

LinkSum

Version 5.0.12

Revision History

June 2013 - Created by Volpe Center

The **LinkSum** program is used to:

1. Generate link data files of volumes, speeds, travel times, V/C ratios, travel time ratios, delay, average density, maximum density, average queue, maximum queue, and cycle failures summarized by time of day.
2. Summarize data within a subarea polygon or for specified facility types.
3. Summarize link data by zone or zone group found in the activity location file.
4. Summarize activity location data fields by link direction.
5. Report the links with the top 100 link volumes, lane volumes, period volumes, speed reductions, V/C ratios, travel time ratios, volume changes, or travel time changes.
6. Report the link groups with total volumes greater than user specified values.
7. Report the distribution of travel time, V/C ratio, travel time change, and volume change by lane kilometer and time period.
8. Select links to output using a link equivalence file.
9. Calculate congestion duration-based measures by aggregating time periods with time ratios greater than a specified value.
10. Report various network performance statistics.

Syntax is `LinkSum [-flag] [control_file]`

The `control_file` is the file name of an ASCII file that contains the control strings expected by the program. The `control_file` is optional. If a file name is not provided, the program will prompt the user to enter a file name. The flag parameters are also optional. Any combination of the following flag parameters can be included on the command line:

Optional Flags:

- Q[uiet] = execute without screen messages
- H[elp] = show program syntax and control keys
- C[ontrol] = create/update a default control file
- K[eyCheck] = list unrecognized control file keys
- P[ause] = pause before exiting
- N[oPause] = never pause before exiting
- D[etail] = execute with detailed status messages
- X[ML] = write an XML file with control keys

The program automatically creates a printout file based on the control file name. If the filename includes an extension (e.g., ".ctl"), the extension is replaced with ".prn". The printout file will be created in the current working directory and will overwrite an existing file with the same name.

Version 5 Features

Link Data and Link Direction files were updated to include data units. Unit codes for vehicle, PCE, and person hours and miles/kilometers of travel were added. Time periods are now read from the Link Data and Link Direction files.

NEW_TURN_VOLUME_FILE, NEW_TURN_VOLUME_FORMAT, and TURN_NODE_RANGE keys were added to create a turning movement file from the link delay data.

The Link Gap report will now include turning movement delays if included in the performance file and activated by including the connection file. The relative gap calculations were modified to aggregate the data from the two link delays files separately and then make the gap calculation. This approach provided more realistic gap calculation when the link and period travel times on the two link delay files are the same.

Relative gap is calculated as follows:

Relative gap = (Previous VHT – Current VHT) / Current VHT

Control Key List

The list of control file keys appears in the tables below:

- Req / Opt indicates whether the key is **required** or **optional**
- The types include **Text**, Input **Filename**, **New** file, **Boolean**, **Path** (to a file), **Time**, **Integer**, **Decimal**, and **List** of items
- The Default is the default value, used if the key does not appear in the control file.
- I/O/P indicates Input, Output or Parameter.

For a more detailed description of the Parameter control keys, refer to the Parameter Reference. For a more detailed description of the Input or Output control keys, refer to the File Reference. These two documents also provide the possible values or range of values allowed for each control key listed below. For instance, files can usually be output to numerous formats beyond TAB_DELIMITED for additional post-processing / file manipulation actions.

Configuration Keys

Control File Keys:	Req/Opt	Type	Default	I/O/P
TITLE	Opt	Text		P
REPORT_DIRECTORY	Opt	Path		O
REPORT_FILE	Opt	New		P
REPORT_FLAG	Opt	Bool	FALSE	P
PAGE_LENGTH	Opt	Int.	65	P
PROJECT_DIRECTORY	Opt	Path		P
DEFAULT_FILE_FORMAT	Opt	Text	TAB_DELIMITED	P
TIME_OF_DAY_FORMAT	Opt	Text	DAY_TIME	P
MODEL_START_TIME	Opt	Time	0:00	P
MODEL_END_TIME	Opt	Time	24:00:00	P
MODEL_TIME_INCREMENT	Opt	Time	15 minutes	P
UNITS_OF_MEASURE	Opt	Text	METRIC	P

Control File Keys:	Req/Opt	Type	Default	I/O/P
RANDOM_NUMBER_SEED	Opt	Int.	0	P
MAX_WARNING_MESSAGES	Opt	Int.	100000	P
MAX_WARNING_EXIT_FLAG	Opt	Bool	TRUE	P
MAX_PROBLEM_COUNT	Opt	Int.	0	P
NUMBER_OF_THREADS	Opt	Int.	1	P

System File Keys

Control File Keys:	Req/Opt	Type	Default	I/O/P
NODE_FILE	Req	File		I
NODE_FORMAT	Opt	Text	TAB_DELIMITED	P
LINK_FILE	Req	File		I
LINK_FORMAT	Opt	Text	TAB_DELIMITED	P
PERFORMANCE_FILE	Req	File		I
PERFORMANCE_FORMAT	Opt	Text	TAB_DELIMITED	P
CONNECTION_FILE	Opt	File		I
CONNECTION_FORMAT	Opt	Text	TAB_DELIMITED	P
LANE_USE_FILE	Opt	File		I
LANE_USE_FORMAT	Opt	Text	TAB_DELIMITED	P
LOCATION_FILE	Opt	File		I
LOCATION_FORMAT	Opt	Text	TAB_DELIMITED	P
SAVE_LANE_USE_FLOWS	Opt	Bool	FALSE	P
LINK_EQUIVALENCE_FILE	Opt	File		I
ZONE_EQUIVALENCE_FILE	Opt	File		I

Data Service Keys

Control File Keys:	Req/Opt	Type	Default	I/O/P
DAILY_WRAP_FLAG	Opt	Bool	FALSE	P
SUMMARY_TIME_RANGES	Opt	Text	ALL	P
SUMMARY_TIME_INCREMENT	Opt	Time	15 minutes	P

Select Service Keys

Control File Keys:	Req/Opt	Type	Default	I/O/P
SELECT_FACILITY_TYPES	Opt	List	ALL	P
SELECT_SUBAREA_POLYGON	Opt	File		P

Control Keys

Control File Keys:	Req/Opt	Type	Default	I/O/P
COMPARE_PERFORMANCE_FILE	Opt	File		I
COMPARE_PERFORMANCE_FORMAT	Opt	Text	TAB_DELIMITED	P
MINIMUM_LINK_FLOW	Opt	Dec.	2.0	P
SELECT_BY_LINK_GROUP	Opt	Bool	FALSE	P
NEW_LINK_ACTIVITY_FILE	Opt	New		O
NEW_LINK_ACTIVITY_FORMAT	Opt	Text	TAB_DELIMITED	P

COPY_LOCATION_FIELDS	Opt	Text		P
NEW_ZONE_TRAVEL_FILE	Opt	New		O
NEW_ZONE_TRAVEL_FORMAT	Opt	Text	TAB_DELIMITED	P
NEW_GROUP_TRAVEL_FILE	Opt	New		O
NEW_GROUP_TRAVEL_FORMAT	Opt	Text	TAB_DELIMITED	P
NEW_LINK_DIRECTION_FILE_1	Opt	New		O
NEW_LINK_DIRECTION_FORMAT_1	Opt	Text	TAB_DELIMITED	P
NEW_LINK_DIRECTION_FIELD_1	Opt	Text		P
NEW_LINK_DIRECTION_INDEX_1	Opt	Bool		P
NEW_LINK_DATA_FILE_1	Opt	New		O
NEW_LINK_DATA_FORMAT_1	Opt	Text	TAB_DELIMITED	P
NEW_LINK_DATA_FIELD_1	Opt	Text		P
NEW_PERFORMANCE_DATA_FILE	Opt	New		O
NEW_PERFORMANCE_DATA_FORMAT	Opt	Text	TAB_DELIMITED	P
NEW_TURN_VOLUME_FILE	Opt	New		O
NEW_TURN_VOLUME_FORMAT	Opt	Text	TAB_DELIMITED	P
TURN_NODE_RANGE	Opt	List	ALL	P
LINKSUM_REPORT_1	Opt	Text		P

Report Options:

TOP_100_LINK_FLOWS
 TOP_100_LANE_FLOWS
 TOP_100_PERIOD_FLOWS
 TOP_100_SPEED_REDUCIONS
 TOP_100_TRAVEL_TIME_RATIOS
 TOP_100_VOLUME_CAPACITY_RATIOS
 TOP_100_TRAVEL_TIME_CHANGES
 TOP_100_VOLUME_CHANGES
 LINK_VOLUME_GREATER_THAN_*
 GROUP_VOLUME_GREATER_THAN_*
 LINK_EQUIVALENCE
 ZONE_EQUIVALENCE
 TRAVEL_TIME_DISTRIBUTION
 VOLUME_CAPACITY_RATIOS
 TRAVEL_TIME_CHANGES
 VOLUME_CHANGES
 LINK_GROUP_TRAVEL_TIME
 NETWORK_PERFORMANCE_SUMMARY
 NETWORK_PERFORMANCE_DETAILS
 RELATIVE_GAP_REPORT

Notes

Each '_FILE' key has a corresponding '_FORMAT' key. The following file formats can be used for input and output files: TEXT, BINARY, FIXED_COLUMN, COMMA_DELIMITED, SPACE_DELIMITED, TAB_DELIMITED, CSV_DELIMITED, DBASE, SQLITE3, VERSION3

Control Key Changes in LinkSum Version 5

A number of keys have changed from V4 to V5. Refer to the File Reference and Parameter Reference documents for additional details. In addition to the network file name changes (e.g., NET_NODE_TABLE to NODE_FILE), specific examples include the following control key and file name changes (V4 → V5):

- LINK_DELAY_FILE -> PERFORMANCE_FILE
- PREVIOUS_LINK_DELAY_FILE->COMPARE_PERFORMANCE_FILE
- SUMMARY_TIME_PERIODS->SUMMARY_TIME_RANGES
- SUMMARY_TIME_INCREMENTS->SUMMARY_TIME_INCREMENT
- MINIMUM_LINK_VOLUME->MINIMUM_LINK_FLOW
- ACTIVITY_LOCATION_FIELDS->COPY_LOCATION_FIELDS
- [List of fields from the activity location file that will be considered in creating the NEW_LINK_ACTIVITY_FILE. Required if a new link activity file is being generated]

The following keys, used in version 4, are not used in version 5:

- CONGESTED_TIME_RATIO
- NEW_LINK_VOLUME_FILE
- NEW_LINK_SPEED_FILE
- NEW_LINK_TRAVEL_TIME_FILE
- NEW_LINK_VC_RATIO_FILE
- NEW_LINK_TIME_RATIO_FILE

New keys in version 5 include

- REPORT_DIRECTORY
- PAGE_LENGTH
- MODEL_START_TIME
- MODEL_END_TIME
- MODEL_TIME_INCREMENT
- UNITS_OF_MEASURE
- SAVE_LANE_USE_FLOWS
- NEW_TURN_VOLUME_FILE
- NEW_TURN_VOLUME_FORMAT
- TURN_NODE_RANGE

Example

Demonstrating the reports and output files

TITLE	LinkSum Default Control Keys
TIME_OF_DAY_FORMAT	HOURLY_CLOCK
MODEL_START_TIME	6:00 //---- >= 0 [seconds], 0.0 [hours], 0:00

```

MODEL_END_TIME          10:00                //---- > [model_start_time]
MODEL_TIME_INCREMENT    15 minutes           //---- 0, 2..240 minutes

#---- System File Keys ----

NODE_FILE               network/node.txt
LINK_FILE               network/link.txt
CONNECTION_FILE         network/connection.txt
POCKET_FILE             network/pocket.txt
PARKING_FILE            network/parking.txt
LOCATION_FILE             network/location2.txt
PERFORMANCE_FILE        results/6AON.linkdelay.txt
SAVE_LANE_USE_FLOWS     FALSE    //- TRUE/FALSE, YES/NO, 1/0, T/F, Y/N

COMPARE_PERFORMANCE_FILE results/5.linkdelay.txt

#---- Data Service Keys ----

DAILY_WRAP_FLAG         FALSE
SUMMARY_TIME_RANGES     7.0..9.0 hours
SUMMARY_TIME_INCREMENT  15 minutes    //---- 0, 2..240 minutes

#---- Select Service Keys ----

SELECT_FACILITY_TYPES   ALL            //---- FREEWAY..EXTERNAL

#---- LinkSum Control Keys ----

MINIMUM_LINK_FLOW       2.0             //---- >= 0
SELECT_BY_LINK_GROUP    FALSE
COPY_LOCATION_FIELDS    FALSE
NEW_ZONE_TRAVEL_FILE    results/6.zonetraavel.txt
NEW_ZONE_TRAVEL_FORMAT  TAB_DELIMITED
NEW_GROUP_TRAVEL_FORMAT TAB_DELIMITED
NEW_LINK_DIRECTION_FILE_1 results/6.linkdir.txt
NEW_LINK_DIRECTION_FORMAT_1 TAB_DELIMITED
NEW_LINK_DIRECTION_FIELD_1 VC_RATIO
#---- Possible values include FLOW, TRAVEL_TIME, VC_RATIO, TIME_RATIO, SPEED,
#    DELAY, DENSITY, MAX_DENSITY, QUEUE, MAX_QUEUE, CYCLE_FAILURE,
#    VMT, VHT, CONGESTED_TIME, CONGESTED_VMT, CONGESTED_VHT
NEW_LINK_DIRECTION_INDEX_1 FALSE
NEW_LINK_DIRECTION_FIELD_2 FLOW
NEW_LINK_DIRECTION_INDEX_2 FALSE
NEW_LINK_DATA_FILE_1    results/6.linkdata.txt
NEW_LINK_DATA_FORMAT_1  TAB_DELIMITED
NEW_LINK_DATA_FIELD_1   VC_RATIO
NEW_PERFORMANCE_DATA_FORMAT TAB_DELIMITED
NEW_TURN_VOLUME_FORMAT  TAB_DELIMITED
LINKSUM_REPORT_1        TOP_100_LINK_FLOWS
LINKSUM_REPORT_2        TOP_100_LANE_FLOWS
LINKSUM_REPORT_3        TOP_100_PERIOD_FLOWS
LINKSUM_REPORT_4        TOP_100_SPEED_REDUCTIONS
LINKSUM_REPORT_5        TOP_100_TRAVEL_TIME_RATIOS

```

LINKSUM_REPORT_6	TOP_100_VOLUME_CAPACITY_RATIOS
LINKSUM_REPORT_7	TOP_100_TRAVEL_TIME_CHANGES
LINKSUM_REPORT_8	TOP_100_VOLUME_CHANGES
LINKSUM_REPORT_9	LINK_VOLUME_GREATER_THAN_1000
LINKSUM_REPORT_11	TRAVEL_TIME_DISTRIBUTION
LINKSUM_REPORT_12	VOLUME_CAPACITY_RATIOS
LINKSUM_REPORT_13	TRAVEL_TIME_CHANGES
LINKSUM_REPORT_14	VOLUME_CHANGES
LINKSUM_REPORT_16	NETWORK_PERFORMANCE_SUMMARY
LINKSUM_REPORT_17	NETWORK_PERFORMANCE_DETAILS
LINKSUM_REPORT_18	RELATIVE_GAP_REPORT

Resulting .prn file with excerpts from the various reports

```
*****
|                                     |
|      LinkSum - Version 5.0.12      |
| Copyright 2012 by TRANSIMS Open-Source |
|      Tue Jun 18 08:58:38 2013      |
|                                     |
*****
```

```
Control File = 6.LinkSum.ct1
Report File  = 6.LinkSum.prn (Create)
```

LinkSum Default Control Keys

```
Project Directory = ../
Default File Format = TAB_DELIMITED
Time of Day Format = HOUR_CLOCK
Model Start Time = 6:00
Model End Time = 10:00
Model Time Increment = 15.00 minutes
Units of Measure = ENGLISH
Random Number Seed = 1371560318
Number of Threads = 2
Warning: LinkSum is Not Thread Enabled
```

Input System Network Files:

```
Node File = ../network/node.txt
Link File = ../network/link.txt
Connection File = ../network/connection.txt
Location File = ../network/location2.txt
```

Input System Demand Files:

```
Performance File = ../results/6AON.linkdelay.txt
```

```
Save Lane Use Flows = FALSE
```

Data Service Controls:

```
Daily Wrap Flag = FALSE
Summary Time Increment = 15.00 minutes
Summary Time Ranges = 7.0..9.0 hours
Number of Time Periods = 8
```

Select Service Controls:
Select Facility Types = ALL

LinkSum Control Keys:

Compare Performance File = ../results/5.linkdelay.txt
Minimum Link Flow = 2
Select By Link Group = FALSE

New Zone Travel File = ../results/6.zonetraavel.txt

New Link Direction File #1 = ../results/6.linkdir.txt
New Link Direction Field #1 = VC_RATIO
New Link Direction Index #1 = FALSE

New Link Data File #1 = ../results/6.linkdata.txt
New Link Data Field = VC_RATIO

LinkSum Reports:

1. TOP_100_LINK_FLOWS
2. TOP_100_LANE_FLOWS
3. TOP_100_PERIOD_FLOWS
4. TOP_100_SPEED_REDUCATIONS
5. TOP_100_TRAVEL_TIME_RATIOS
6. TOP_100_VOLUME_CAPACITY_RATIOS
7. TOP_100_TRAVEL_TIME_CHANGES
8. TOP_100_VOLUME_CHANGES
9. LINK_VOLUME_GREATER_THAN_1000
11. TRAVEL_TIME_DISTRIBUTION
12. VOLUME_CAPACITY_RATIOS
13. TRAVEL_TIME_CHANGES
14. VOLUME_CHANGES
16. NETWORK_PERFORMANCE_SUMMARY
17. NETWORK_PERFORMANCE_DETAILS
18. RELATIVE_GAP_REPORT

Number of Node File Records = 57

Number of Link File Records = 72
Number of Directional Links = 114

Number of Connection File Records = 190

Number of Location File Records = 196

Number of Performance File Records = 1015
Number of Performance Data Records = 912
Number of Link Direction Records = 912
Number of Link Connection Records = 0

Number of Summary Time Periods = 8
Percent of Link Periods with Travel Time Data = 100.0%
Percent of Time Periods with Performance Data = 100.0%

Number of Compare Performance File Records = 1015
Number of Performance Data Records = 912
Number of Link Direction Records = 912
Number of Link Connection Records = 0

Number of Summary Time Periods = 8
 Percent of Link Periods with Travel Time Data = 100.0%
 Percent of Time Periods with Performance Data = 100.0%

Number of Link Locations = 1000
 Number of Selected Zones = 30

Number of Zone Travel Records = 30

Number of New Link Direction File #1 Records = 114
 Number of Time Periods = 8

Number of New Link Data File #1 Records = 72
 Number of Time Periods = 8

Top 100 Link Flow Report

Link	From	To-Node	Time-of-Day	Flow
37	115	122	7:45..8:00	697.0
23	107	126	7:45..8:00	661.0
53	136	137	7:45..8:00	640.0
60	146	147	7:45..8:00	628.0
...				
44	115	119	7:45..8:00	156.0
19	107	103	8:00..8:15	149.0
45	116	120	7:45..8:00	147.0
25	127	108	8:00..8:15	144.0
27	106	111	7:45..8:00	141.0

Number of Records in the Report = 100

Top 100 Lane Flow Report

Link	From	To-Node	Time-of-Day	Flow
66	127	136	7:45..8:00	395.0
37	115	122	7:45..8:00	349.0
23	107	126	7:45..8:00	330.0
35	123	124	7:45..8:00	293.0
33	110	125	7:45..8:00	281.0
68	126	142	7:45..8:00	266.0
70	124	144	7:45..8:00	265.0
28	112	107	7:45..8:00	260.0
35	124	123	8:00..8:15	253.0
64	122	134	7:45..8:00	251.0
...				
13	30	130	7:45..8:00	68.0
31	111	112	7:30..7:45	68.0
20	105	104	7:45..8:00	67.0

Number of Records in the Report = 100

Top 100 Period Flow Report

Link	From	To-Node	Time-of-Day	Flow
37	115	122	7:45..8:00	697.0
23	107	126	7:45..8:00	660.8
53	136	137	7:45..8:00	640.0

37	115	122	8:00..8:15	631.3
60	146	147	7:45..8:00	628.0
...				
58	144	145	7:15..7:30	367.0
36	123	122	7:30..7:45	366.3
41	115	116	7:45..8:00	365.3
23	126	107	7:45..8:00	364.8
33	110	125	7:00..7:15	364.8
14	137	23	7:15..7:30	364.1

Number of Records in the Report = 100

Top 100 Speed Reductions Report

Link	From	To-Node	Time-of-Day	Base	Loaded	Percent
66	127	136	7:45..8:00	50.7	12.8	74.8
66	127	136	8:00..8:15	50.7	16.9	66.7
37	115	122	7:45..8:00	50.7	18.2	64.1
23	107	126	7:45..8:00	50.9	20.8	59.1
...						
41	115	116	7:45..8:00	51.4	45.3	11.9
23	126	107	7:45..8:00	50.9	44.9	11.8
33	110	125	7:00..7:15	50.7	44.7	11.8
33	125	110	7:45..8:00	50.7	44.7	11.8

Number of Records in the Report = 100

Top 100 Travel Time Ratios

Link	From	To-Node	Time-of-Day	Base	Loaded	Percent
66	127	136	7:45..8:00	19.4	76.7	395.4
66	127	136	8:00..8:15	19.4	58.1	299.5
37	115	122	7:45..8:00	19.4	54.1	278.9
23	107	126	7:45..8:00	29.0	70.9	244.5
66	127	136	7:30..7:45	19.4	47.3	243.8
37	115	122	8:00..8:15	19.4	42.8	220.6
37	115	122	7:30..7:45	19.4	40.3	207.7
...						
36	123	122	8:00..8:15	9.8	11.2	114.3
65	135	127	7:45..8:00	19.4	22.1	113.9
41	115	116	7:45..8:00	63.8	72.4	113.5
23	126	107	7:45..8:00	29.0	32.9	113.4
33	110	125	7:00..7:15	19.4	22.0	113.4
33	125	110	7:45..8:00	19.4	22.0	113.4

Number of Records in the Report = 100

Top 100 Volume Capacity Ratios

Link	From	To-Node	Time-of-Day	Capacity	Volume	Ratio
66	127	136	7:45..8:00	250	395	1.58
66	127	136	8:00..8:15	250	358	1.43
37	115	122	7:45..8:00	500	697	1.39
23	107	126	7:45..8:00	500	661	1.32
66	127	136	7:30..7:45	250	330	1.32
37	115	122	8:00..8:15	500	631	1.26
...						

21	105	106	7:45..8:00	500	373	0.75
65	135	127	7:45..8:00	250	184	0.74
36	123	122	7:30..7:45	500	366	0.73
23	126	107	7:45..8:00	500	365	0.73
33	110	125	7:00..7:15	500	365	0.73
41	115	116	7:45..8:00	500	365	0.73

Number of Records in the Report = 100

Top 100 Travel Time Changes

Link	From	To-Node	Time-of-Day	Previous	Current	Percent
66	127	136	7:45..8:00	57.2	76.7	34.1
66	127	136	8:00..8:15	45.5	58.1	27.7
30	111	110	8:00..8:15	77.1	96.1	24.6
30	110	111	7:45..8:00	75.4	93.4	23.9
38	111	116	7:45..8:00	100.6	122.5	21.8
38	116	111	7:45..8:00	98.4	117.4	19.3
...						
33	125	110	7:00..7:15	19.9	20.0	0.5
37	122	115	8:45..9:00	19.4	19.5	0.5
37	115	122	8:30..8:45	20.4	20.5	0.5
42	117	116	7:00..7:15	65.9	66.2	0.5

Number of Records in the Report = 100

Top 100 Volume Changes

Link	From	To-Node	Time-of-Day	Previous	Current	Percent
38	116	111	8:00..8:15	147	235	59.9
38	111	116	7:45..8:00	192	283	47.4
27	111	106	7:45..8:00	147	214	45.6
38	116	111	7:45..8:00	193	271	40.4
21	106	105	7:45..8:00	331	438	32.3
30	110	111	7:45..8:00	228	299	31.1
30	111	110	8:00..8:15	241	305	26.6
...						
27	111	106	8:30..8:45	38	41	7.9
38	111	116	7:15..7:30	63	68	7.9
7	121	27	8:00..8:15	64	69	7.8
43	118	117	7:30..7:45	180	194	7.8
12	33	104	8:45..9:00	13	14	7.7

Number of Records in the Report = 100

Link Volumes Greater Than 1000

Link	A-Node	B-Node	Time-of-Day	Volume_AB	Volume_BA
------	--------	--------	-------------	-----------	-----------

Number of Records in the Report = 72

Travel Time Distribution

Time Period	Loaded / Base Travel Time Ratio									Lane KM
	-----Percentile Distribution by Time Period-----									
	50%	65%	70%	75%	80%	85%	90%	95%	99%	
7:00..7:15	1.00	1.00	1.00	1.00	1.01	1.01	1.03	1.03	1.09	494
7:15..7:30	1.00	1.00	1.00	1.02	1.05	1.06	1.10	1.15	1.33	494
7:30..7:45	1.00	1.01	1.03	1.06	1.10	1.12	1.18	1.23	1.64	494
7:45..8:00	1.01	1.04	1.07	1.13	1.20	1.27	1.37	1.46	1.75	494
8:00..8:15	1.00	1.02	1.05	1.08	1.09	1.16	1.25	1.37	1.73	494
8:15..8:30	1.00	1.00	1.00	1.01	1.02	1.03	1.05	1.08	1.21	494
8:30..8:45	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.02	494
8:45..9:00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	494
Total	1.00	1.00	1.00	1.01	1.02	1.05	1.10	1.21	1.46	3953

Volume Capacity Ratio Distribution

Time Period	Volume / Capacity Ratio									Lane KM
	-----Percentile Distribution by Time Period-----									
	50%	65%	70%	75%	80%	85%	90%	95%	99%	
7:00..7:15	0.20	0.25	0.31	0.36	0.39	0.44	0.50	0.54	0.67	494
7:15..7:30	0.27	0.36	0.38	0.47	0.57	0.60	0.69	0.76	0.91	494
7:30..7:45	0.35	0.45	0.53	0.60	0.69	0.72	0.79	0.84	1.08	494
7:45..8:00	0.42	0.54	0.63	0.73	0.81	0.88	0.94	1.00	1.12	494
8:00..8:15	0.38	0.46	0.58	0.65	0.67	0.77	0.85	0.94	1.12	494
8:15..8:30	0.24	0.32	0.34	0.37	0.48	0.54	0.59	0.66	0.82	494
8:30..8:45	0.14	0.19	0.21	0.23	0.28	0.29	0.34	0.37	0.46	494
8:45..9:00	0.07	0.10	0.10	0.13	0.15	0.16	0.19	0.21	0.25	494
Total	0.24	0.34	0.37	0.43	0.48	0.57	0.69	0.82	1.00	3953

Time Change Distribution

Time Period	Time Change * 100 / Previous Time									Lane MI
	-----Percentile Distribution by Time Period-----									
	50%	65%	70%	75%	80%	85%	90%	95%	99%	
7:00..7:15	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.4	0.7	94
7:15..7:30	0.0	0.1	0.2	0.4	0.6	1.3	2.0	2.8	3.6	94
7:30..7:45	0.1	0.5	0.8	1.0	2.0	2.4	3.7	5.2	7.4	94
7:45..8:00	0.2	2.1	3.5	4.1	5.1	7.3	10.1	19.3	23.8	94
8:00..8:15	0.1	0.7	0.8	1.4	1.6	2.6	4.3	7.6	24.6	94
8:15..8:30	0.0	0.1	0.1	0.1	0.4	0.4	0.4	0.7	1.2	94
8:30..8:45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	94
8:45..9:00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	94
Total	0.0	0.0	0.1	0.1	0.4	0.8	2.0	4.5	11.5	749

Volume Change Distribution

	Volume Change * 100 / Previous Volume									
	-----Percentile Distribution by Time Period-----									Lane
Time Period	50%	65%	70%	75%	80%	85%	90%	95%	99%	MI
7:00..7:15	0.7	1.4	1.7	1.9	2.9	3.3	4.0	6.2	7.9	94
7:15..7:30	2.4	3.7	3.9	4.9	5.8	6.8	7.5	8.3	13.7	94
7:30..7:45	2.8	5.0	6.1	6.7	7.8	8.9	10.4	12.7	19.4	94
7:45..8:00	5.2	7.7	9.7	10.7	13.8	14.5	19.2	31.2	45.6	94
8:00..8:15	4.1	6.5	6.9	7.9	8.6	9.3	10.6	15.2	26.5	94
8:15..8:30	1.8	2.5	3.0	3.3	3.6	4.2	4.9	6.6	11.4	94
8:30..8:45	0.4	1.5	1.6	1.7	2.1	2.5	3.2	4.9	7.9	94
8:45..9:00	0.0	0.9	1.2	1.4	2.5	3.0	3.4	4.7	5.9	94
Total	1.9	3.2	3.5	4.4	5.4	6.8	8.2	11.6	22.2	749

Network Performance Summary

Time Period	Lane Miles	Vehicle Miles	Vehicle Hours	Miles /Hour	Hours of Delay	Number of Turns
7:00..7:15	93.58	6062.21	164.15	36.93	3.46	0
7:15..7:30	93.58	8415.54	238.81	35.24	16.07	0
7:30..7:45	93.58	10118.55	304.00	33.28	34.88	0
7:45..8:00	93.58	12084.54	395.19	30.58	74.34	0
8:00..8:15	93.58	10838.60	332.89	32.56	46.43	0
8:15..8:30	93.58	7430.05	203.99	36.42	8.67	0
8:30..8:45	93.58	4180.59	111.72	37.42	0.57	0
8:45..9:00	93.58	2213.74	59.55	37.18	0.02	0
Total	93.58	61343.83	1810.29	33.89	184.44	0

Network Performance Details

	Current	Previous	Difference	Percent
Time Period	7:00..7:15			
Number of Links	114.00			
Number of Roadway Miles	27.03			
Number of Lane Miles	93.58			
Vehicle Miles of Travel	6062.21	6029.15	33.06	(0.55%)
Vehicle Hours of Travel	164.15	163.03	1.12	(0.69%)
Vehicle Hours of Delay	3.46	3.38	0.09	(2.52%)
Number of Queued Vehicles	0.00	0.00	0.00	(0.00%)
Maximum Queued Vehicles	0.00	0.00	0.00	(0.00%)
Number of Cycle Failures	0.00	0.00	0.00	(0.00%)
Number of Turning Movements	0.00	0.00	0.00	(0.00%)
Average Link Time Ratio	1.01	1.01	0.00	(0.04%)
Average Link Density (/ln-mi)	0.00	0.00	0.00	(0.00%)
Maximum Link Density (/ln-mi)	0.00	0.00	0.00	(0.00%)
Average Miles per Hour	36.93	36.98	-0.05	(-0.14%)

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	Current	Previous	Difference	Percent
Time Period	7:45..8:00			
Number of Links	114.00			
Number of Roadway Miles	27.03			
Number of Lane Miles	93.58			
Vehicle Miles of Travel	12084.54	11619.61	464.93	(4.00%)
Vehicle Hours of Travel	395.19	373.39	21.80	(5.84%)

Vehicle Hours of Delay	74.34	66.75	7.60	(11.38%)
Number of Queued Vehicles	0.00	0.00	0.00	(0.00%)
Maximum Queued Vehicles	0.00	0.00	0.00	(0.00%)
Number of Cycle Failures	0.00	0.00	0.00	(0.00%)
Number of Turning Movements	0.00	0.00	0.00	(0.00%)
Average Link Time Ratio	1.16	1.16	0.00	(0.01%)
Average Link Density (/ln-mi)	0.00	0.00	0.00	(0.00%)
Maximum Link Density (/ln-mi)	0.00	0.00	0.00	(0.00%)
Average Miles per Hour	30.58	31.12	-0.54	(-1.74%)

Time Period	8:00..8:15			
Number of Links	114.00			
Number of Roadway Miles	27.03			
Number of Lane Miles	93.58			
Vehicle Miles of Travel	10838.60	10435.97	402.62	(3.86%)
Vehicle Hours of Travel	332.89	316.03	16.86	(5.34%)
Vehicle Hours of Delay	46.43	40.64	5.79	(14.23%)
Number of Queued Vehicles	0.00	0.00	0.00	(0.00%)
Maximum Queued Vehicles	0.00	0.00	0.00	(0.00%)
Number of Cycle Failures	0.00	0.00	0.00	(0.00%)
Number of Turning Movements	0.00	0.00	0.00	(0.00%)
Average Link Time Ratio	1.11	1.11	0.01	(0.69%)
Average Link Density (/ln-mi)	0.00	0.00	0.00	(0.00%)
Maximum Link Density (/ln-mi)	0.00	0.00	0.00	(0.00%)
Average Miles per Hour	32.56	33.02	-0.46	(-1.40%)

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Time Period	8:45..9:00			
Number of Links	114.00			
Number of Roadway Miles	27.03			
Number of Lane Miles	93.58			
Vehicle Miles of Travel	2213.74	2200.05	13.69	(0.62%)
Vehicle Hours of Travel	59.55	59.10	0.44	(0.75%)
Vehicle Hours of Delay	0.02	0.02	0.00	(21.73%)
Number of Queued Vehicles	0.00	0.00	0.00	(0.00%)
Maximum Queued Vehicles	0.00	0.00	0.00	(0.00%)
Number of Cycle Failures	0.00	0.00	0.00	(0.00%)
Number of Turning Movements	0.00	0.00	0.00	(0.00%)
Average Link Time Ratio	1.00	1.00	0.00	(0.00%)
Average Link Density (/ln-mi)	0.00	0.00	0.00	(0.00%)
Maximum Link Density (/ln-mi)	0.00	0.00	0.00	(0.00%)
Average Miles per Hour	37.18	37.22	-0.05	(-0.13%)

Time Period	Total			
Number of Links	114.00			
Number of Roadway Miles	27.03			
Number of Lane Miles	93.58			
Vehicle Miles of Travel	61343.83	59989.64	1354.18	(2.26%)
Vehicle Hours of Travel	1810.29	1755.83	54.47	(3.10%)
Vehicle Hours of Delay	184.44	169.08	15.37	(9.09%)
Number of Queued Vehicles	0.00	0.00	0.00	(0.00%)
Maximum Queued Vehicles	0.00	0.00	0.00	(0.00%)
Number of Cycle Failures	0.00	0.00	0.00	(0.00%)
Number of Turning Movements	0.00	0.00	0.00	(0.00%)
Average Link Time Ratio	1.06	1.06	0.00	(0.07%)
Average Link Density (/ln-mi)	0.00	0.00	0.00	(0.00%)
Maximum Link Density (/ln-mi)	0.00	0.00	0.00	(0.00%)
Average Miles per Hour	33.89	34.17	-0.28	(-0.82%)

Relative Gap Report

Time Period	Current VHT	Previous VHT	Relative Gap	Current VMT	Previous VMT	Current Speed	Previous Speed	Difference
7:00..7:15	164.2	163.0	-0.006825	60622.1	60291.5	54.165	54.240	-0.075
7:15..7:30	238.8	234.8	-0.016768	84155.4	83113.2	51.684	51.915	-0.230
7:30..7:45	304.0	296.9	-0.023464	101185.5	98859.2	48.818	48.842	-0.024
7:45..8:00	395.2	373.4	-0.055161	120845.4	116196.1	44.850	45.642	-0.792
8:00..8:15	332.9	316.0	-0.050649	108386.0	104359.7	47.754	48.433	-0.679
8:15..8:30	204.0	201.7	-0.011199	74300.5	73536.7	53.421	53.470	-0.050
8:30..8:45	111.7	110.9	-0.007367	41805.9	41539.3	54.885	54.939	-0.055
8:45..9:00	59.5	59.1	-0.007463	22137.4	22000.5	54.525	54.595	-0.070
Total	1810.3	1755.8	-0.030089	613438.3	599896.4	49.700	50.110	-0.411

Tue Jun 18 08:58:38 2013 -- Process Complete with 1 Warning (0:00:00)