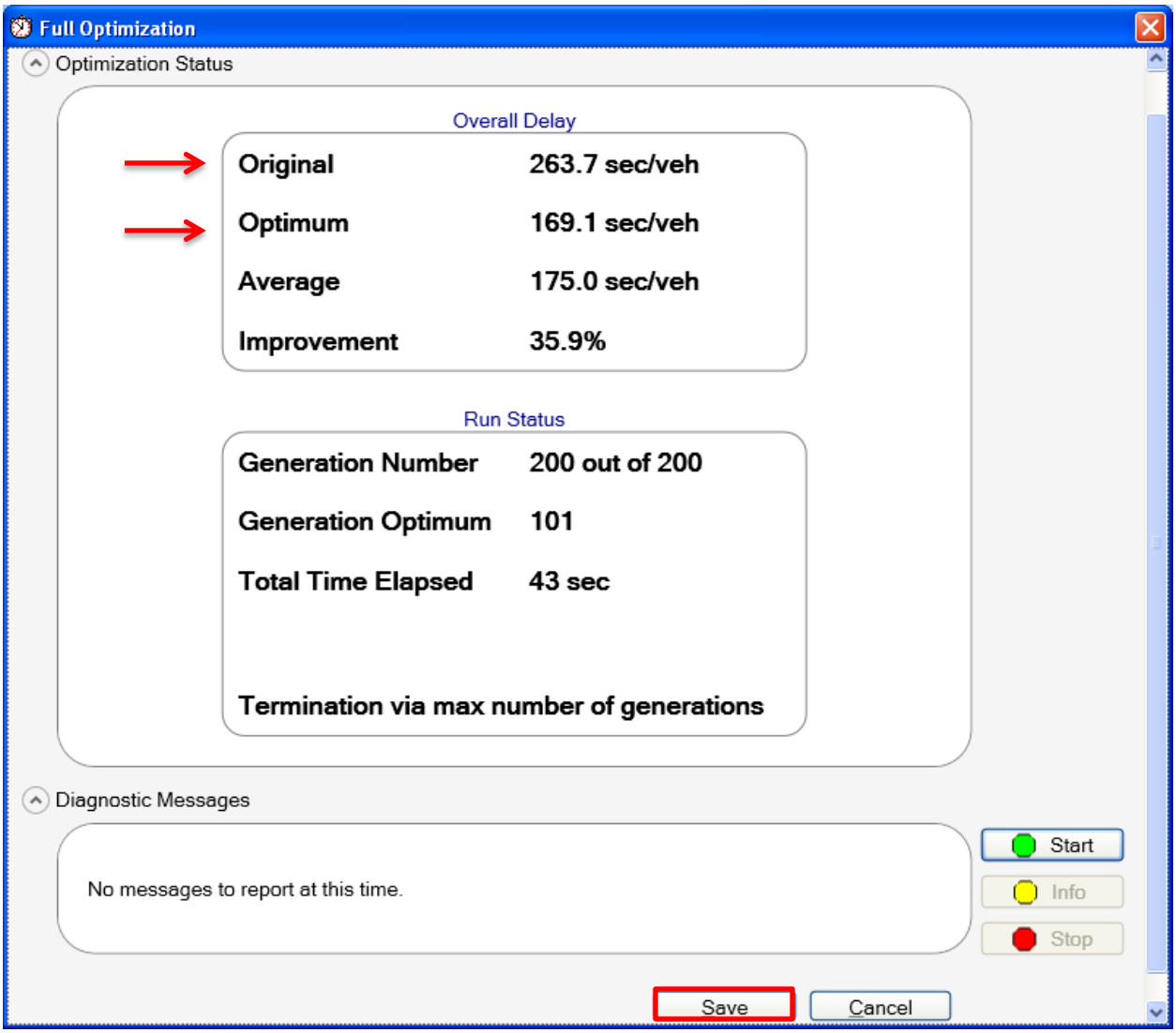


10. Run **Full Optimization**

a. Click the  icon
b. Check Cycle Length
c. Check Phasing Sequence
d. Change Minimum Cycle to 60
e. Change Maximum Cycle to 120
f. Change Number of Generation to 200
g. Change Mutation Probability to 4

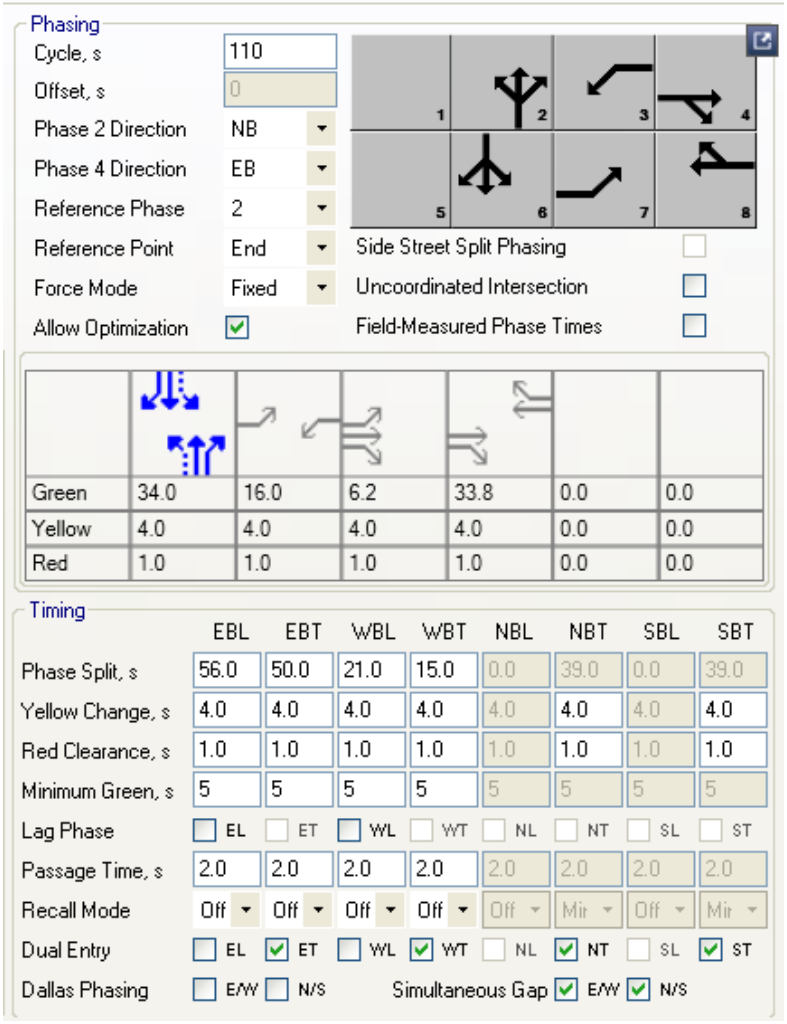


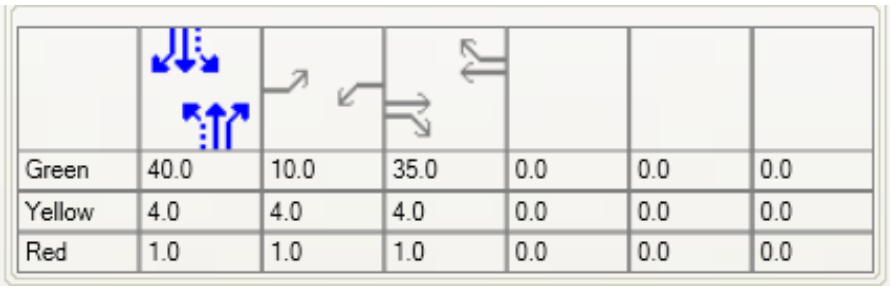
11. **Optimization** Results
    a. Shows the original and optimum delay results
       ***Note** be sure to check the Diagnostic Messages*
    b. Click Save to import the optimization results



12. The **Phasing** and **Timing** will have updated

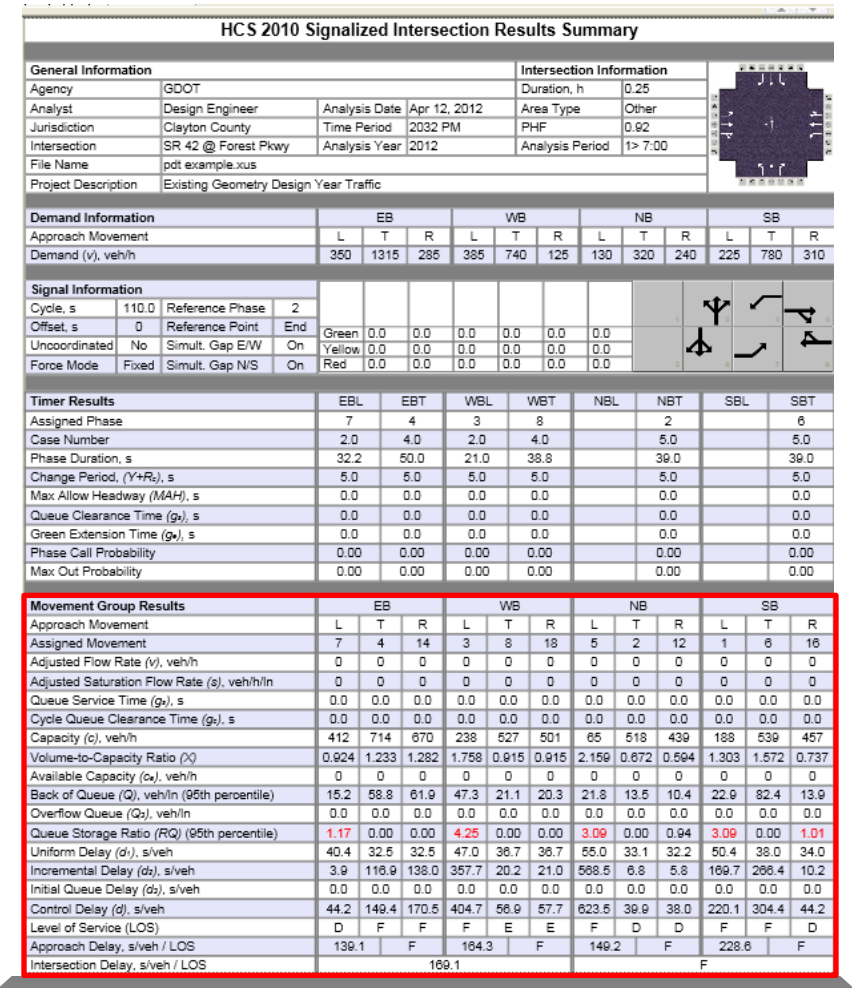
*__Note__ *that the Phasing Sequence has changed= An additional phase was added to provide additional time for the eastbound left turn movement.*





Previous Phasing

13. View/Print **Results** Summary Report
    a. Focus on the Movement Group Results



HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	GDOT			Duration, h	0.25
Analyst	Design Engineer	Analysis Date	Apr 12, 2012	Area Type	Other
Jurisdiction	Clayton County	Time Period	2032 PM	PHF	0.92
Intersection	SR 42 @ Forest Pkwy	Analysis Year	2012	Analysis Period	1> 7:00
File Name	pdt example.xus				
Project Description	Existing Geometry Design Year Traffic				

Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	350	1315	285	385	740	125	130	320	240	225	780	310

Signal Information													
Cycle, s	110.0	Reference Phase	2										
Offset, s	0	Reference Point	End	Green	0.0	0.0	0.0	0.0	0.0	0.0			
Uncoordinated	No	Simult. Gap E/W	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0			

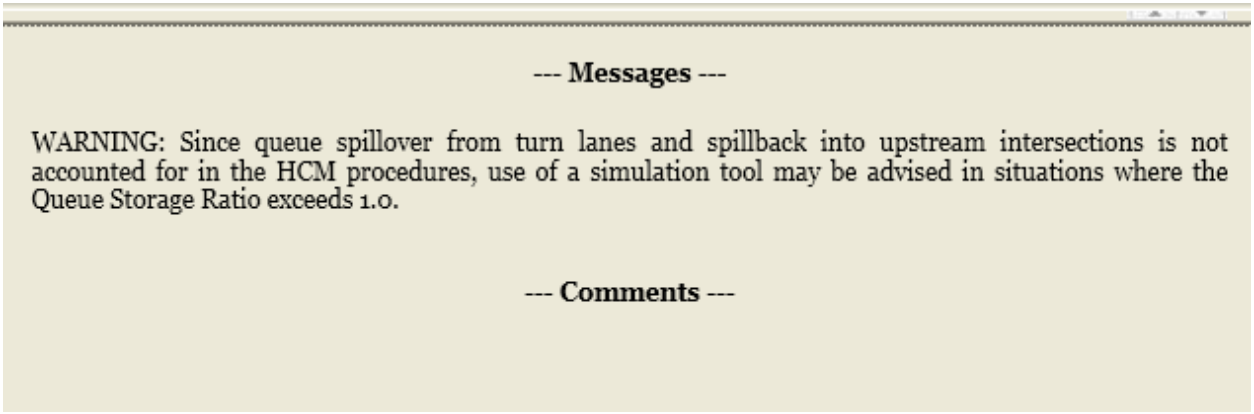
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	7	4	3	8		2		6
Case Number	2.0	4.0	2.0	4.0		5.0		5.0
Phase Duration, s	32.2	50.0	21.0	38.8		39.0		39.0
Change Period, ($Y+R_c$), s	5.0	5.0	5.0	5.0		5.0		5.0
Max Allow Headway (*MAH*), s	0.0	0.0	0.0	0.0		0.0		0.0
Queue Clearance Time (g_s), s	0.0	0.0	0.0	0.0		0.0		0.0
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0		0.0		0.0
Phase Call Probability	0.00	0.00	0.00	0.00		0.00		0.00
Max Out Probability	0.00	0.00	0.00	0.00		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Adjusted Saturation Flow Rate (*s*), veh/h/ln	0	0	0	0	0	0	0	0	0	0	0	0
Queue Service Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Queue Clearance Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Capacity (*c*), veh/h	412	714	670	238	527	501	65	518	439	188	539	457
Volume-to-Capacity Ratio (X)	0.924	1.233	1.282	1.758	0.915	0.915	2.159	0.672	0.594	1.303	1.572	0.737
Available Capacity (c_a), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Back of Queue (*Q*), veh/ln (95th percentile)	15.2	58.8	61.9	47.3	21.1	20.3	21.8	13.5	10.4	22.9	82.4	13.9
Overflow Queue (Q_3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (*RQ*) (95th percentile)	1.17	0.00	0.00	4.25	0.00	0.00	3.09	0.00	0.94	3.09	0.00	1.01
Uniform Delay (d_1), s/veh	40.4	32.5	32.5	47.0	36.7	36.7	55.0	33.1	32.2	50.4	38.0	34.0
Incremental Delay (d_2), s/veh	3.9	116.9	138.0	357.7	20.2	21.0	568.5	6.8	5.8	169.7	266.4	10.2
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	44.2	149.4	170.5	404.7	56.9	57.7	623.5	39.9	38.0	220.1	304.4	44.2
Level of Service (LOS)	D	F	F	F	E	E	F	D	D	F	F	D
Approach Delay, s/veh / LOS	139.1	F		164.3	F		149.2	F		228.6	F	
Intersection Delay, s/veh / LOS	169.1						F					

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Adjusted Saturation Flow Rate (*s*), veh/h/ln	0	0	0	0	0	0	0	0	0	0	0	0
Queue Service Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Queue Clearance Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Capacity (*c*), veh/h	412	714	670	238	527	501	65	518	439	188	539	457
Volume-to-Capacity Ratio (X)	0.924	1.233	1.282	1.758	0.915	0.915	2.159	0.672	0.594	1.303	1.572	0.737
Available Capacity (c_a), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Back of Queue (*Q*), veh/ln (95th percentile)	15.2	58.8	61.9	47.3	21.1	20.3	21.8	13.5	10.4	22.9	82.4	13.9
Overflow Queue (Q_3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (*RQ*) (95th percentile)	1.17	0.00	0.00	4.25	0.00	0.00	3.09	0.00	0.94	3.09	0.00	1.01
Uniform Delay (d_1), s/veh	40.4	32.5	32.5	47.0	36.7	36.7	55.0	33.1	32.2	50.4	38.0	34.0
Incremental Delay (d_2), s/veh	3.9	116.9	138.0	357.7	20.2	21.0	568.5	6.8	5.8	169.7	266.4	10.2
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	44.2	149.4	170.5	404.7	56.9	57.7	623.5	39.9	38.0	220.1	304.4	44.2
Level of Service (LOS)	D	F	F	F	E	E	F	D	D	F	F	D
Approach Delay, s/veh / LOS	139.1	F		164.3	F		149.2	F		228.6	F	
Intersection Delay, s/veh / LOS	169.1						F					

14. View Messages Report

Look for any warnings!!!



--- **Messages** ---

WARNING: Since queue spillover from turn lanes and spillback into upstream intersections is not accounted for in the HCM procedures, use of a simulation tool may be advised in situations where the Queue Storage Ratio exceeds 1.0.

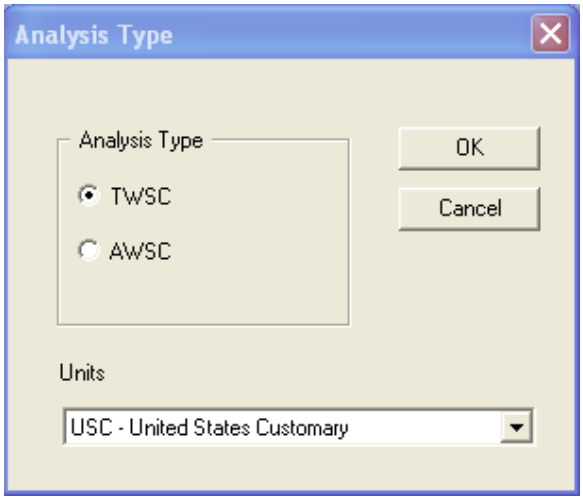
--- **Comments** ---

MODULE 2: TWO WAY STOP CONTROL

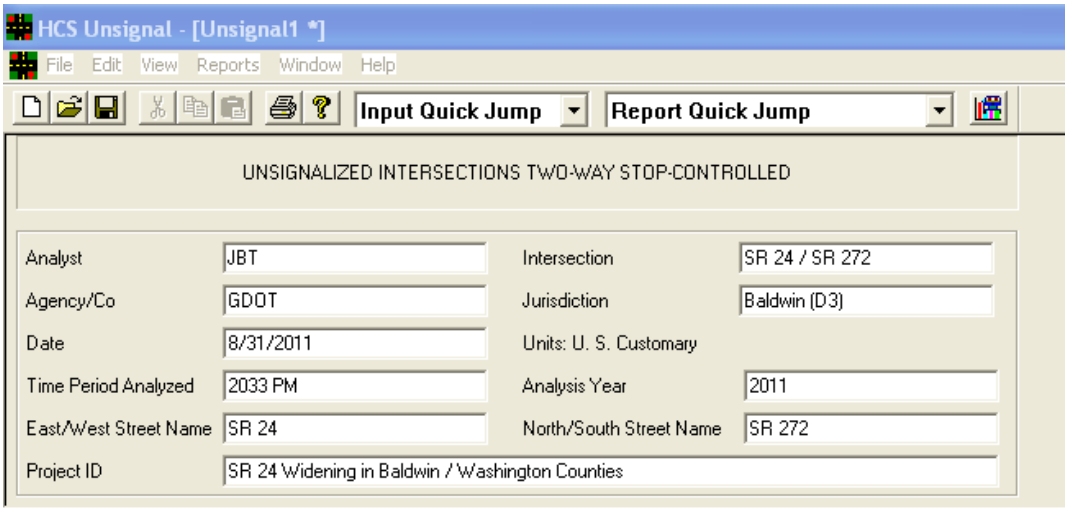
1. Open HCS 2010 

2. Select the **TWSC** module

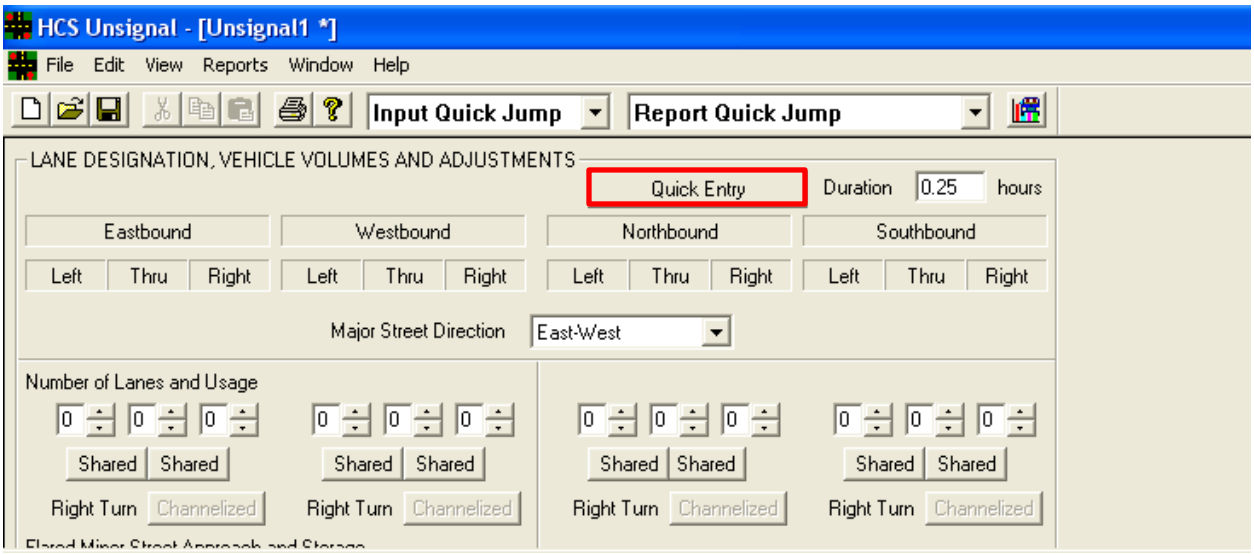
3. Create a new file. Select TWSC on the **Analysis Type** screen.



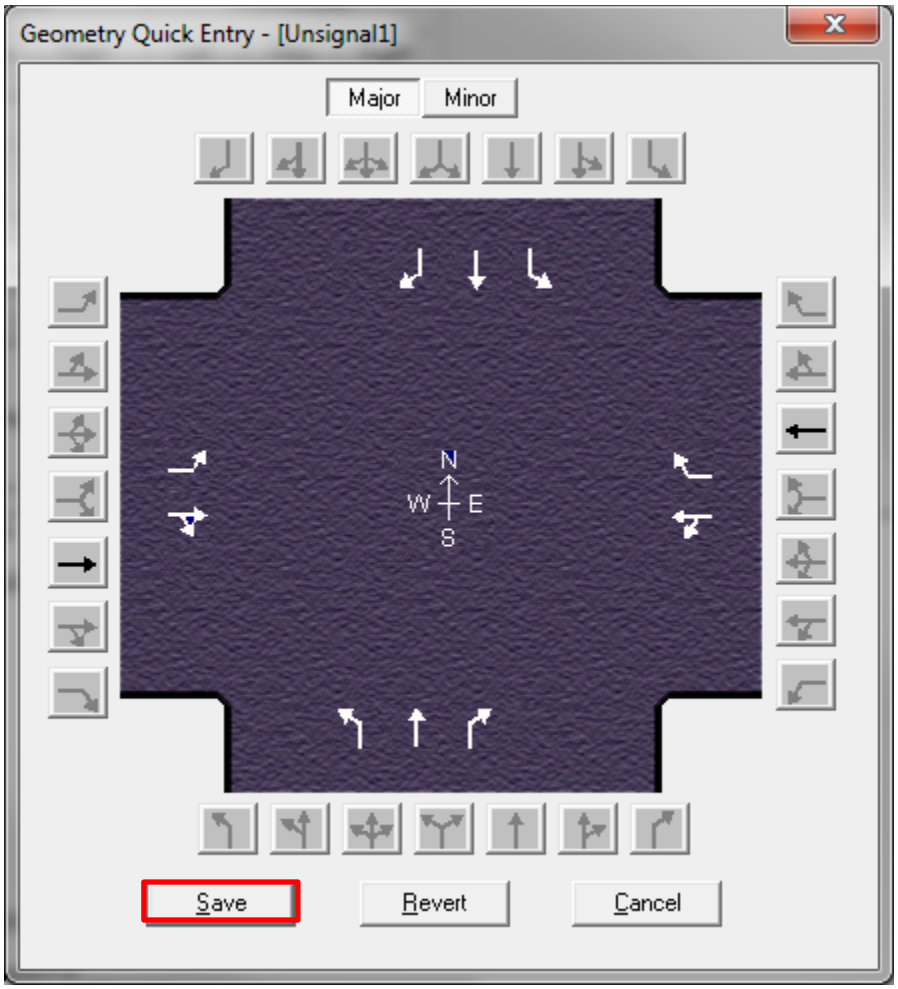
4. Complete the **General Information** section.



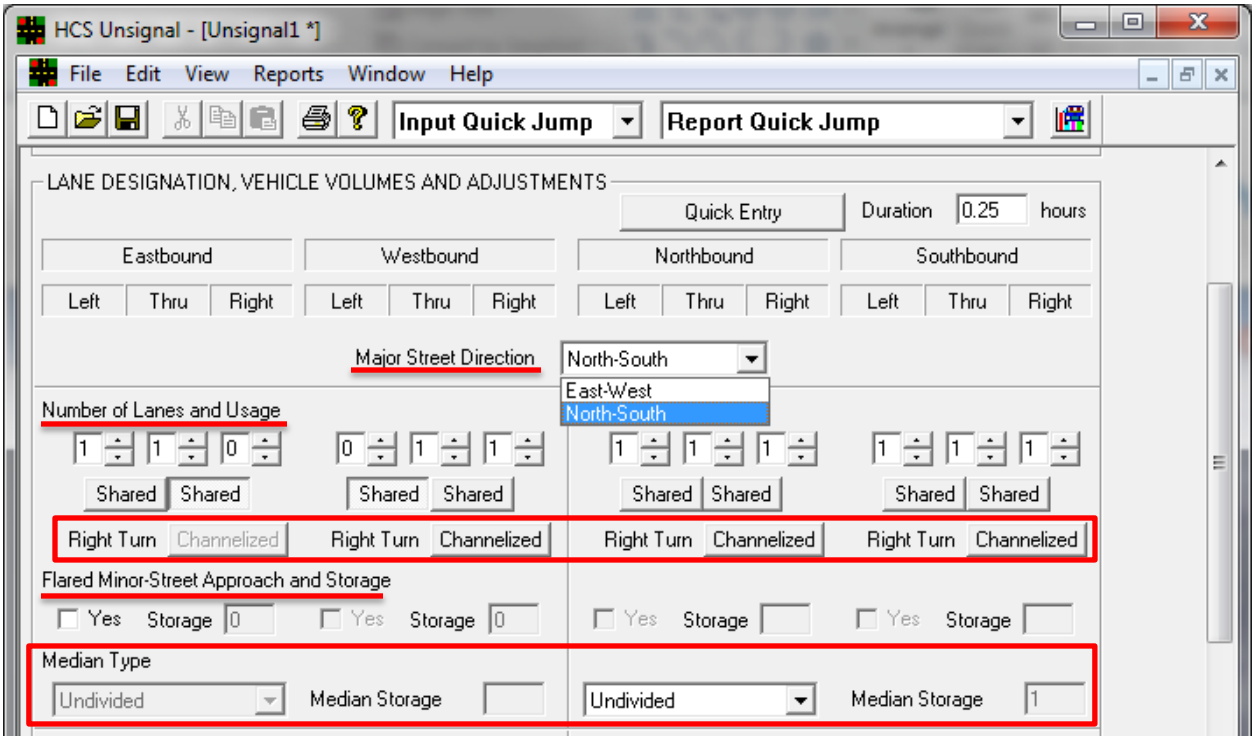
5. Select **Quick Entry** under **Lane Designation, Vehicle Volumes and Adjustments**



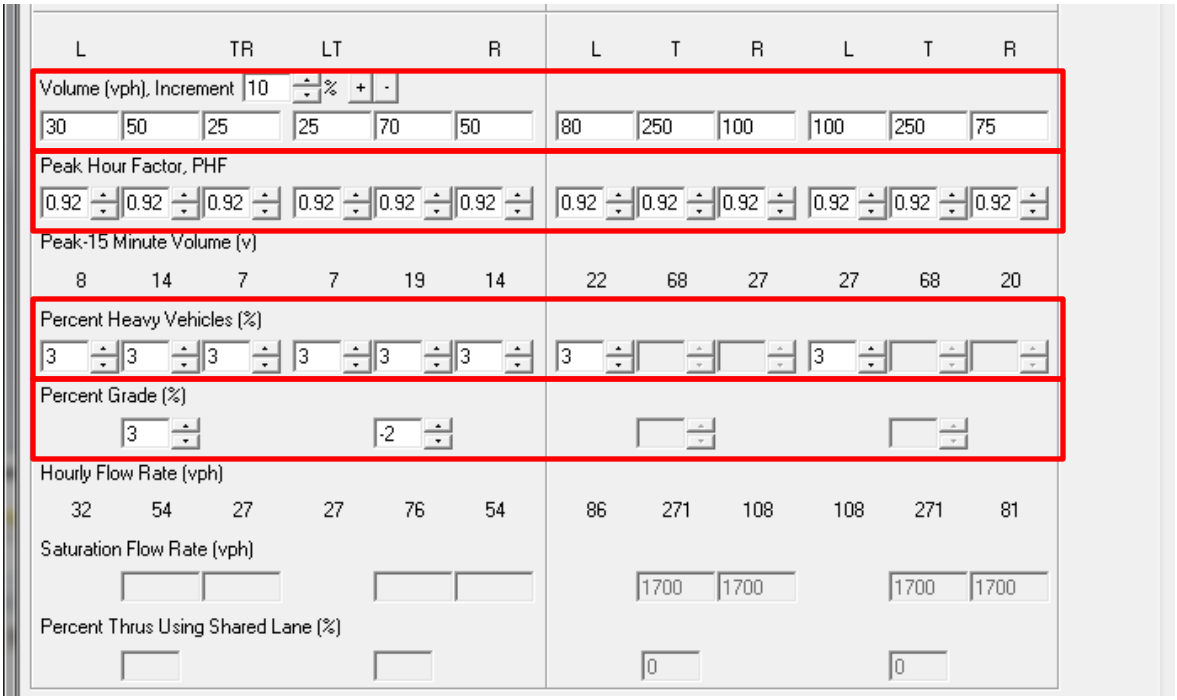
6. Enter the lane configuration into the **Quick Entry** window. (click the black arrow buttons to add movement. Click the white arrows to remove a movement). Click **Save**.



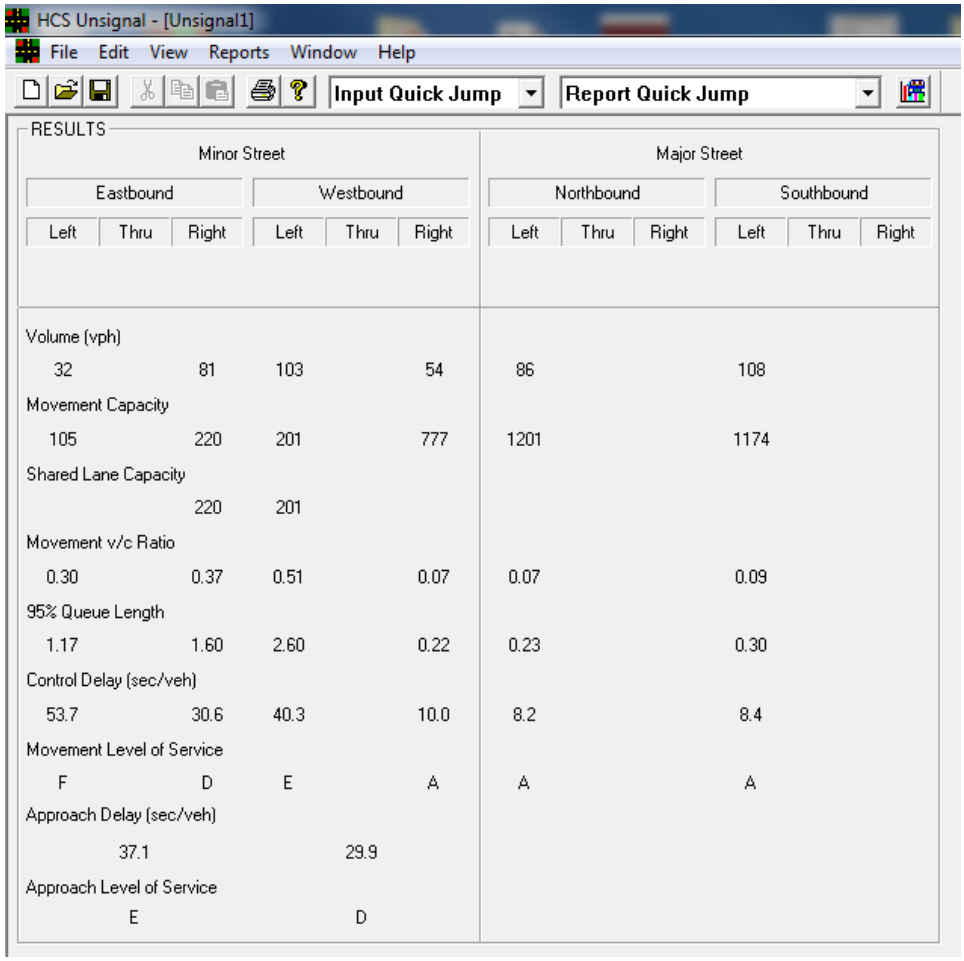
7. Complete the **Lane Designation, Vehicle Volumes and Adjustments** Section
    a. Select a Major Street Direction (the free flowing direction)
    b. Notice that the Number of Lanes and Usage is filled in from the Quick Entry
    c. If applicable, designate channelized right turns for each approach *(This button is activated only 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.)*
    d. Select Flared Minor Street Approach and 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*). NOTE: for use when there is room for sneaker right turners to squeeze through at an approach.
    e. Select a Median Type for the Major approach (Undivided, Raised Curb or TWLTL) If type is Raised Curb or TWLTL then input the storage (for two stage left turners from the minor street)



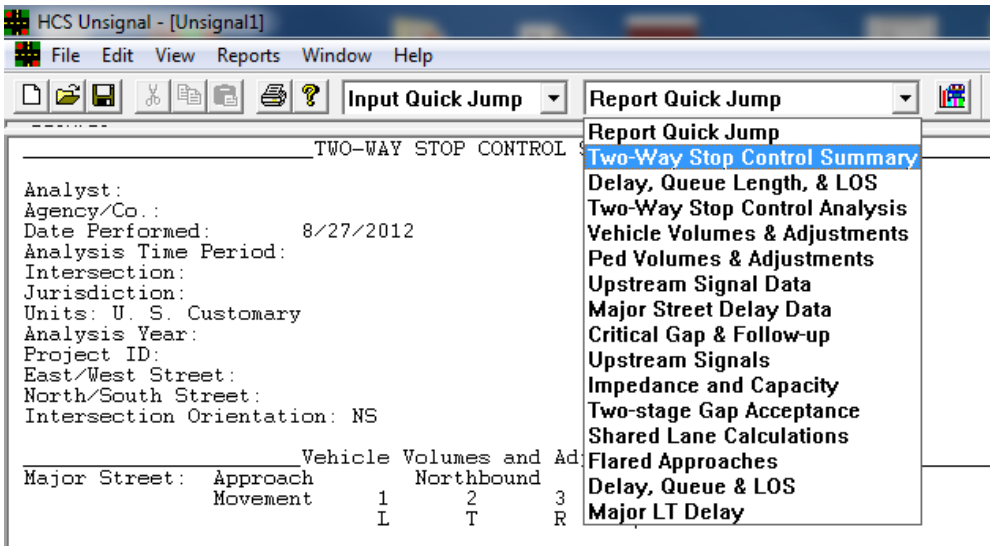
8. Continue to complete the **Lane Designation, Vehicle Volumes and Adjustments**
    a. Enter the Volume for each movement
    b. Enter the Peak Hour Factor for each movement
    c. Enter the Percent Heavy Vehicle for each movement
    d. Enter the Percent Grade for each approach



9. Scroll down to review the **Results** (results are calculated for every movement and approach)



10. Select Two Way Stop Control Summary from the **Report Quick Jump** to view (or print) the results

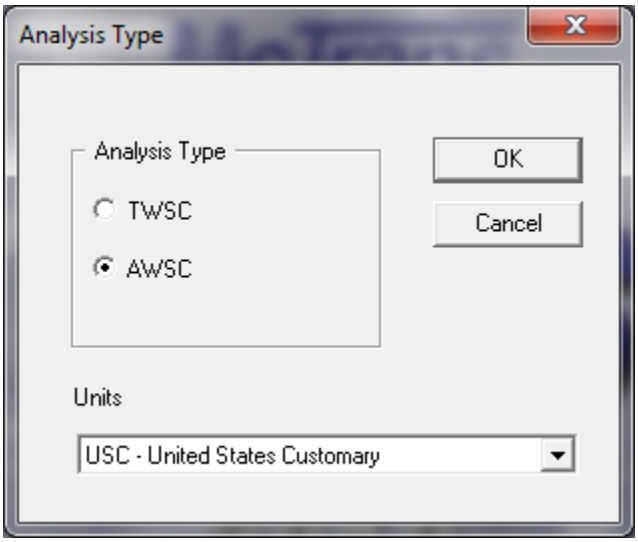


MODULE 3: ALL WAY STOP CONTROL

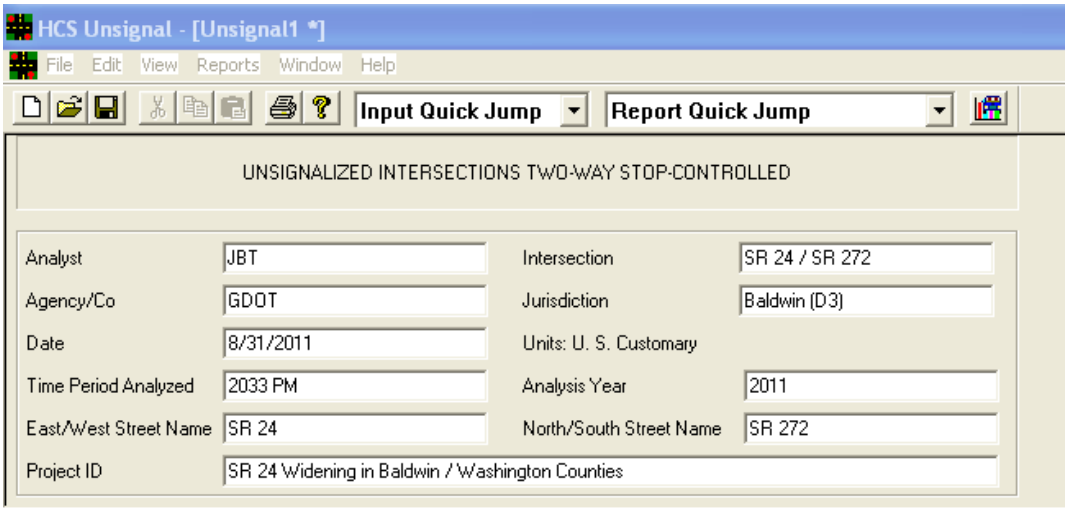
1. Open HCS 2010 

2. Select the **AWSC** module

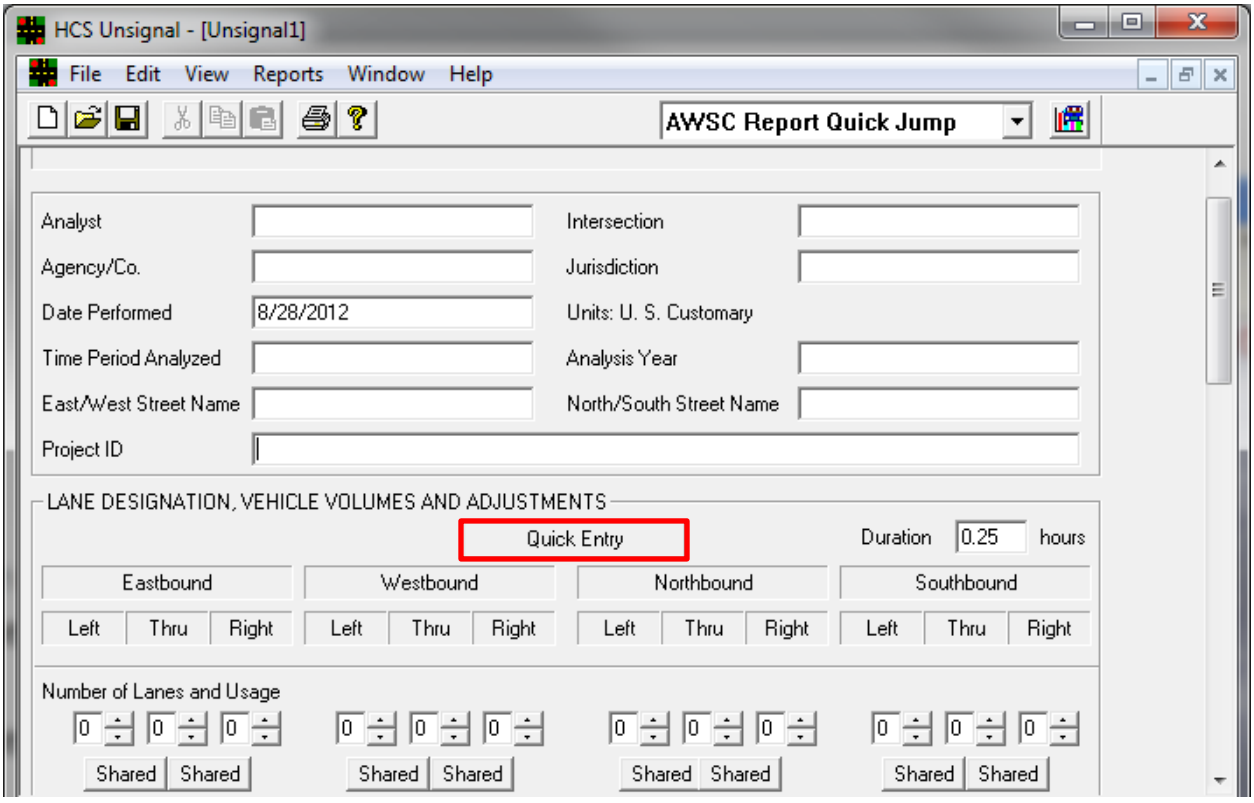
3. Create a new file. Select AWSC on the **Analysis Type** screen.



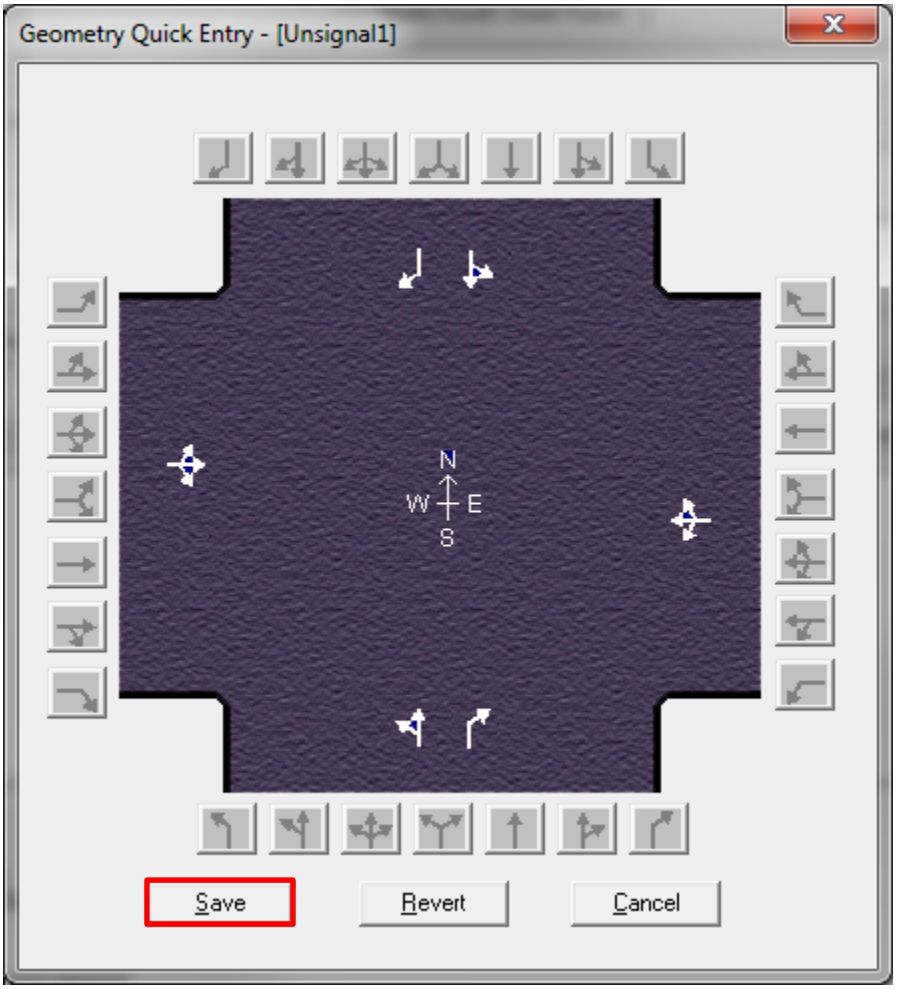
4. Complete the **General Information** section.



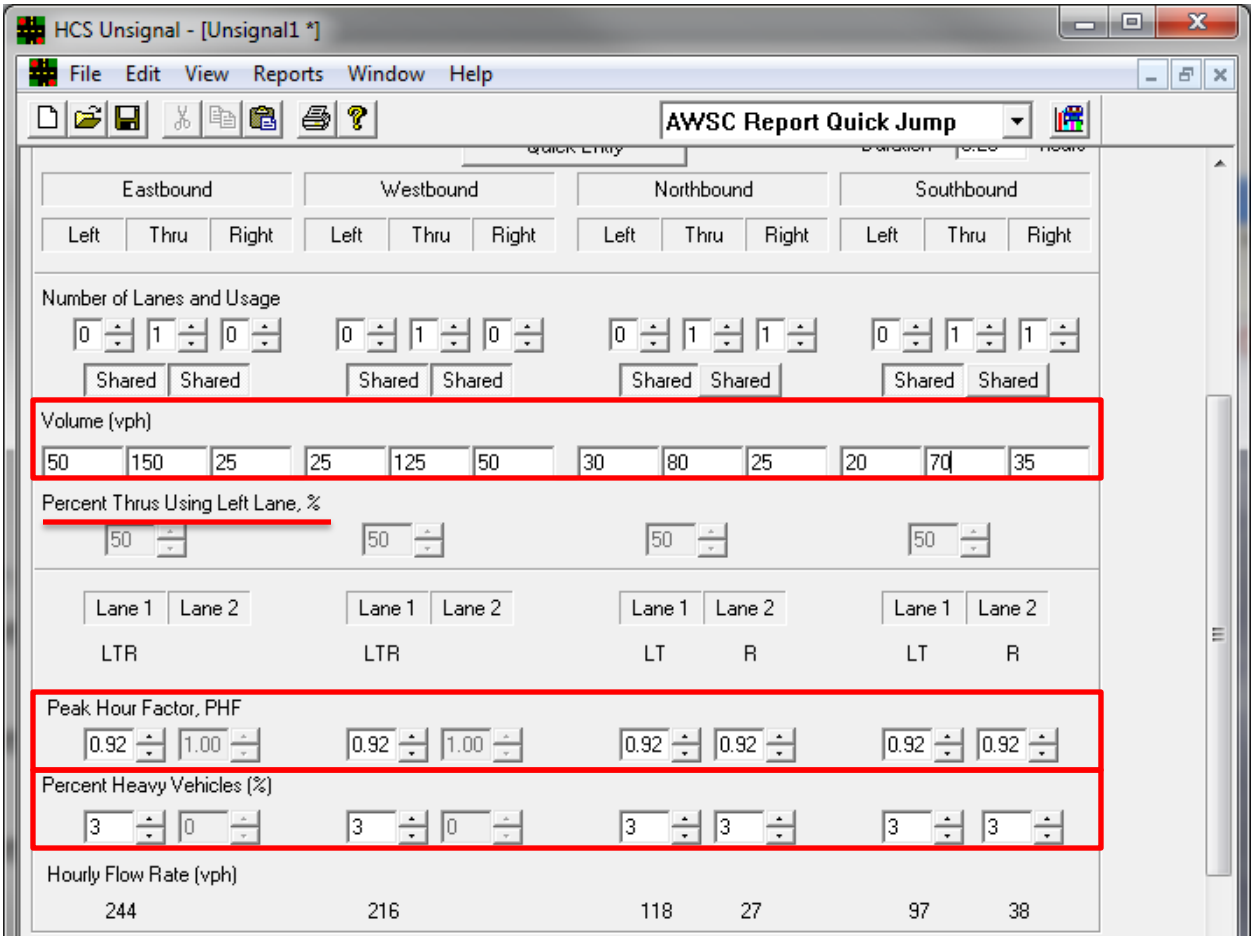
5. Select **Quick Entry** under **Lane Designation, Vehicle Volumes and Adjustments**



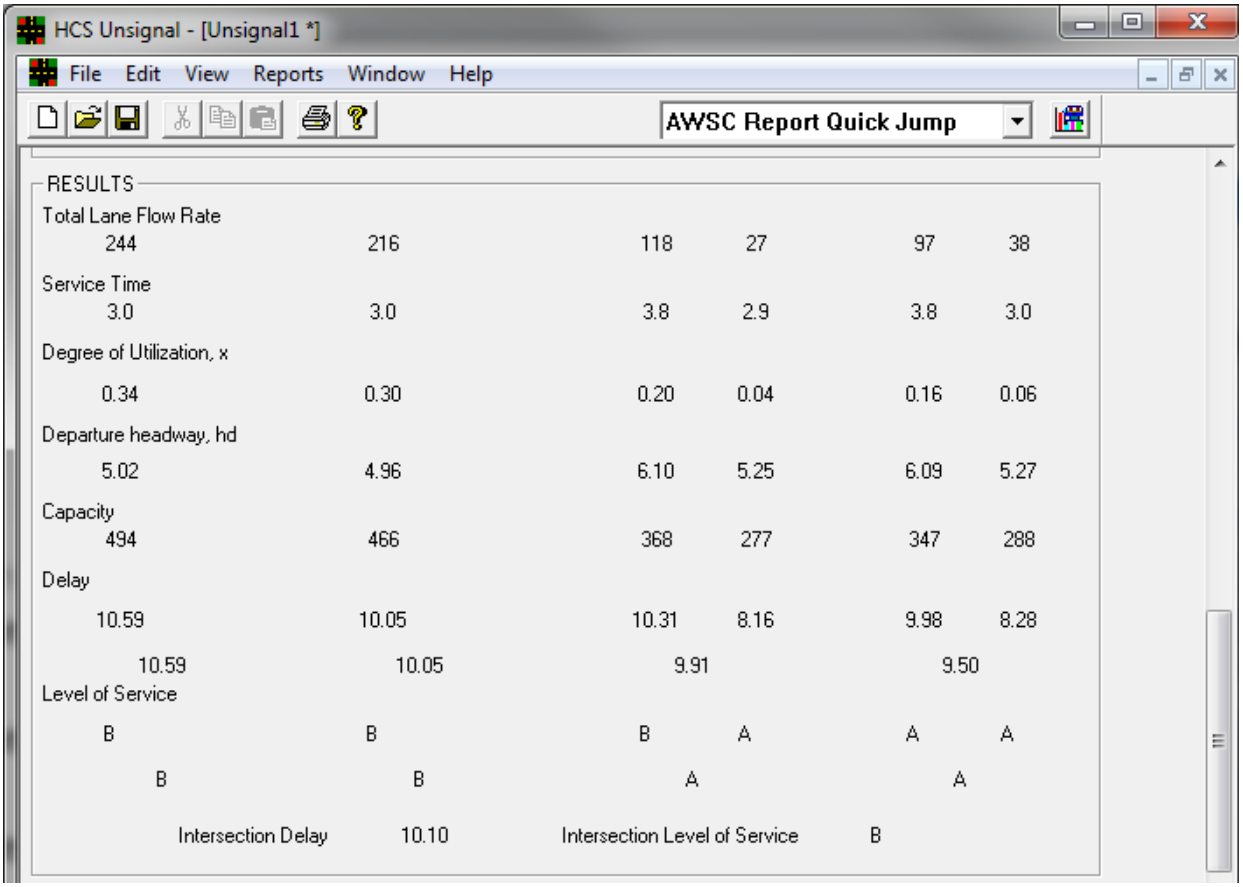
6. Enter the lane configuration into the **Quick Entry** window. (click the black arrow buttons to add movement. Click the white arrows to remove a movement). Click **Save**.



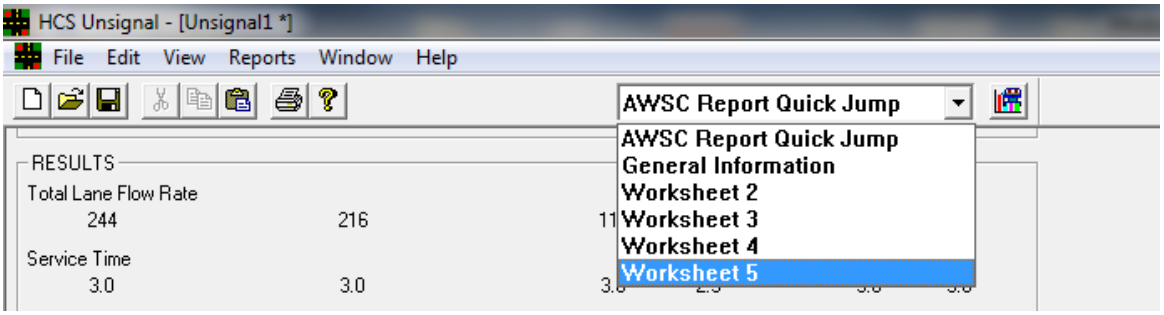
7. Complete the **Lane Designation, Vehicle Volumes and Adjustments** Section
    a. Notice that the Number of Lanes and Usage is filled in from the Quick Entry
    b. Enter the Volume for each movement
    c. If applicable, enter the Percent Thrus using Left Lane for each leg
    d. Enter the Enter the Peak Hour Factor for each movement
    e. Enter the Percent Heavy Vehicle for each movement



8. Scroll down to review the **Results**



9. Select Two Way Stop Control Summary from the **AWSC Report Quick Jump** to view (or print) the results

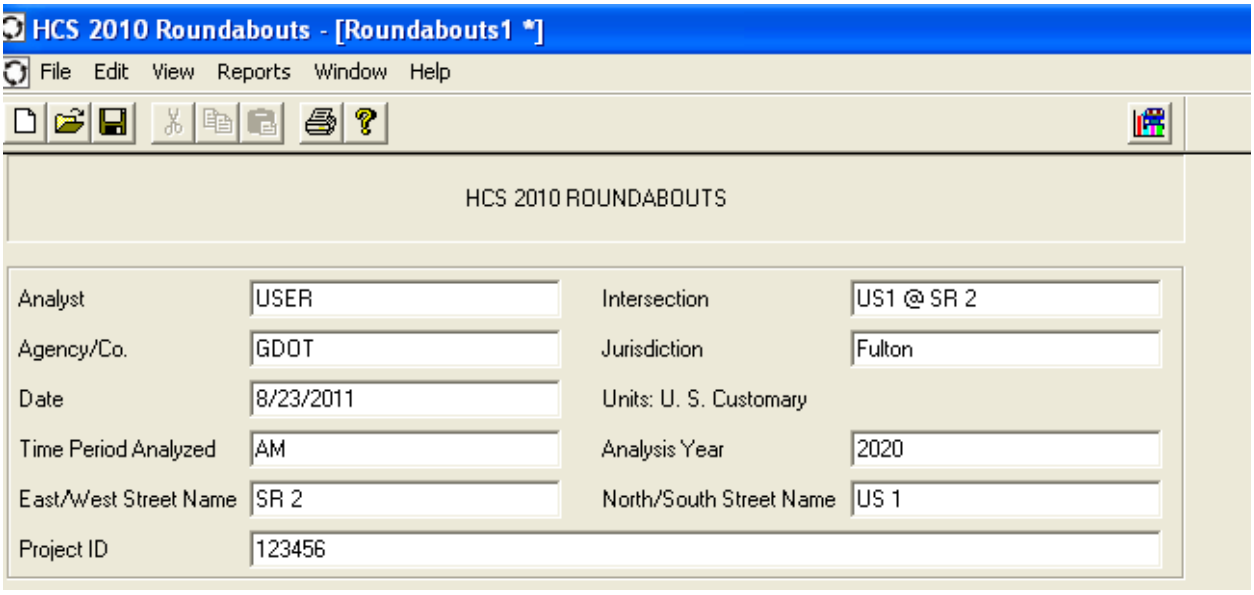


MODULE 4: ROUNDABOUTS

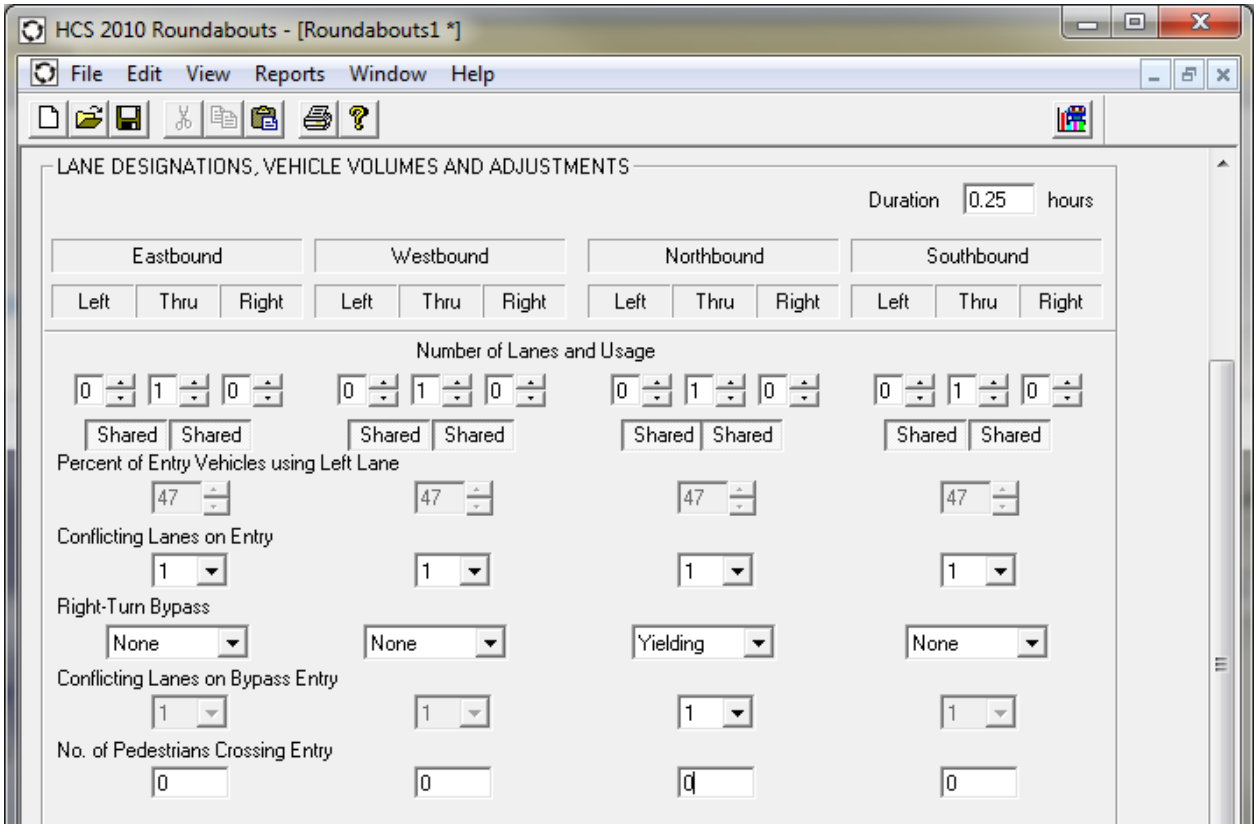
1. Open HCS 2010 

2. Select the **Roundabout** module

3. Open a New File
4. Enter the **General Information**

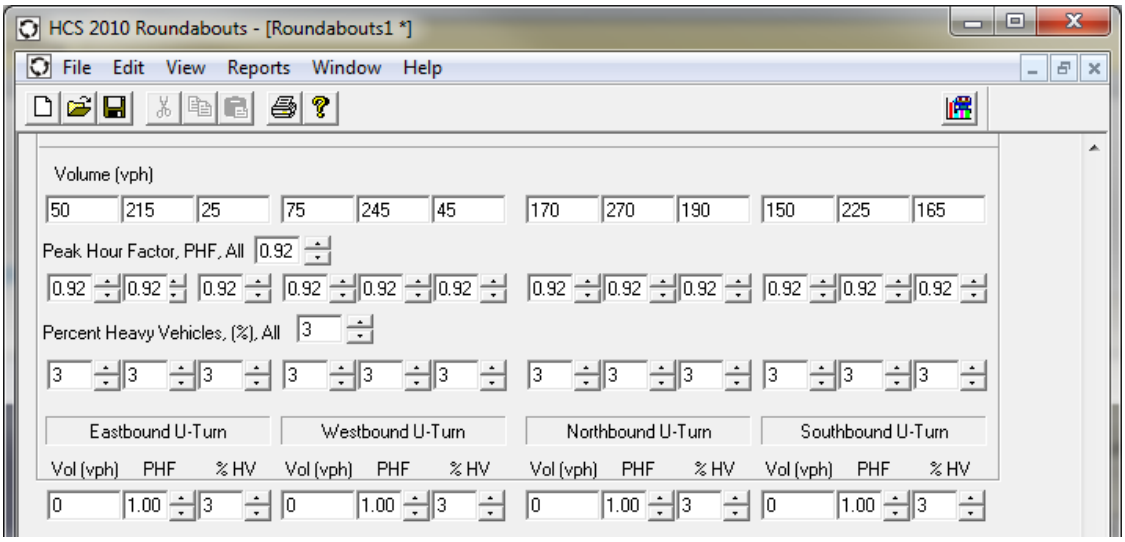


5. Complete the **Lane Designations** section
    a. Enter the lane configuration for each approach
    For a one-lane roundabout entry, enter one thru lane and select both the left "shared" button and the right "shared" button. For a two-lane roundabout entry, enter one of the following combinations based on the entry lanes' pavement markings: 1) two thru lanes and select both "shared" buttons, one left lane and one thru lane and select the right "shared" button, or 2) one thru lane and one left lane and select the left "shared" button.
    b. If a multilane enter the Percent of Entry Vehicles using Left Lane
    c. Enter the number of Conflicting Lanes on Entry
    The number of lanes that pass directly in front of the approach entry.
    d. If applicable, designate a Right Turn Bypass Lane
        i. Yielding -right-turning traffic yields to exiting roundabout traffic
        ii. Non-Yielding - right-turning traffic enters a new lane on exit leg
    For roundabout entries with right turn bypass lanes, the user should enter one thru lane, select both the left "shared" button and the right "shared button", and select the type of bypass lane in the "Right-Turn Bypass" field.
    e. If applicable, designate the number of Conflicting Lanes on Bypass Entry
    The number of lanes that pass directly in front of the yielding bypass lane.

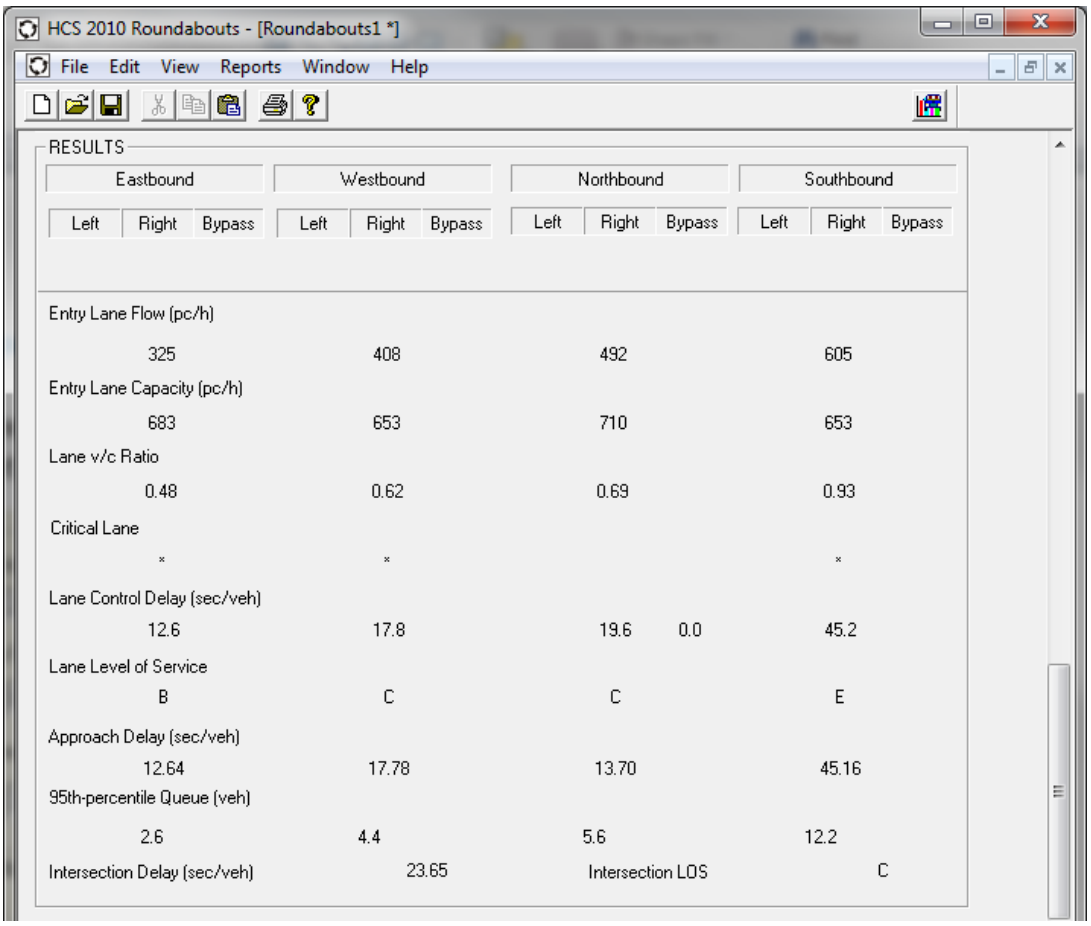


This is an example of a single lane RAB with a right bypass lane on the South Leg

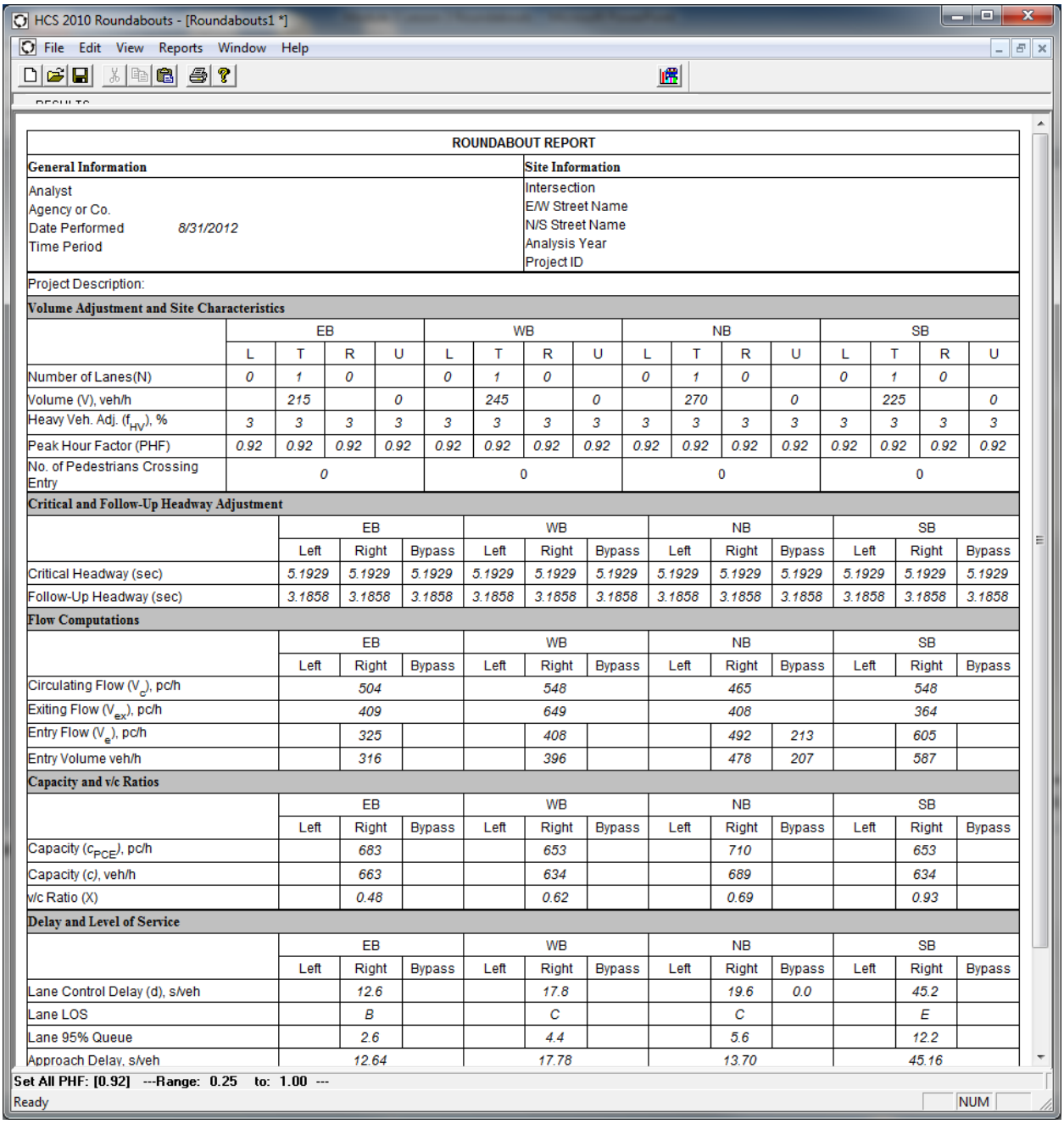
6. Complete the **Vehicle Volumes** section
    a. Enter Vehicle Volumes for each approach movement
    b. Enter Peak Hour Factor
    c. Enter Percent Heavy Vehicles



7. Scroll down to review the **Results**



8. Print the Report
    - **a.** Go to the **Reports** Menu and select **Formatted Report**
    - b. View in bottom of split screen
    - c. Go to File > Print to print



HCS 2010 Roundabouts - [Roundabouts1 *]

File Edit View Reports Window Help

ROUNDABOUT REPORT

General Information		**Site Information**
Analyst		Intersection
Agency or Co.		E/W Street Name
Date Performed	8/31/2012	N/S Street Name
Time Period		Analysis Year
		Project ID

Project Description:

Volume Adjustment and Site Characteristics

	EB				WB				NB				SB			
	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	U
Number of Lanes(N)	0	1	0		0	1	0		0	1	0		0	1	0	
Volume (V), veh/h		215		0		245		0		270		0		225		0
Heavy Veh. Adj. (f_{HV}), %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Peak Hour Factor (PHF)	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
No. of Pedestrians Crossing Entry	0				0				0				0			

Critical and Follow-Up Headway Adjustment

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (sec)	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929
Follow-Up Headway (sec)	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858

Flow Computations

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Circulating Flow (V_c), pc/h		504			548			465			548	
Exiting Flow (V_{ex}), pc/h		409			649			408			364	
Entry Flow (V_e), pc/h		325			408			492	213		605	
Entry Volume veh/h		316			396			478	207		587	

Capacity and v/c Ratios

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Capacity (c_{PCE}), pc/h		683			653			710			653	
Capacity (c), veh/h		663			634			689			634	
v/c Ratio (X)		0.48			0.62			0.69			0.93	

Delay and Level of Service

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		12.6			17.8			19.6	0.0		45.2	
Lane LOS		B			C			C			E	
Lane 95% Queue		2.6			4.4			5.6			12.2	
Approach Delay, s/veh		12.64			17.78			13.70			45.16	

Set All PHF: [0.92] ---Range: 0.25 to: 1.00 ---

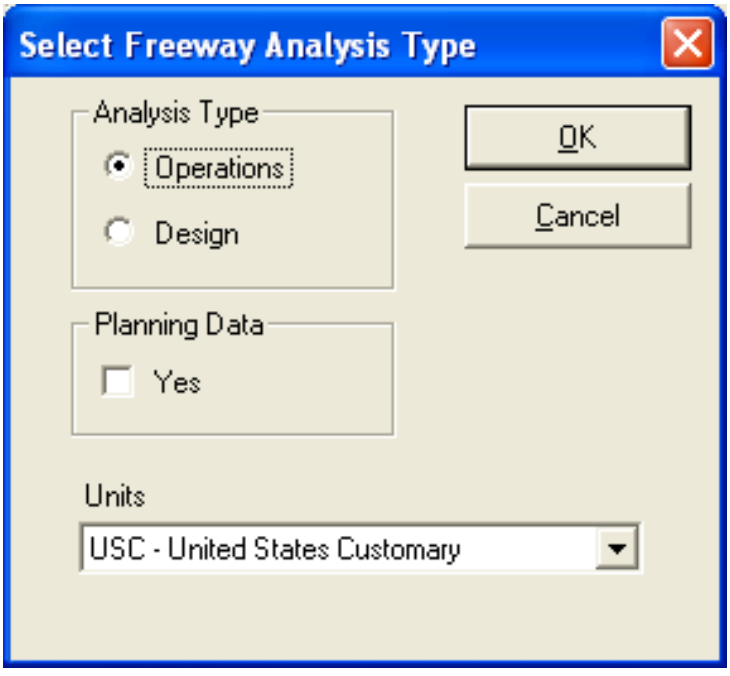
Ready NUM

MODULE 5: FREEWAY

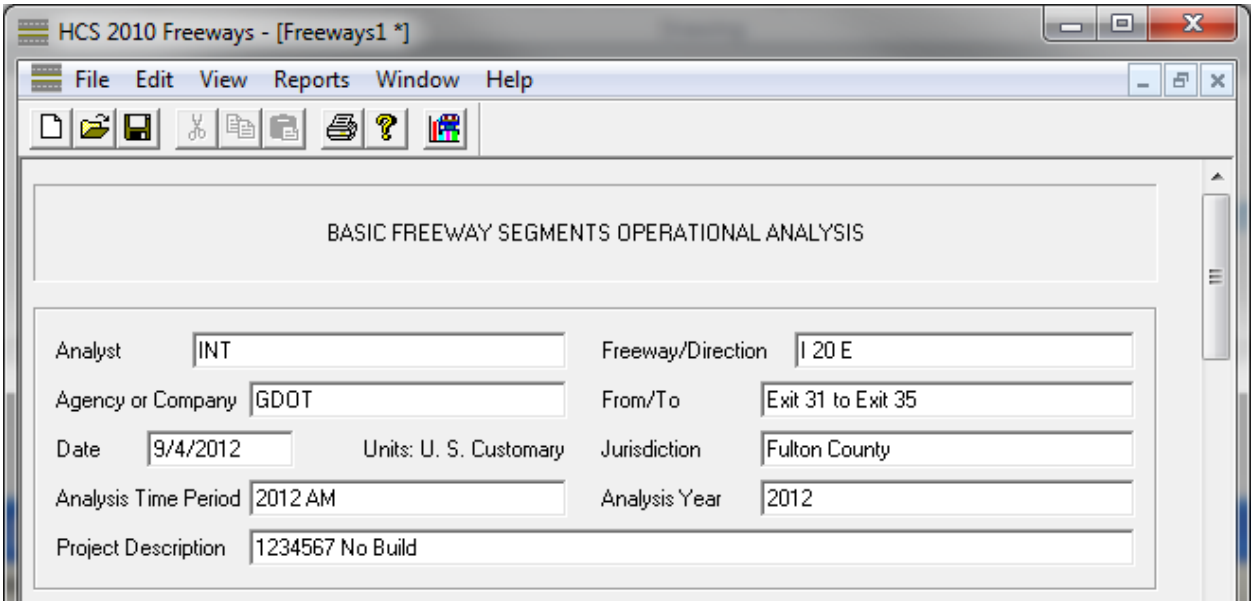
1. Open **HCS 2010** 

2. Select the **Freeways** module

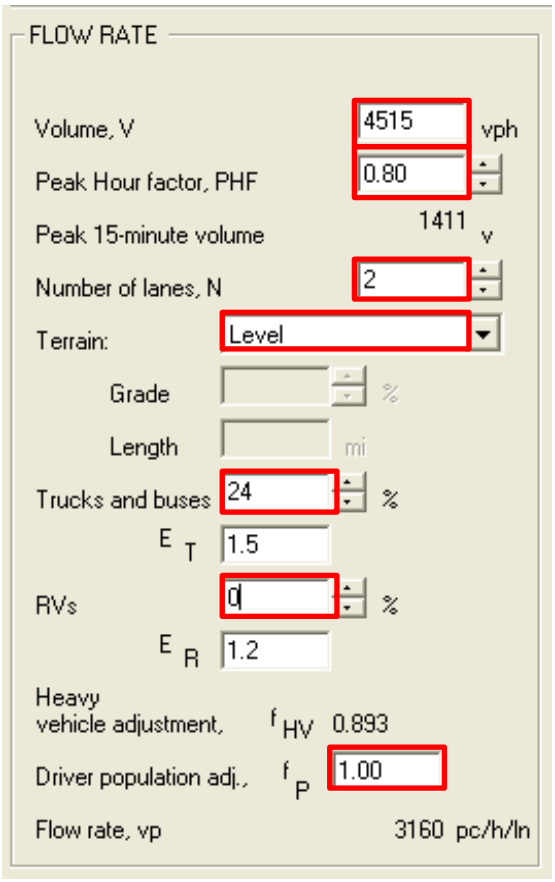
3. Open a **New File** an select **Operations** for Analysis Type



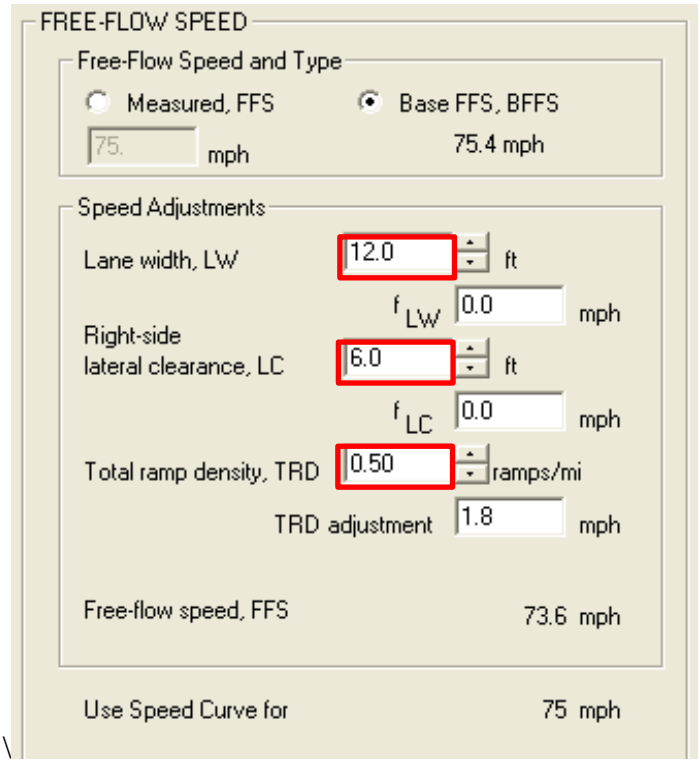
4. Enter the **General Information**



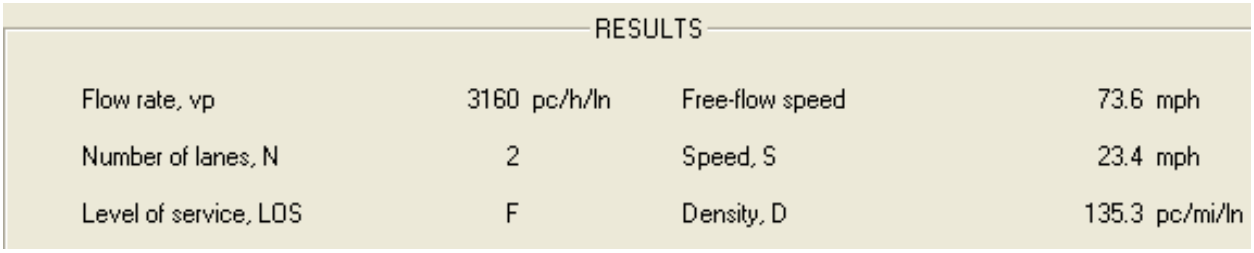
5. Complete the **Flow Rate** and **Free Flow Speed** Section
    a. Volume
    b. Peak Hour Factor
    c. Number of Lanes
    d. Terrain (Level, Rolling, Mountainous, Grade or Composite)
        i. Level, Rolling and Mountainous - *defined in HCM see pg 11-14*
        ii. Grade - allows the entrance of a specific grade and length
        iii. Composite - produces a dialog list to enter grades for several lengths
    e. Truck Percentage
    f. RV Percentage
    g. Driver populations adjustment
    **the Driver Population Factor is normally 1.00, unless the population is dominated by unfamiliar users in which case a value from 0.85-1.00 may be used.*



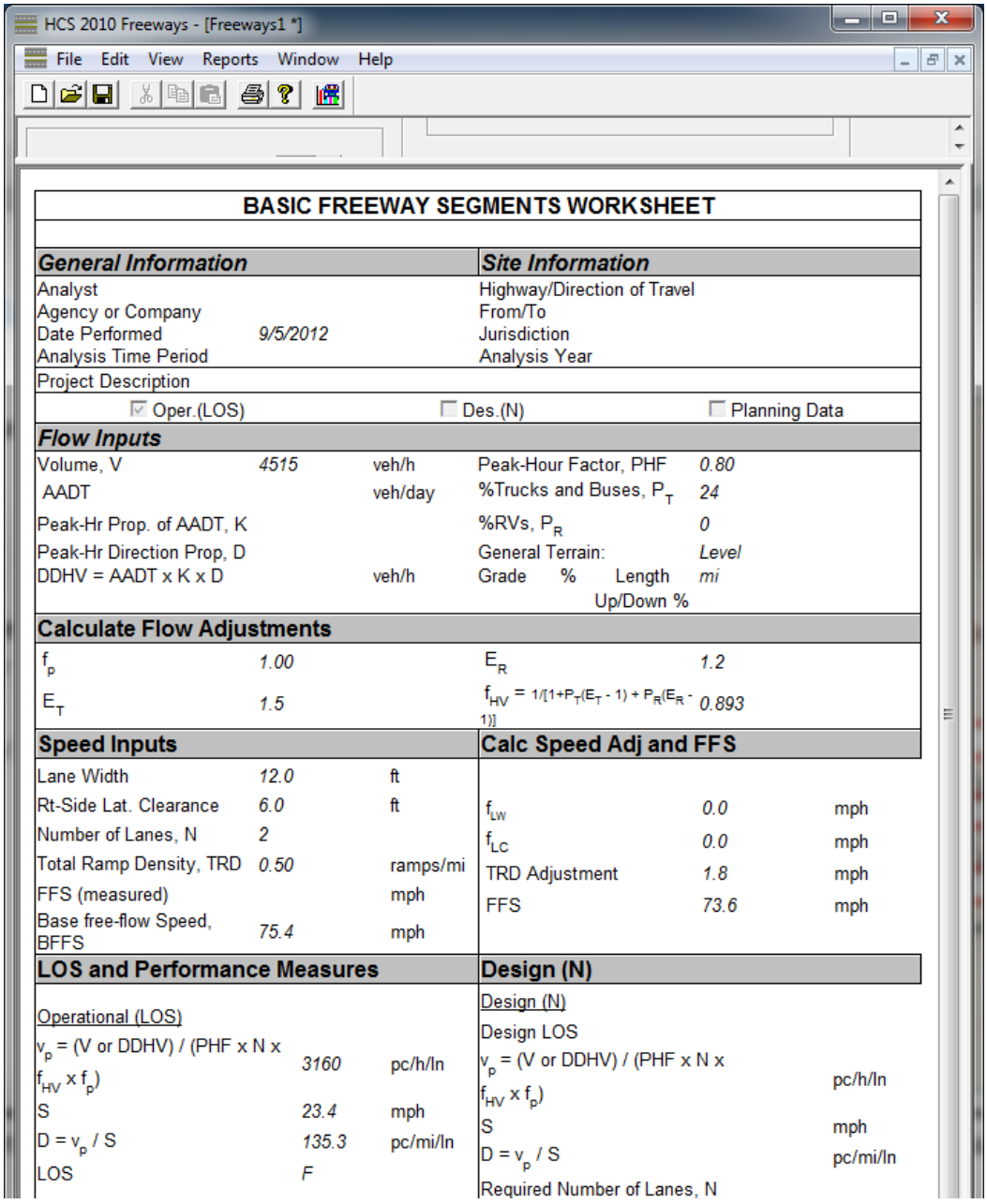
6. Complete the **Free Flow Speed** Section
    a. Enter the Lane width
    b. Enter the Right-side lateral clearance
    c. Enter Total ramp Density *the number of ramps within 3 miles in each direction on one side of the freeway divided by six*



7. Scroll down to view the **Results**



8. Go to the **Reports** menu then **Basic Freeway Worksheet** to print the report.



BASIC FREEWAY SEGMENTS WORKSHEET

General Information			***Site Information***	
Analyst			Highway/Direction of Travel	
Agency or Company			From/To	
Date Performed	*9/5/2012*		Jurisdiction	
Analysis Time Period			Analysis Year	
Project Description				
☑ Oper.(LOS)		☐ Des.(N)		☐ Planning Data

Flow Inputs				
Volume, V	*4515*	veh/h	Peak-Hour Factor, PHF	*0.80*
AADT		veh/day	%Trucks and Buses, P_T	*24*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.893*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft			
Rt-Side Lat. Clearance	*6.0*	ft	f_{LW}	*0.0*	mph
Number of Lanes, N	*2*		f_{LC}	*0.0*	mph
Total Ramp Density, TRD	*0.50*	ramps/mi	TRD Adjustment	*1.8*	mph
FFS (measured)		mph	FFS	*73.6*	mph
Base free-flow Speed, BFFS	*75.4*	mph			

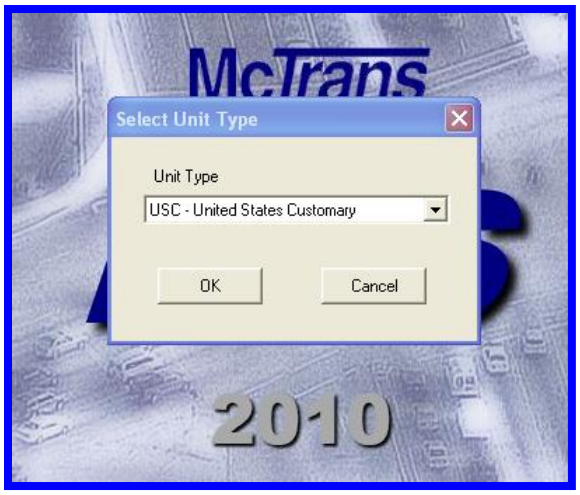
LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*3160*	pc/h/ln	Design LOS	
			v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	*23.4*	mph	S	mph
D = v_p / S	*135.3*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*F*		Required Number of Lanes, N	

MODULE 6: WEAVING

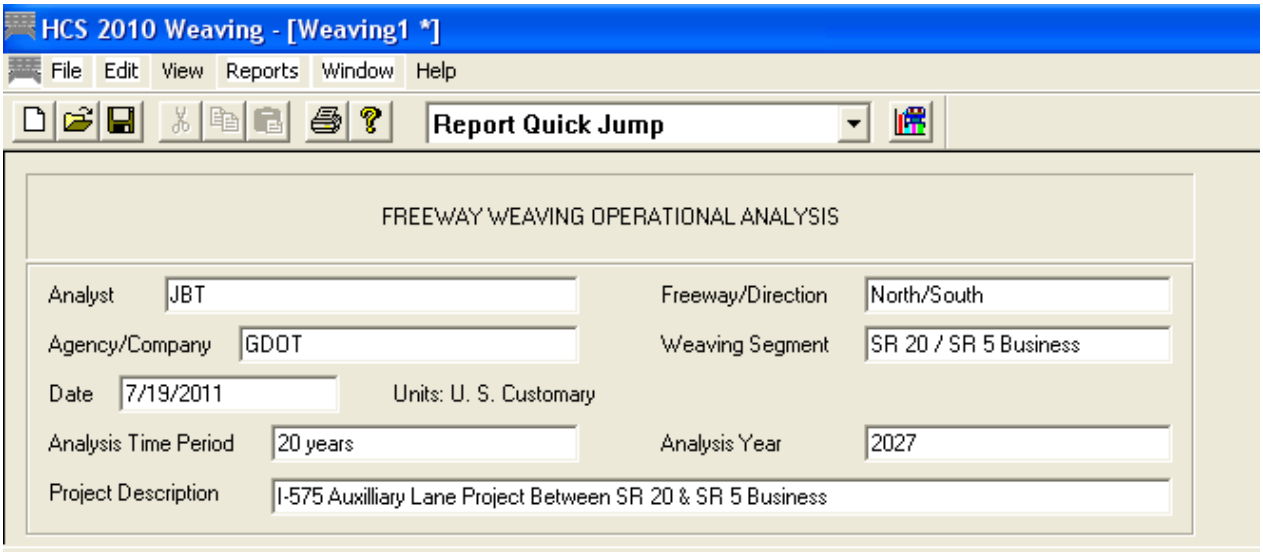
1. Open **HCS 2010** 

2. Select the **Weaving** module

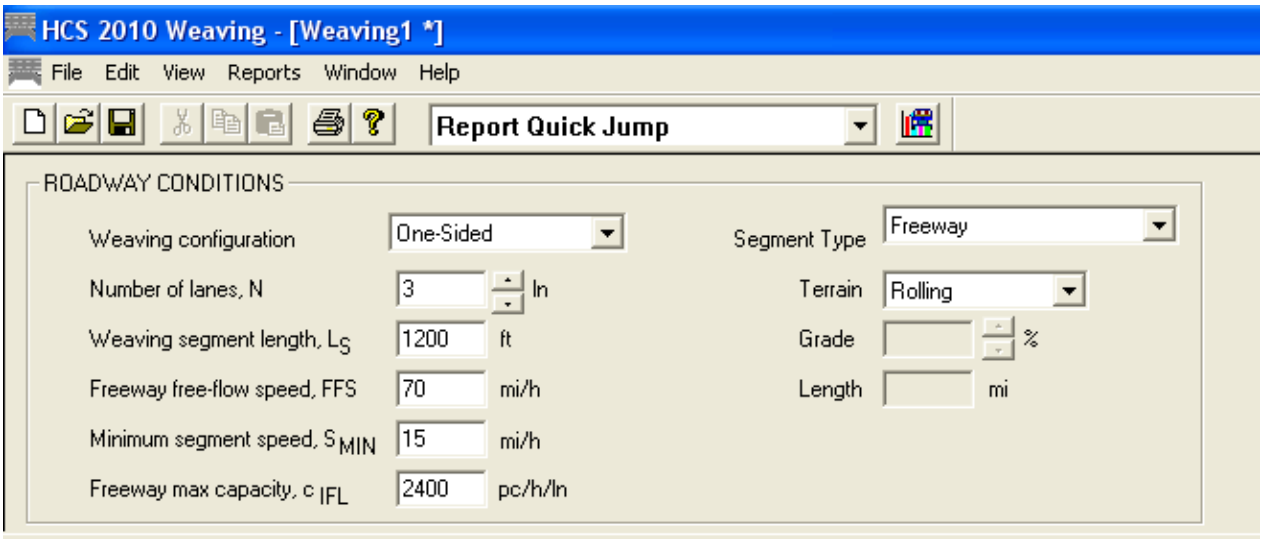
3. Open a **New File** an select **USC** for Unit Type



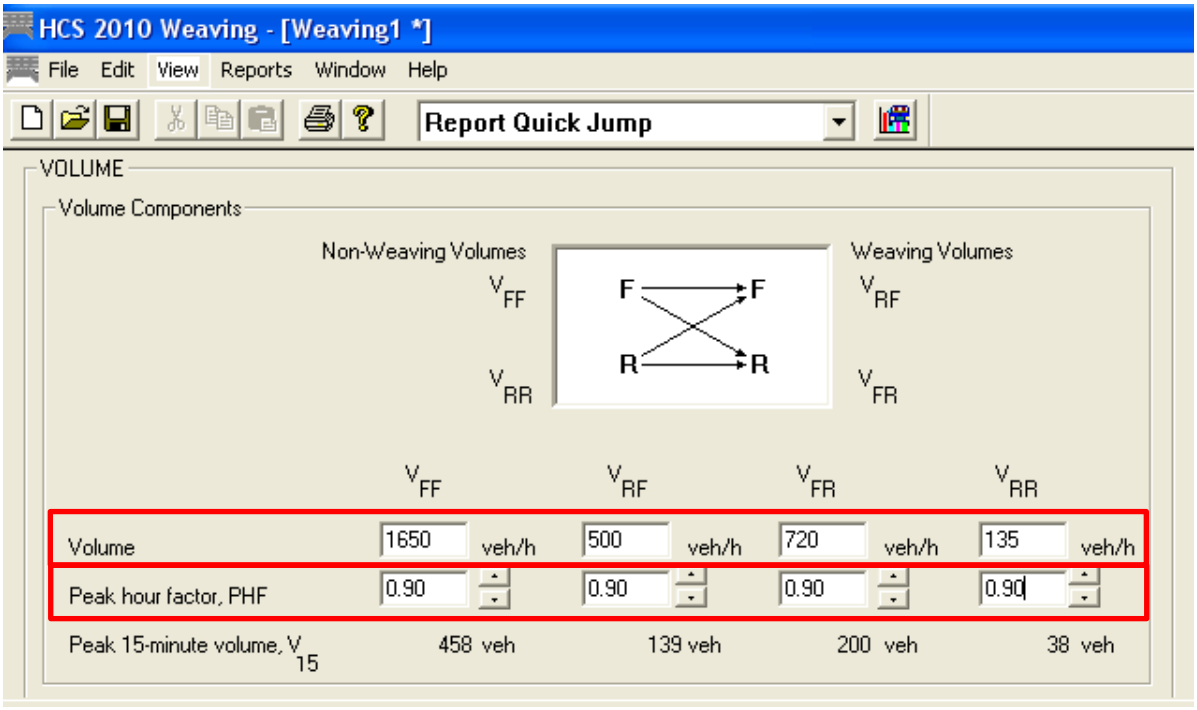
4. Enter the General Information



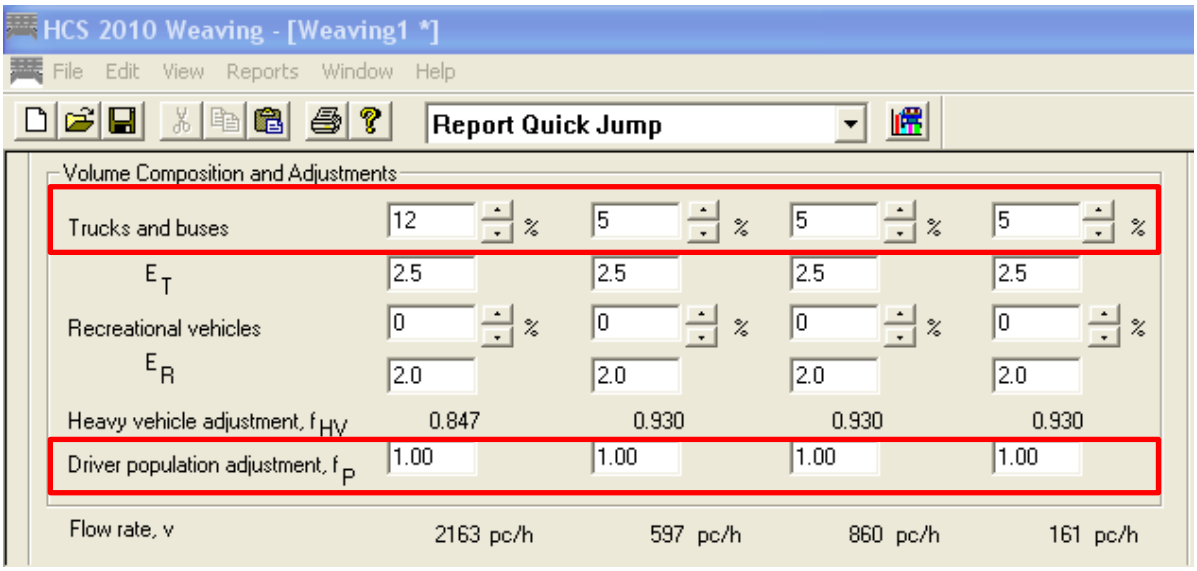
5. Complete the **Roadway Conditions** section
    a. <u>Weaving configuration</u>
        i. One sided – *no weaving maneuver requires more than two lane changes*
        ii. Two-sided – *at least one weaving maneuver requires three or more lane changes or were a single lane on ramp is followed closely by a single lane off ramp on the opposite side of the freeway.*



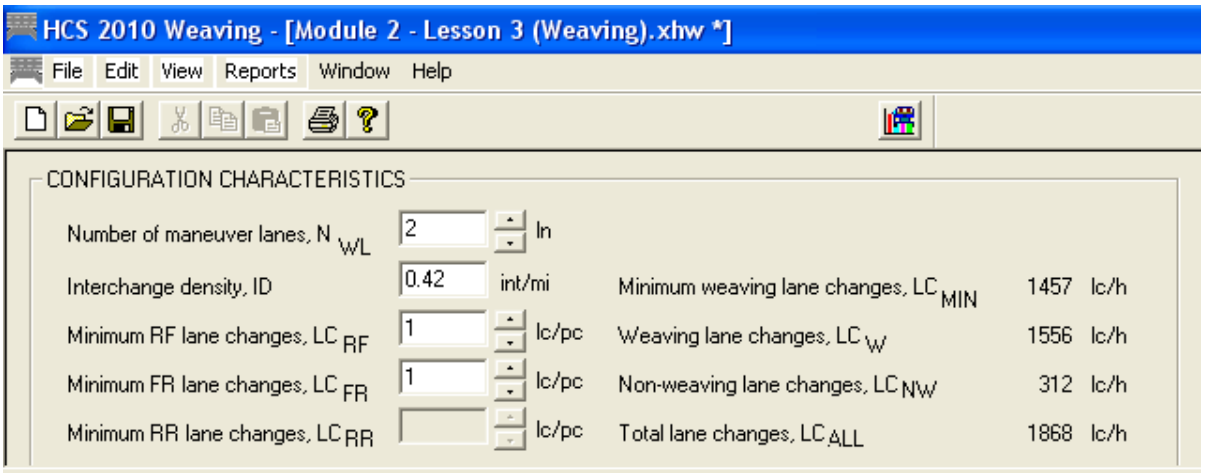
6. Complete the **Volume** section



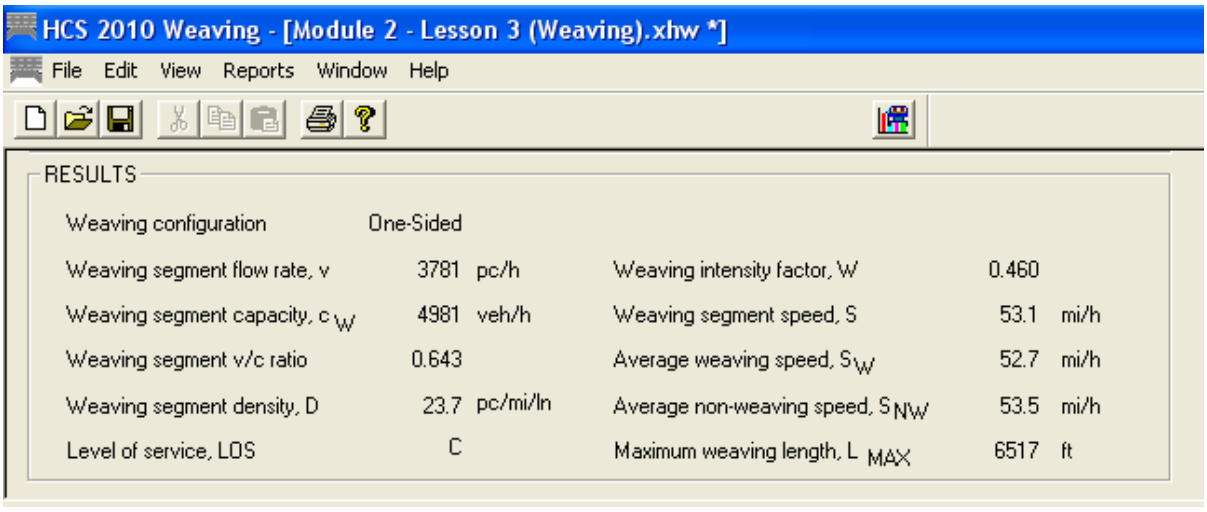
7. Completed the **Vehicle Composition and Adjustment** section
**the Driver Population Factor is normally 1.00, unless the population is dominated by unfamiliar users in which case a value from 0.85-1.00 may be used.*



8. Complete the **Configuration Characteristics** section
    a. Number of Maneuver Lanes – the number of lanes from which a weaving maneuver may be made with one or no lane changes
    b. Interchange Density - *average number of interchanges per mile from a distance 3 miles upstream to 3 miles downstream of the midpoint of the weaving segment. The subject weaving segment should be counted as one interchange*.
    c. Minimum RF Lane changes – *minimum number of lane changes that must be made by a single weaving vehicle moving from the on-ramp to the freeway*
    d. Minimum FR Lane changes –*minimum number of lane changes that must be made by a single weaving vehicle moving from the freeway to the off-ramp*
    e. Minimum RR Lange changes – *minimum number of lane changes that must be made by a single weaving vehicle moving from ramp to ramp.*two sided only*



9. View the **Results**



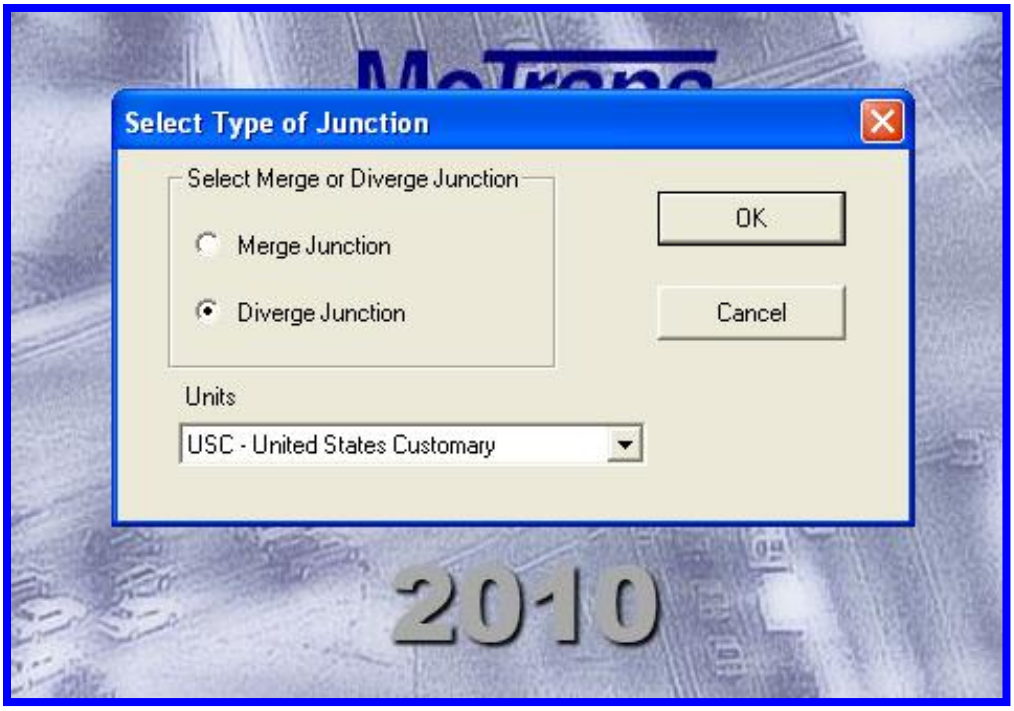
10. Go to the **Reports** menu and select **Freeway Weaving Worksheet** to view and print report

MODULE 7: RAMPS

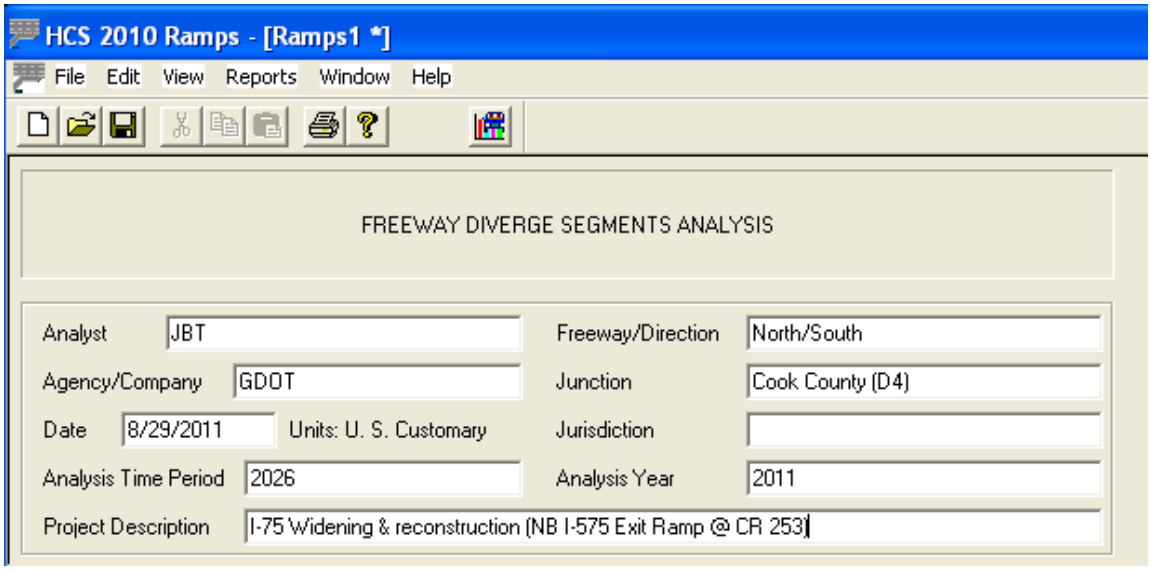
1. Open **HCS 2010** 

2. Select the **Ramps** module

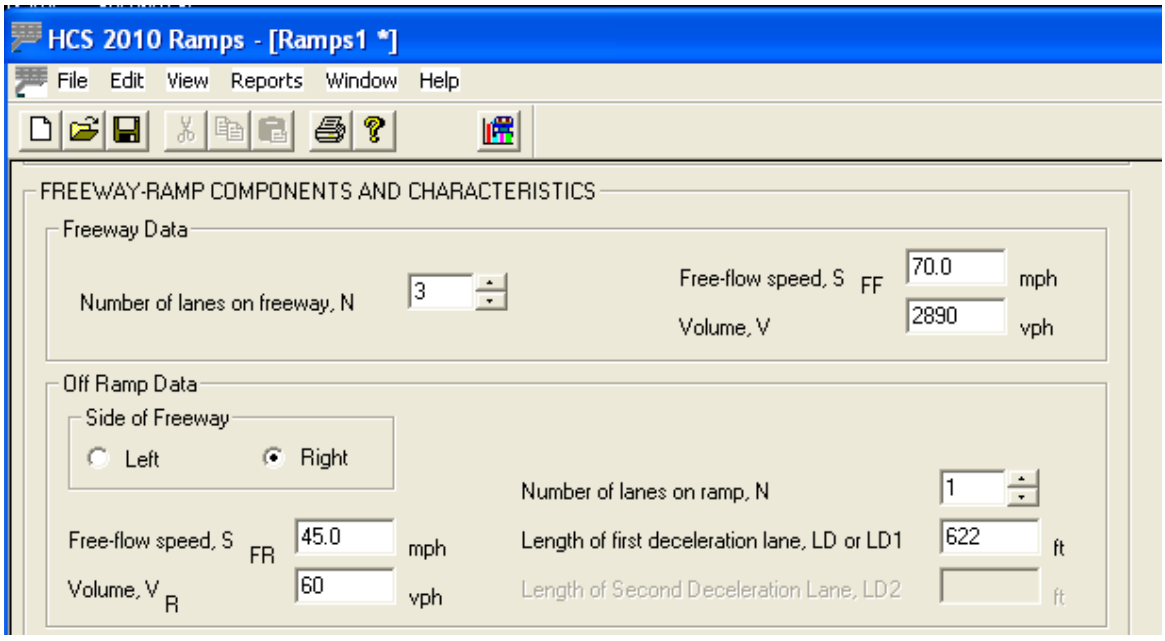
3. Open a **New File** an select **Merge** (On/Entering Ramp) **or Diverge** (Off/Exiting Ramp) Junction type



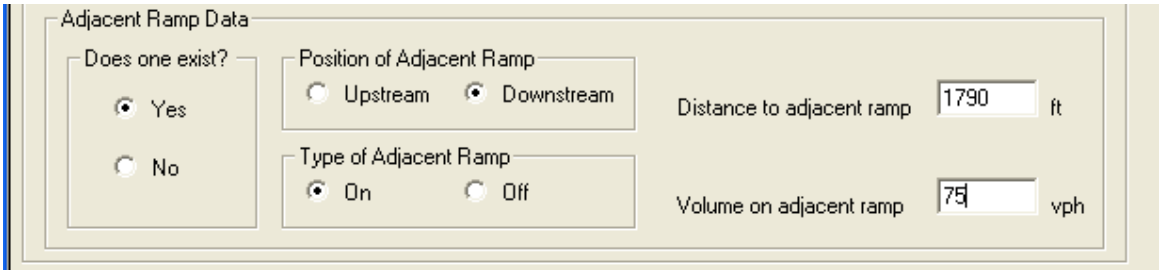
4. Complete the General Information Section



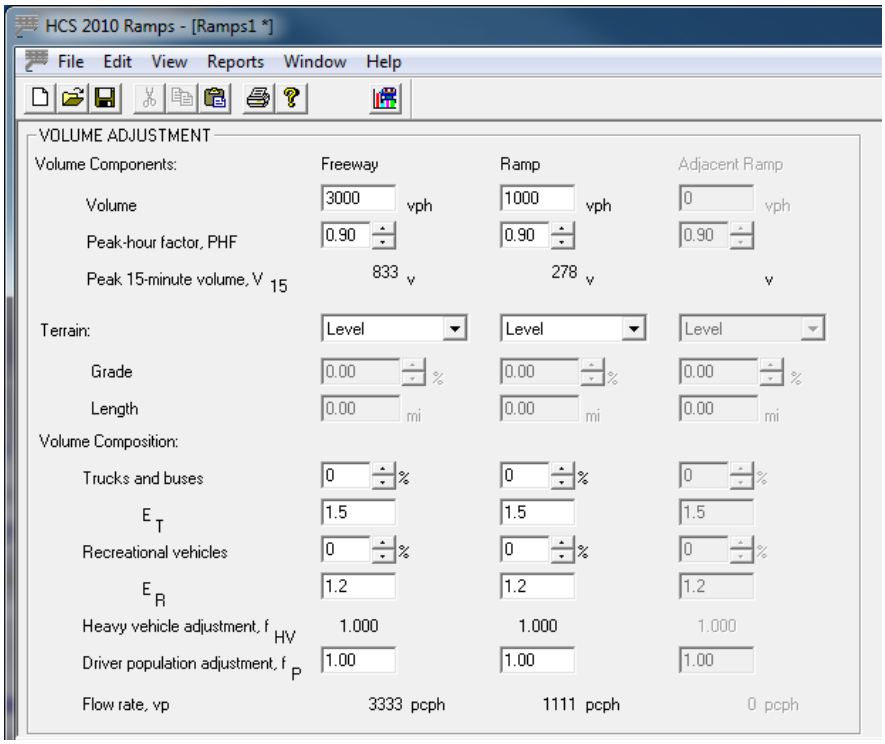
5. Complete the **Freeway Data** and **Off Ramp Data** of the **Freeway-Ramp Components and Characteristics**
    a. Enter the number of freeway lanes, freeway free flow speed, and freeway volume.
    b. Select the side of the freeway the ramp is located
    c. Enter the free flow ramp speed, the ramp volume, the number of lanes on the ramp and the length of the deceleration lane



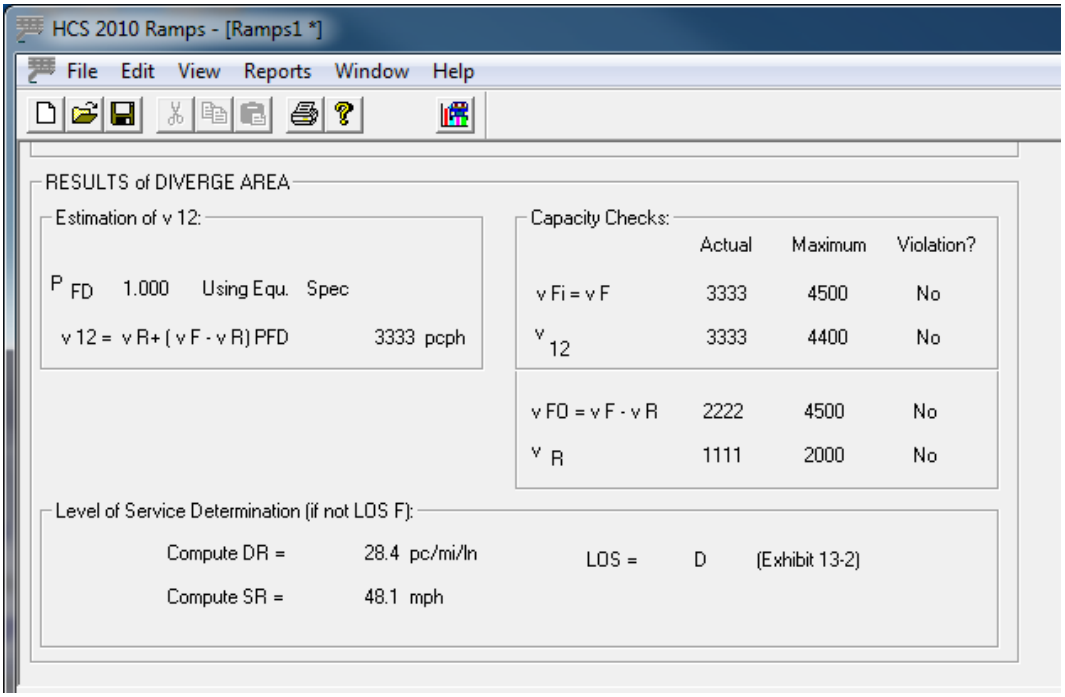
6. If there is an adjacent ramp within 8,000 ft of the analysis ramp, the complete the **Adjacent Ramp Data** section. *If both upstream and downstream adjacent ramps exist, the analysis must be run twice.*



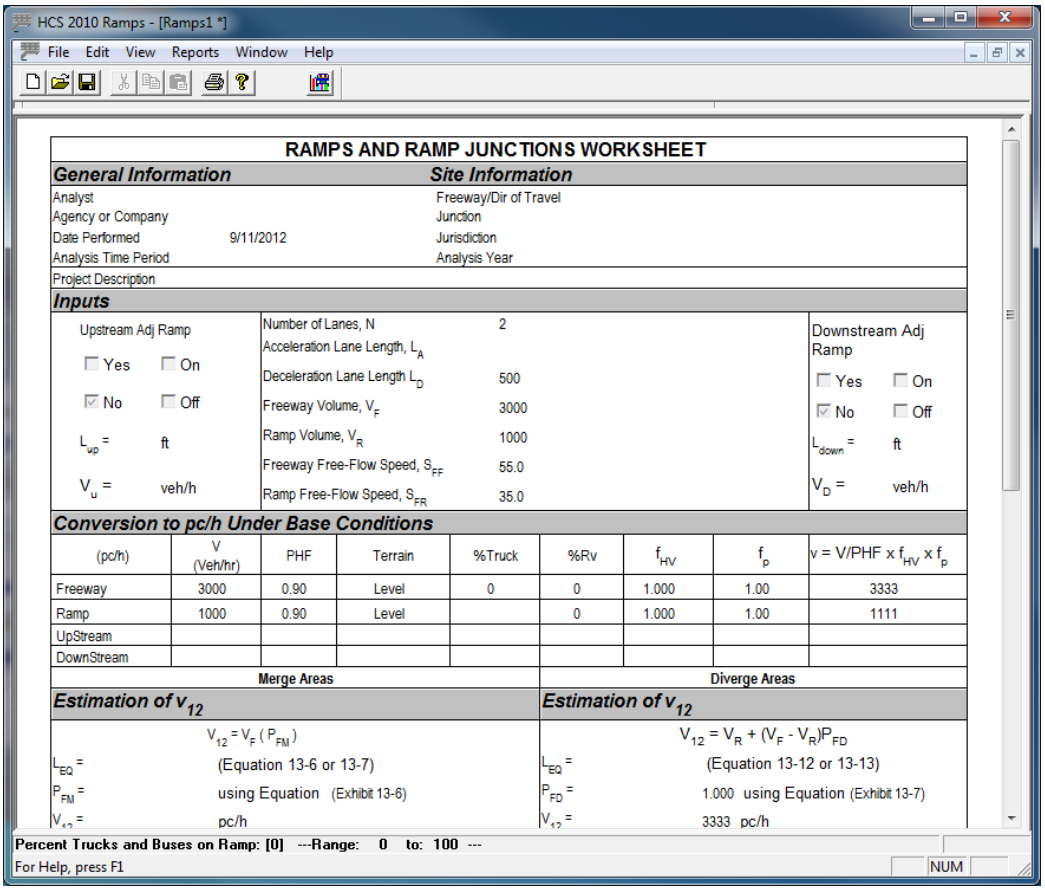
7. Complete the **Volume Adjustment** section
    a. Enter the Peak Hour Factor
    b. Select the Terrain Type
    c. Enter the Truck Percentage
    d. Enter the Driver Populations Adjustment factor



8. View the Results



9. Go to the **Reports** Menu. Select **Ramps and Ramp Junctions Worksheet** and **Print** the report.

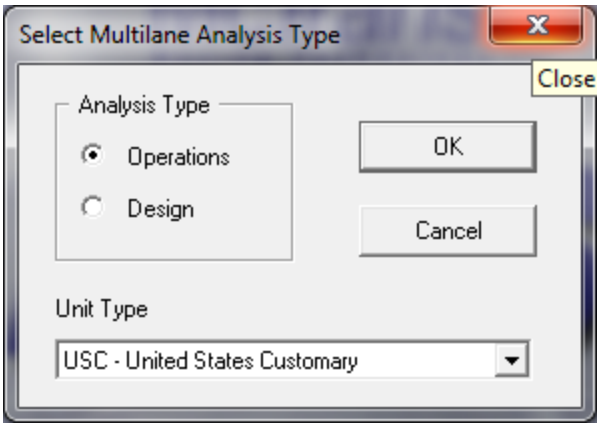


MODULE 7: MULTILANE

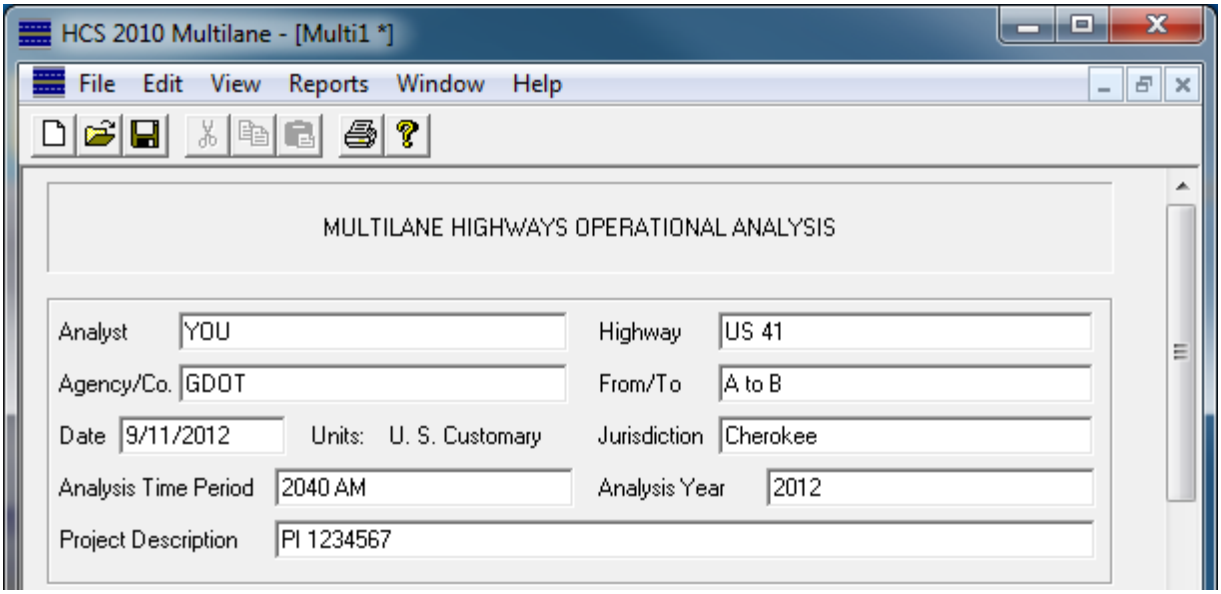
1. Open **HCS 2010** 

2. Select the **Multilane** module

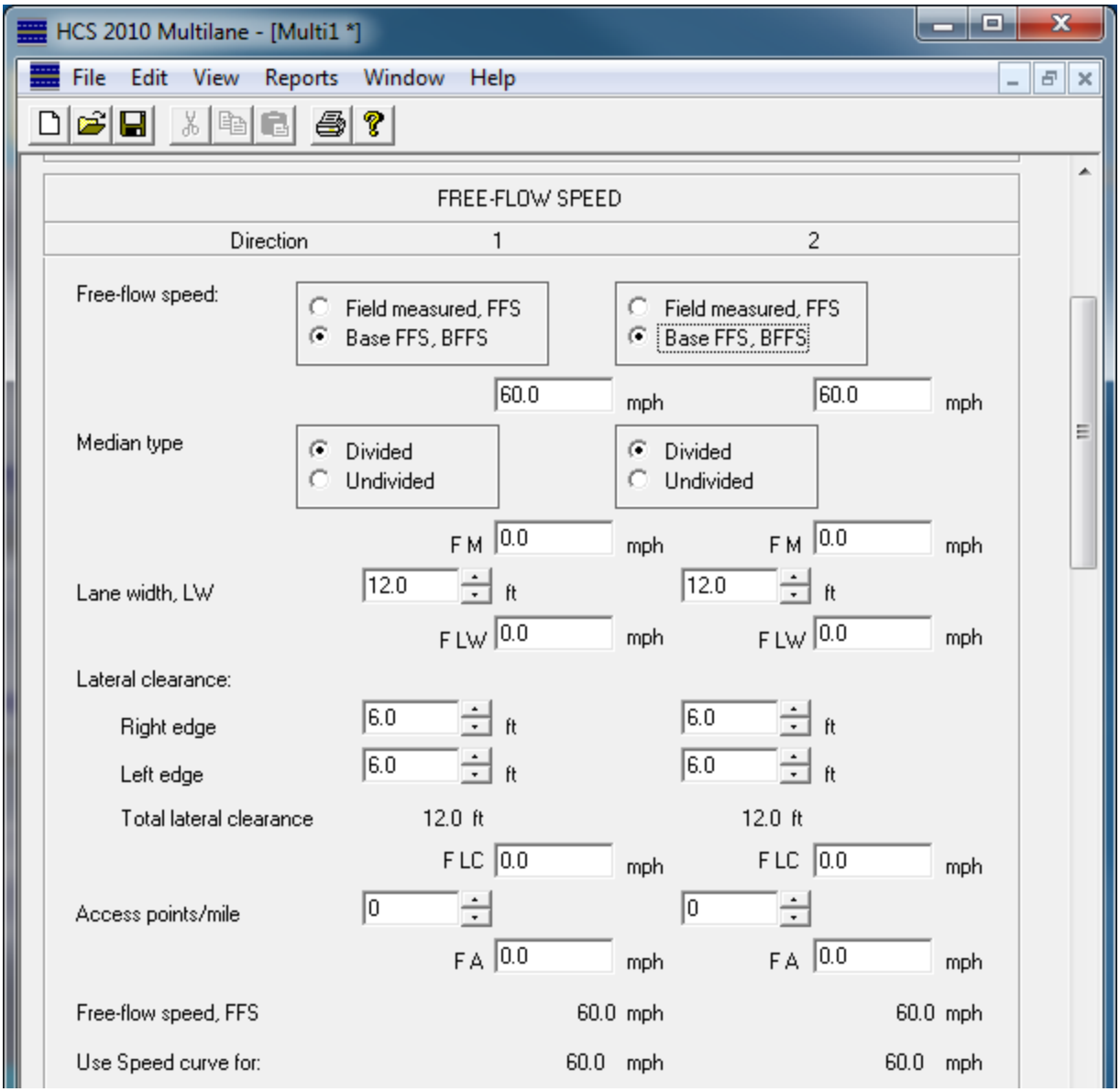
3. Open a **New File** and select **Operations** Analysis Type



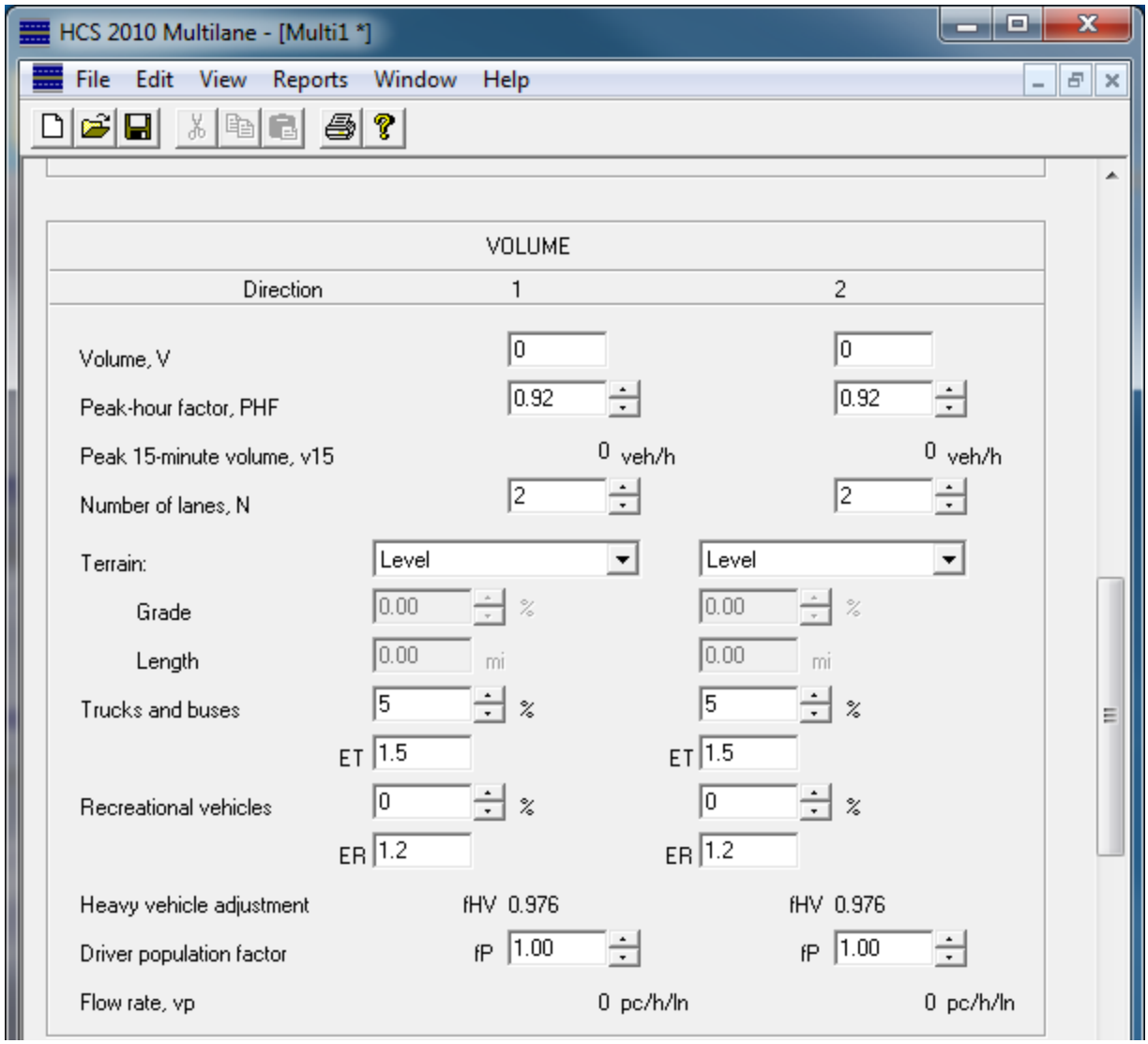
4. Enter the General information



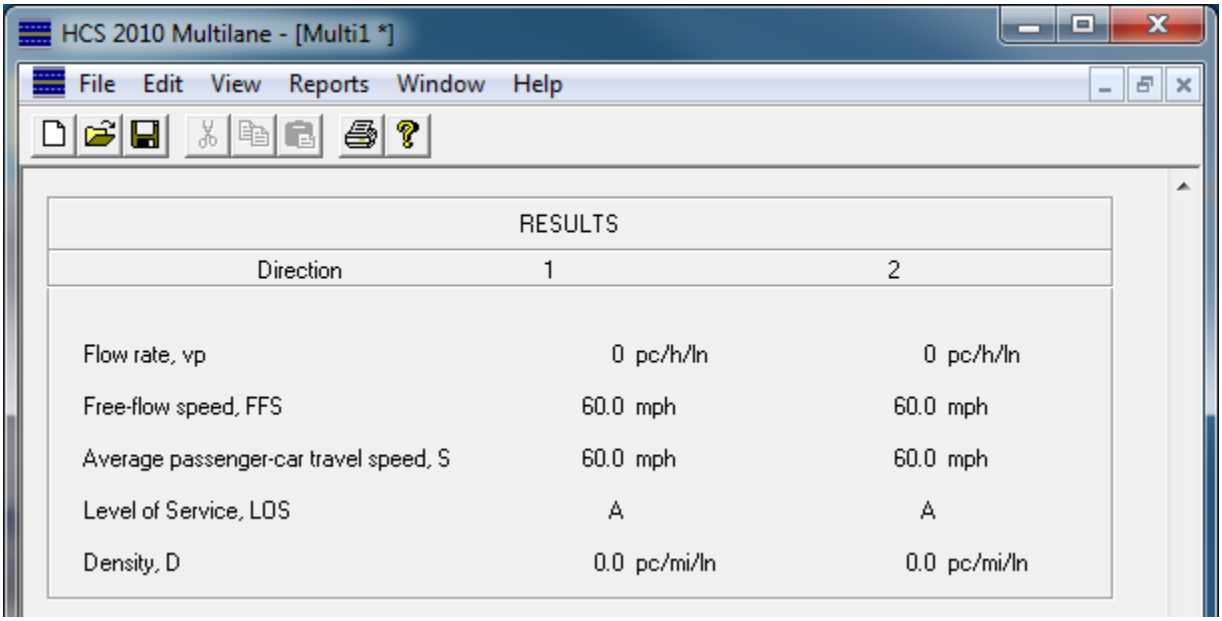
5. Complete the **Free Flow Speed** Section
    a. Select Base FFS for the Free Flow Speed
    b. Select the Median Type
    c. Enter the Lane Width
    d. Enter the Lateral Clearance for the right and left side
    e. Enter the Access points/mile



6. Complete the **Volume** section
    a. Enter the Volume for both directions
    b. Enter the Peak Hour Factor
    c. Enter the Number of Lanes
    d. Select the Terrain type
    e. Enter the Truck Percentage
    f. Enter the Driver Populations Factor



7. View the **results**.



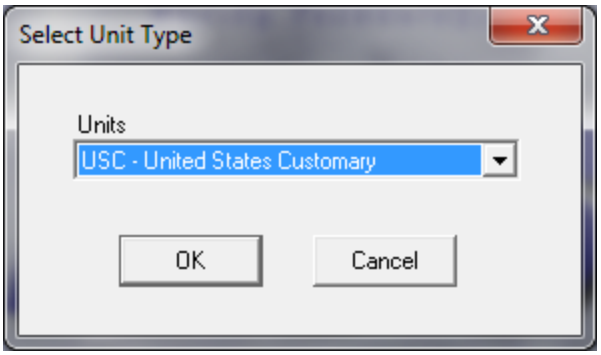
8. Go to the **Reports** menu to select the Multilane Worksheet for both directions and print.

MODULE 7: TWOLANE

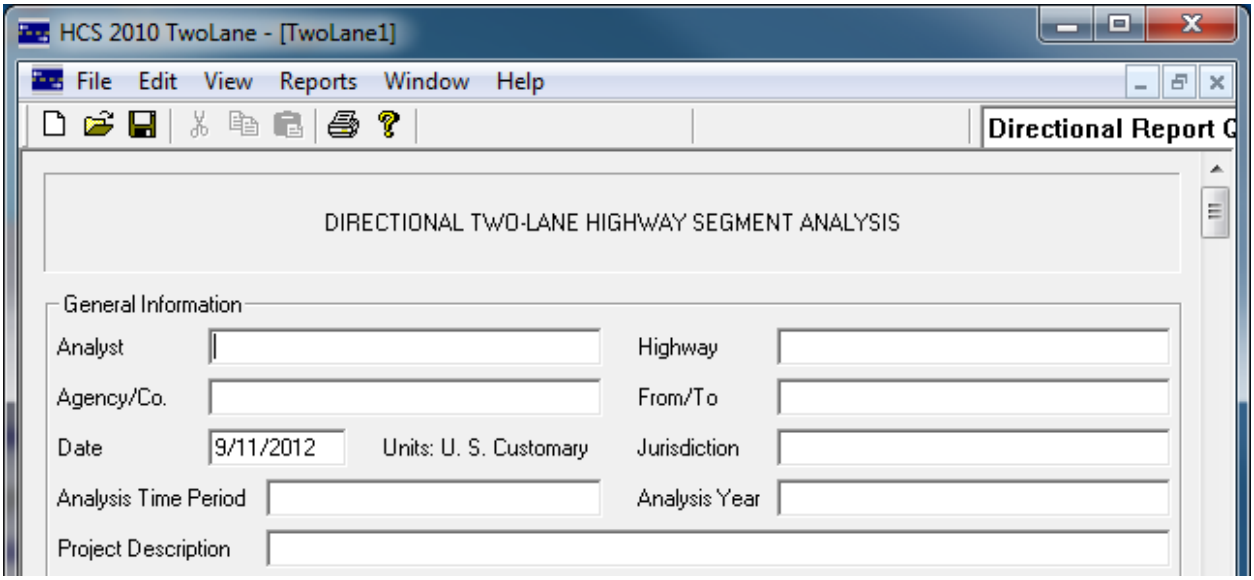
1. Open **HCS 2010** 

2. Select the **TwoLane** module

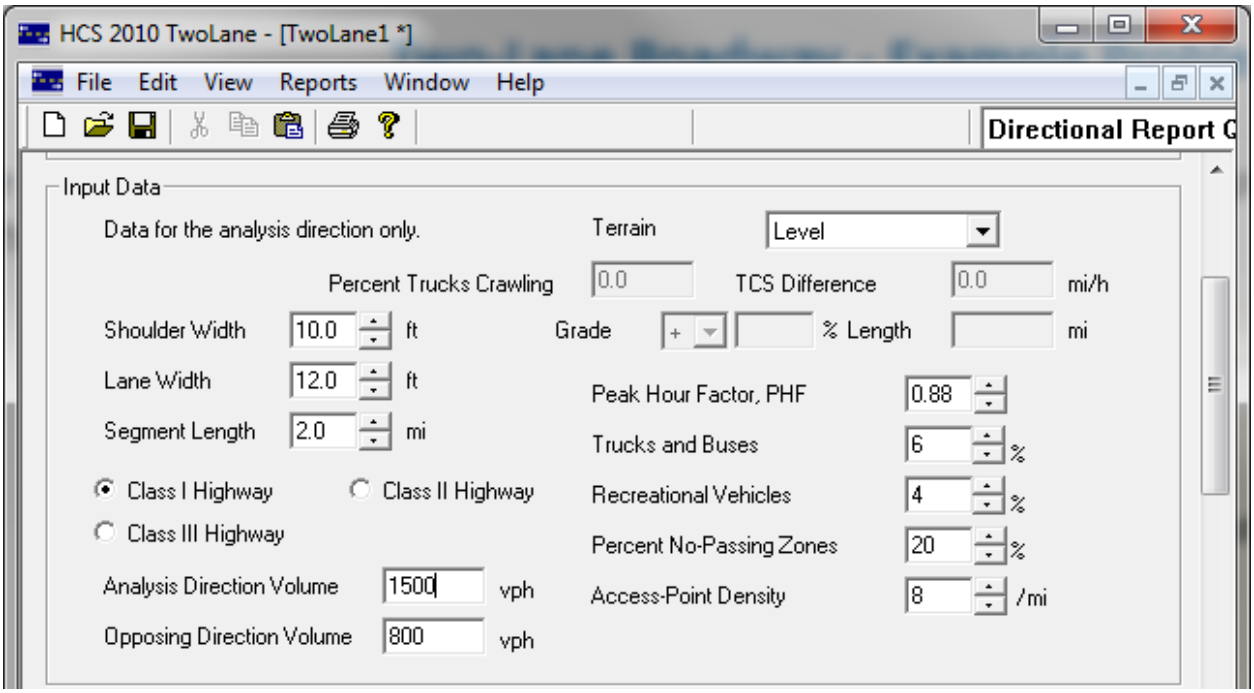
3. Open a **New File** and confirm Unit Type



4. Enter General Information



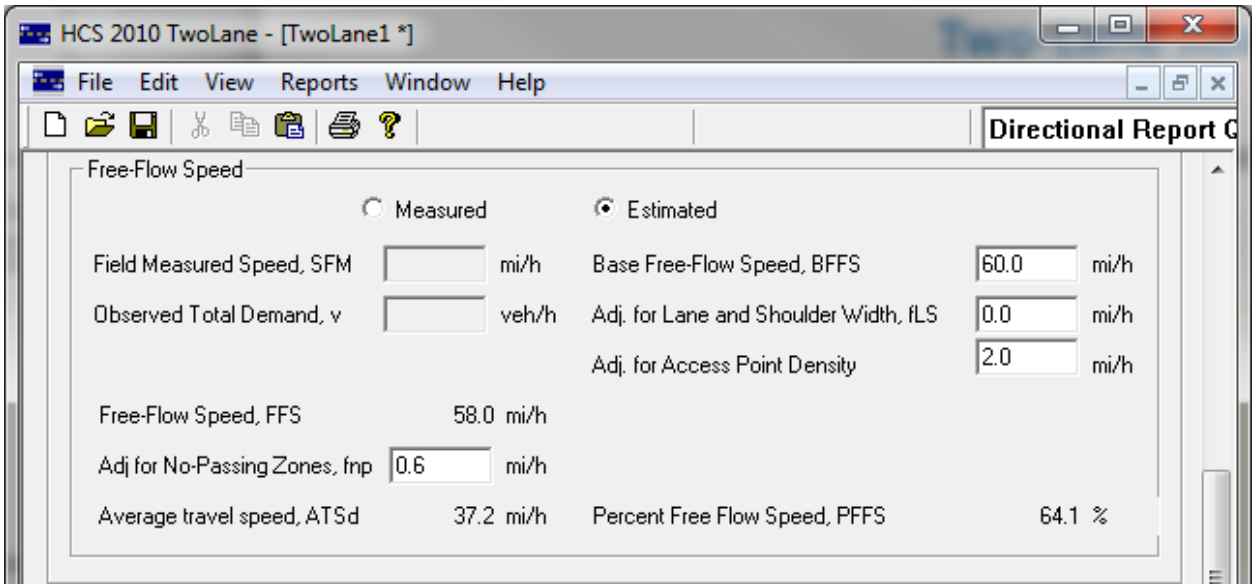
5. Complete the **Input Data** Section -*Analyze one direction at a time*
    a. Select a Terrain type
    b. Enter the shoulder width, lane width and segment length of the area to be analyzed
    c. Select the Class of highway *see page 15-3 of HCM 2010*
    d. Enter the volumes for the analysis direction and the opposing direction
    e. Enter the peak hour factor keep .88 if unknown
    f. Enter Truck Percentage
    g. Enter the Percent No-Passing Zone *is entered based on Exhibit 15-5 HCM2010*
    h. Enter the Access-Point Density *divide the total number of unsignalized intersections and driveways on **both** sides of the roadway segment by the length of the segment*



6. The **Average Travel Speed** section is calculated by HCS

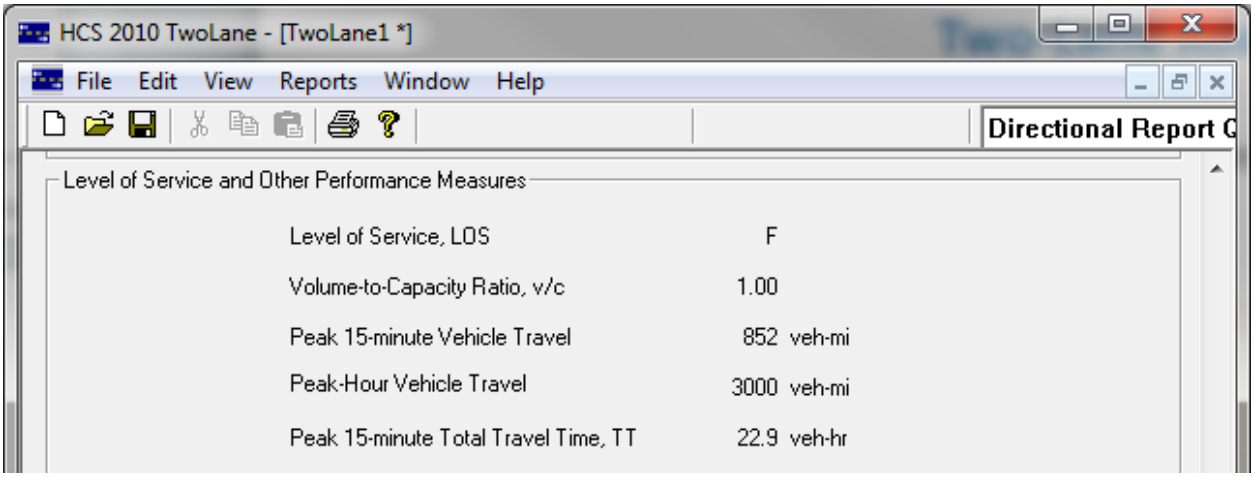
7. Complete the **Free-Flow Speed** Section
    a. Select Estimated
    b. Enter the Base Free Flow speed

    Note:all the adjustments are calculated by HCS



8. The **Percent Time Spent Following** section is calculated by HCS

9. View the Results



10. Select either the **Directional** and **Directional Passing Lane** report to print.