

TECHNICAL MEMORANDUM

To: CH2M Hill

From: DLZ Ohio, Inc.

Date: October 3, 2012

Subject: SCI-823 Portsmouth Bypass - Technical Memo of Traffic Data Collected

As an element of the Financial Analysis, Risk and Technical Feasibility Study, existing traffic conditions were collected, including traffic counts, count classification data (vehicle type), and travel time data. Mechanical (24-hour) counts (with classification data) were collected at 20 locations, manual classification counts were performed at five (5) locations and travel time studies were performed on US-23 and US-52/SR-104.

Traffic Counts

Traffic counts were conducted as follows:

- 48 hour mechanical/tube counts at 20 locations
- 5 manual classification counts - 2 hours for AM, PM and off peak periods at each location

Traffic Counts - Ohio Portsmouth

No.	Route	Location	Classification Location	Primary
1	US52	N of Rte 10	Y	P
2	US 23	N of Rte 10	Y	P
3	US 52	S of Rte 140		P
4	US 23	E of Rte 7		P
5	US 23	Chillicothe St. Bridge		P
6	Rte 8	E of John Rd		P
7	Rte 852	Carl D. Perkins Bridge		P
8	Rte 52	N of CR49		P
9	73/104	W of Scioto St.		P
10	US 52	W of Court St.		P
11	73/104	S of CR440		
12	73/104	N of Dry Run Rd (CR57)		P
13	Rte 104	S of Rte348		
14	Rte 104	N of Rte348	Y	P
15	Rte 348	W of Rte 104		P
16	US 23	S of CR25		P
17	US 23	S of Cook Rd	Y	P
18	US 23	S of Lowry Hollow Rd		

19	Rte 139	S of Hinkley Hollow		
20	Rte 139	N of CR168		
21	Rte 139	S of CR549		P
22	CR28	E of Cook Rd (CR30)		P
23	CR28	E of Rte 335		
24	Rte 335	N of CR28		P
25	Rte 335	N of Barklow Rd (Scioto County Airport)		P
26	Rte 335	N of Township Hwy234	Y	P
27	Rte 335	N of Dixon Mills Rd		
28	Rte 140	E of CR15		

Counts were conducted on a Tuesday and Wednesday with set up on Monday and tear down on Thursday. The traffic data was downloaded from the counters, checked and formatted for use. (See appendix for count location map)

Travel Time Studies

The limits for the travel time studies were US-23 between South Shore and Rosemont and US-52/SR-104 between Wheelersburg and West Portsmouth, with a target of 3-5 runs in each of the AM peak, PM peak and off-peak periods (2 routes x 2 directions x 3 periods x 3-5 runs = 36-60 runs). Collected data and results were formatted for use. (See Appendix for results)

Traffic Count Issues/Problems

No project is without issues or problems. The plan was to complete the counts and travel time studies over a two week period. Various issues occurred to collecting the traffic counts, forcing a third week to complete the data collection process.

- Issues on Monday 7/16/2012
 - After setting up tube counters at all locations, because of temperatures in the upper 90's and soft asphalt, tubes came up at locations(some nails pulled out of the pavement and in some instances the tape pulled up the asphalt):
 - 1 (loss of eastbound classification)
 - 3 – no data Westbound 2:00 – 6:00 PM, Eastbound 3:00 – 6:00 PM
 - 7 (no data before 9:00 PM)
 - 9 (no data before 8:00 PM)
 - 10 (no data)
 - Tubes came up partially at locations:
 - 8, 12 (no data loss)
 - All tubes were reset using new nails and existing tape from JAMAR, in time for the official count period at 12 am Tuesday.
- Issues Tuesday 7/17/2012
 - Tubes were inspected after 12:30 PM and all tubes were fine.
 - During PM Peak Travel Time Study, tubes were up at the following locations:
 - 1- 1 tube Eastbound (loss of classification)
 - 3 - 1 tube Westbound (no data from 4:00 – 5:00 PM)
 - 10 - Both tubes Eastbound (no data)

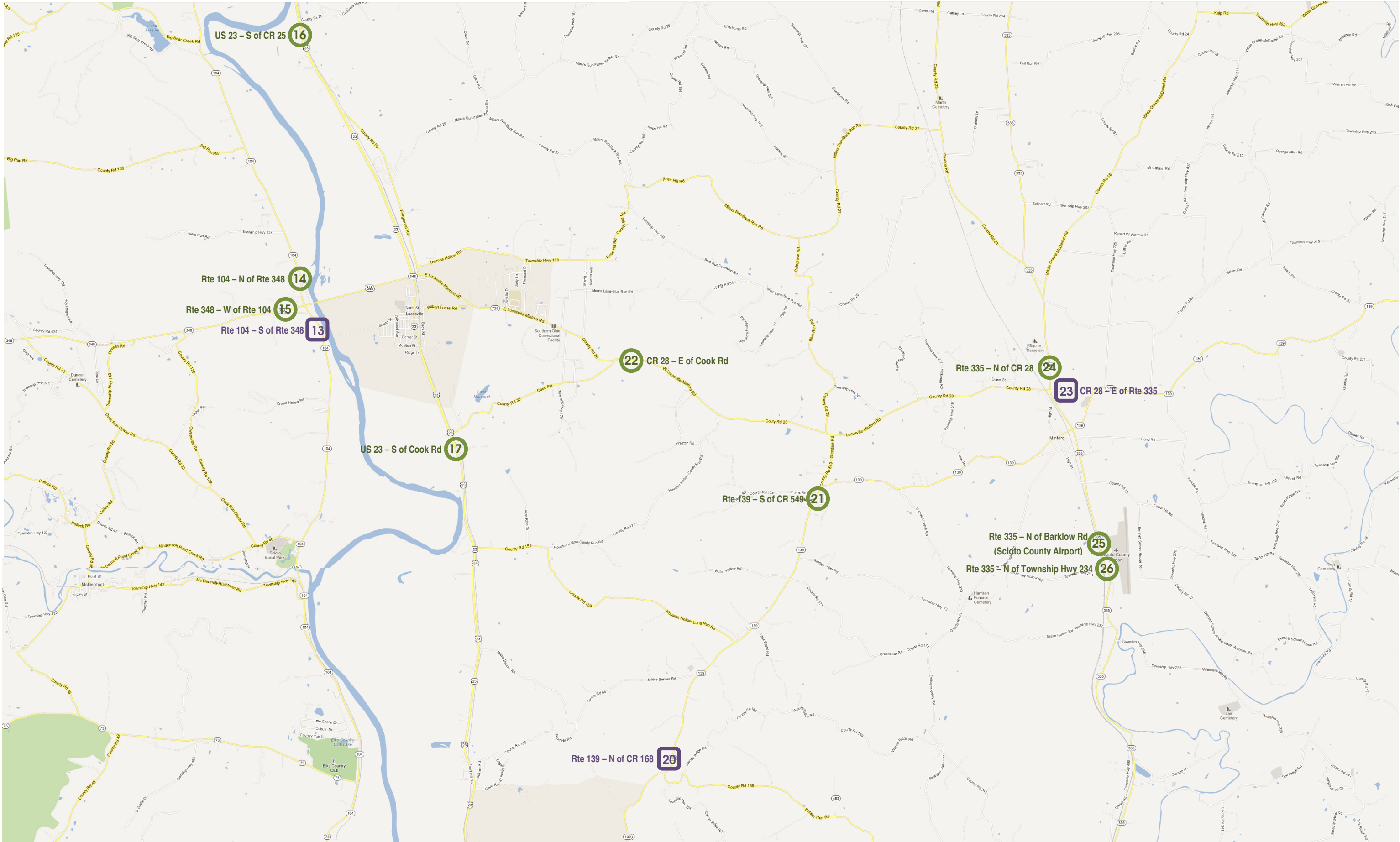
-
- 7 - 1 tube (no data from 5:00 – 6:00 PM)
 - 9 - 1 tube (no data loss)
 - All tubes were replaced after manual traffic counts and the travel time study was completed (after 6:00 PM) using new nails and duct tape.
 - Issues Wednesday 7/18/2012
 - At location #25, tubes were ripped in half due to a vehicle's tire "burnout". The vehicle turned right (off Barklow Rd.) onto Rte. 335 northbound, and traveled over the tubes. The tire marks left on the pavement extended from Barklow Rd. to north of the tube locations. There is no data available at location 25 after 5:00 PM Tuesday (7/17/12)
 - Location #1, US 52 North of Rte. 10, eastbound traffic count information had loss of classification (have volumes for eastbound traffic; have volumes and classification for westbound traffic).
 - Location #10, US 52 west of Portsmouth, one counter did not record. Will have to be reset next week.
 - Issues for week 2 (July 23-27)
 - Location #2, US 23 in Kentucky, SB tubes were destroyed by a contractor installing a rumble strip in the berm. This was recounted.
 - Location #5, at the US 23 bridge, the data indicates a problem. Because of the location of the bridge to the roadway, the tubes were installed in the roadway outside of the bridge approach to avoid putting nails in the concrete. The tubes were too close to the parallel roadway and did not count vehicles correctly forcing the resetting of these counters the next week. [A stronger tape was used and the tubes were put on on the bridge deck in week 3].
 - Week 3 was not planned or estimated. Seven locations were reset and there were no issues with the tubes; locations 2, 5, 10, 12, 21, 22, 25. There was a problem with downloading the data from one of the counters and it was sent to the manufacturer for them to download it, causing some delay and extra effort in processing that count.

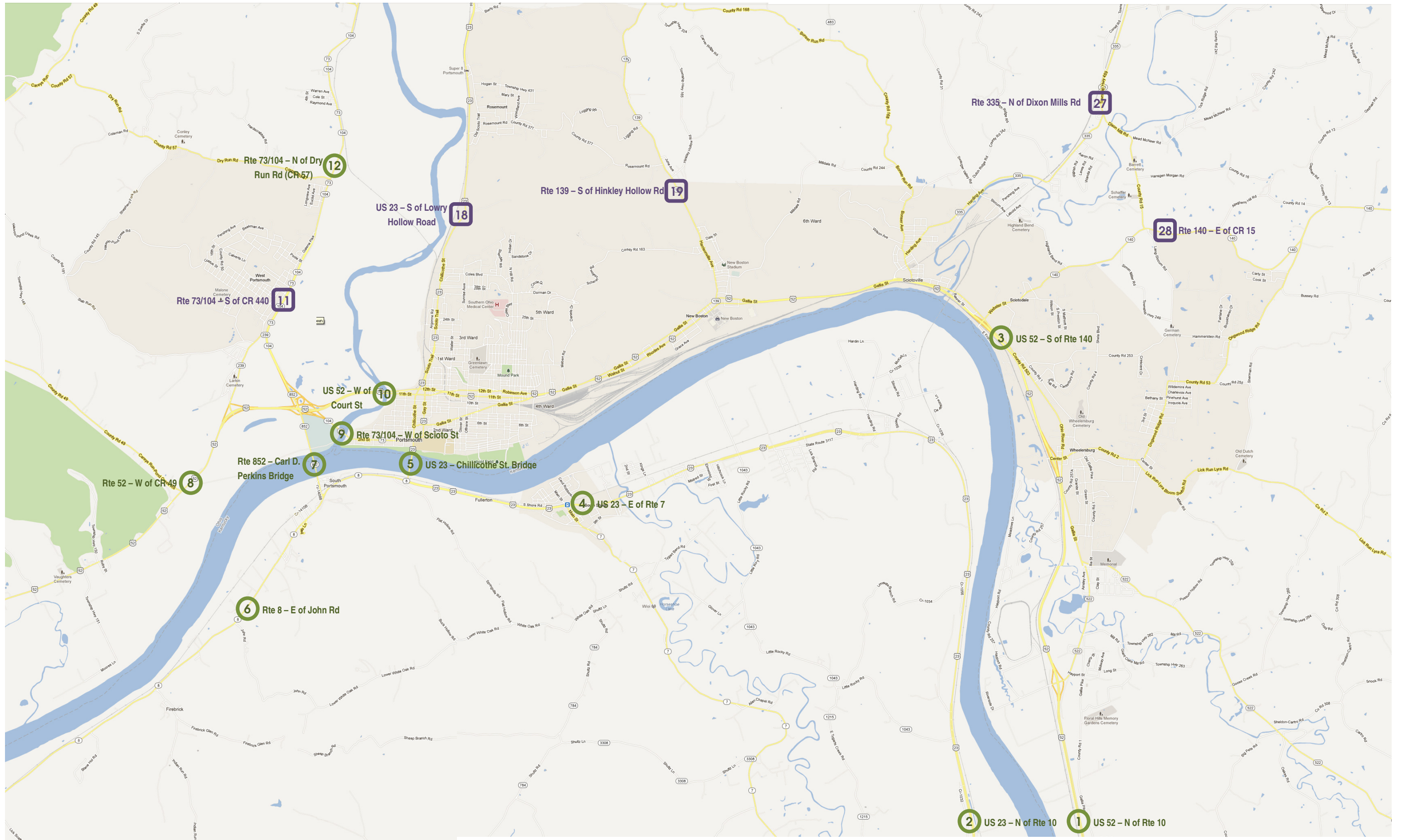
Even with the issues and delay, the collection of the traffic data for analyzing the existing conditions was successful and completed in a tight timeframe.

APPENDIX

- 24-Hour Count map
- Travel time results

Traffic Counts – Ohio Portsmouth (Top 20 Primary Locations # / Secondary Locations #)





1 US 52 - N of Rte 10

2 US 23 - N of Rte 10

3 US 52 - S of Rte 140

4 US 23 - E of Rte 7

5 US 23 - Chillicothe St. Bridge

6 Rte 8 - E of John Rd

8 Rte 52 - W of CR 49

9 Rte 73/104 - W of Scioto St

10 US 52 - W of Court St

11 Rte 73/104 - S of CR 440

12 Rte 73/104 - N of Dry Run Rd (CR 67)

18 US 23 - S of Lowry Hollow Road

19 Rte 139 - S of Hinkley Hollow Rd

27 Rte 335 - N of Dixon Mills Rd

28 Rte 140 - E of CR 15

DLZ OHIO, INC.
 SCI-823 Portsmouth Traffic Model
 Before Travel-Time Study

Study Name : **US 23 NB AM**
 Study Date : **7/31/2012**
 Page No. : **1**

Study Summary

Runs Used in This Study

Run Title	Start Date	Start Time	Length	Before/After	Run Type
US 23-NB-001	07/24/12	07:18	49757	Before	Primary
US 23-NB-002	07/24/12	07:56	49793	Before	Primary
US 23-NB-003	07/24/12	08:33	49891	Before	Primary
US 23-NB-004	07/25/12	07:42	49833	Before	Primary
US 23-NB-005	07/25/12	08:17	49902	Before	Primary

Node Info

#	Len	Name
1	0	
2	152	KY 1043
3	10929	SR 7
4	9681	SR 8
5	2406	US 73
6	3174	US 52 EB
7	7367	COLES BLVD
8	16126	CR 160

Length of Study Route = 49,835 feet

Notes:

DLZ OHIO, INC.
 SCI-823 Portsmouth Traffic Model
 Before Travel-Time Study

Study Name : **US 23 NB AM**
 Study Date : **7/31/2012**
 Page No. : **2**

Overall Output Statistics

Node #	Length	Node	Travel Time	# of Stops	Avg Speed	Total Delay	Time <= 0 MPH	Time <= 35 MPH	Time <= 55 MPH
1	0								
2	152	KY 1043	3.0	0.0	34.5	0.0	0.0	0.0	3.0
3	10929	SR 7	158.2	0.4	47.1	0.0	7.6	14.2	158.2
4	9681	SR 8	131.8	0.0	50.1	0.0	0.0	10.0	121.0
5	2406	US 73	55.4	0.6	29.6	8.4	0.2	33.2	55.4
6	3174	US 52 EB	107.8	0.8	20.1	45.8	7.0	107.8	107.8
7	7367	COLES BLVD	201.4	1.6	24.9	57.4	32.0	140.6	201.4
8	16126	CR 160	256.4	0.4	42.9	0.0	4.2	34.0	252.0
Total	49,835		914.0	3.8	37.2	111.6	51.0	339.8	898.8

Stats based on 5 BEFORE runs.
 Stops based on a Stop Speed of 5 MPH.
 Total Delay based on a Normal Speed of 35 MPH.

DLZ OHIO, INC.
 SCI-823 Portsmouth Traffic Model
 Before Travel-Time Study

Study Name : **US 23 NB AM**
 Study Date : **7/31/2012**
 Page No. : **3**

Fuel Consumption & Emissions

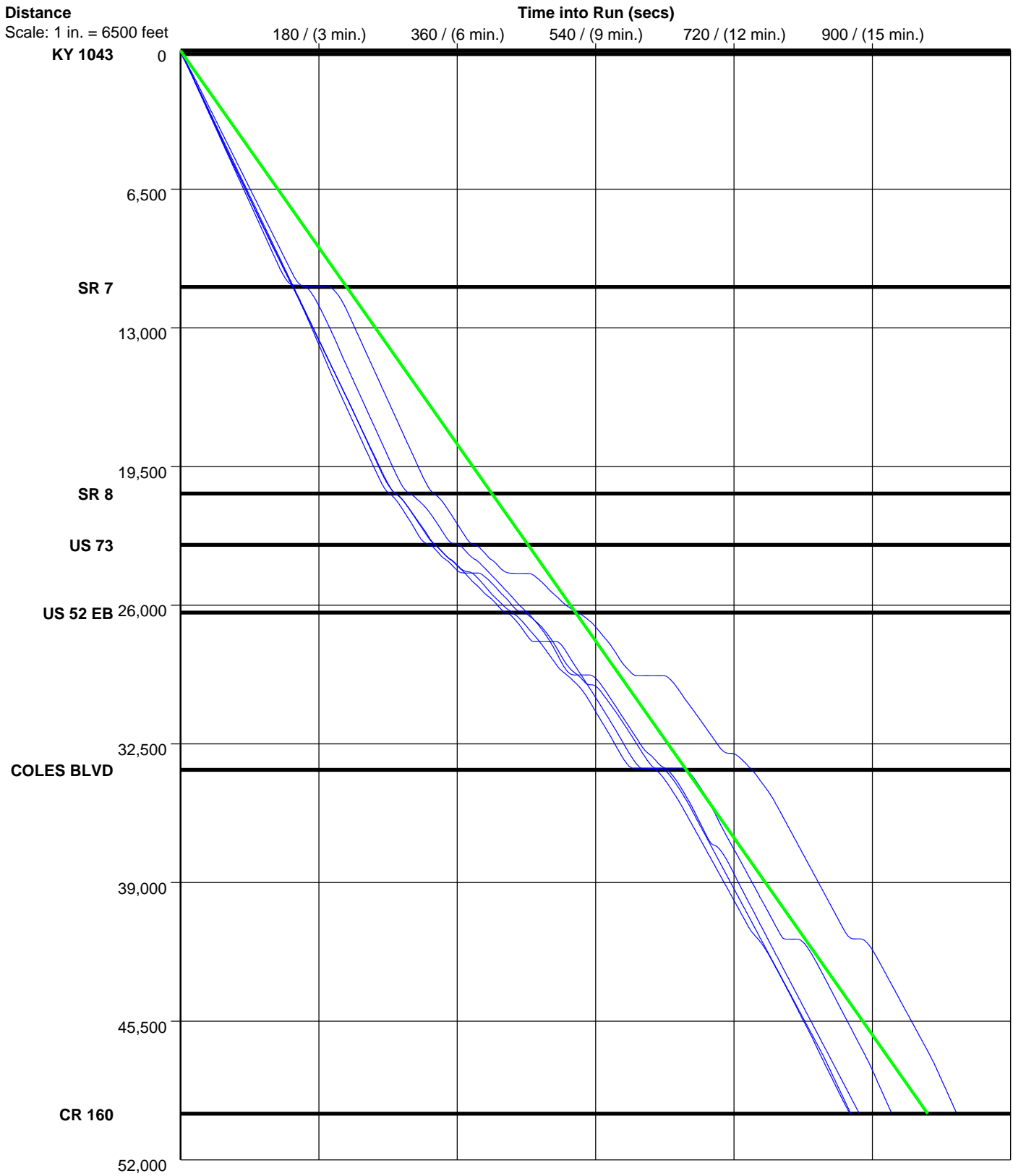
Node #	Length	Node Name	Fuel (gal)	HC (grams)	CO (grams)	NOx (grams)
1	0					
2	152	KY 1043	0.0016	0.0668	0.7725	0.0152
3	10929	SR 7	0.0933	3.9189	47.5982	1.0384
4	9681	SR 8	0.0846	4.0910	53.0672	1.6688
5	2406	US 73	0.0229	2.2639	21.4922	1.4613
6	3174	US 52 EB	0.0337	3.4561	26.9104	1.9430
7	7367	COLES BLVD	0.0739	6.9181	66.4297	3.8207
8	16126	CR 160	0.1398	9.4920	117.0355	4.9189
Total	49,835		0.4499	30.2068	333.3057	14.8662

Stats based on 5 BEFORE runs.

DLZ OHIO, INC.
 SCI-823 Portsmouth Traffic Model
 Before Travel-Time Study

Study Name : **US 23 NB AM**
 Study Date : **7/31/2012**
 Page No. : **4**

Time/Space Trajectories of All Runs



Solid Line is Normal Speed of 35 MPH

DLZ OHIO, INC.
 SCI-823 Portsmouth Traffic Model
 Before Travel-Time Study

Study Name : **US 23 NB OFF**
 Study Date : **8/1/2012**
 Page No. : **1**

Study Summary

Runs Used in This Study

Run Title	Start Date	Start Time	Length	Before/After	Run Type
US 23-NB-001	07/24/12	09:48	49851	Before	Primary
US 23-NB-002	07/24/12	10:24	49846	Before	Primary
US 23-NB-003	07/24/12	11:00	49754	Before	Primary
US 23-NB-004	07/25/12	10:18	49831	Before	Primary
US 23-NB-005	07/25/12	10:53	49867	Before	Primary

Node Info

#	Len	Name
1	0	
2	144	KY 1043
3	10973	SR 7
4	9697	SR 8
5	2388	US 73
6	3193	US 52 EB
7	7338	COLES BLVD
8	16096	CR 160

Length of Study Route = 49,829 feet

Notes:

DLZ OHIO, INC.
 SCI-823 Portsmouth Traffic Model
 Before Travel-Time Study

Study Name : **US 23 NB OFF**
 Study Date : **8/1/2012**
 Page No. : **2**

Overall Output Statistics

Node #	Length	Node	Travel Time	# of Stops	Avg Speed	Total Delay	Time <= 0 MPH	Time <= 35 MPH	Time <= 55 MPH
1	0								
2	144	KY 1043	2.4	0.0	40.9	0.0	0.0	0.0	2.4
3	10973	SR 7	157.8	0.4	47.4	0.0	7.2	14.4	149.2
4	9697	SR 8	132.6	0.0	49.9	0.0	0.0	11.6	84.2
5	2388	US 73	60.2	0.8	27.0	13.2	1.2	49.6	60.2
6	3193	US 52 EB	122.2	1.4	17.8	59.8	12.4	122.2	122.2
7	7338	COLES BLVD	218.4	2.0	22.9	75.4	33.6	184.6	218.4
8	16096	CR 160	243.6	0.2	45.1	0.0	0.6	21.2	241.0
Total	49,829		937.2	4.8	36.3	148.4	55.0	403.6	877.6

Stats based on 5 BEFORE runs.
 Stops based on a Stop Speed of 5 MPH.
 Total Delay based on a Normal Speed of 35 MPH.

DLZ OHIO, INC.
 SCI-823 Portsmouth Traffic Model
 Before Travel-Time Study

Study Name : **US 23 NB OFF**
 Study Date : **8/1/2012**
 Page No. : **3**

Fuel Consumption & Emissions

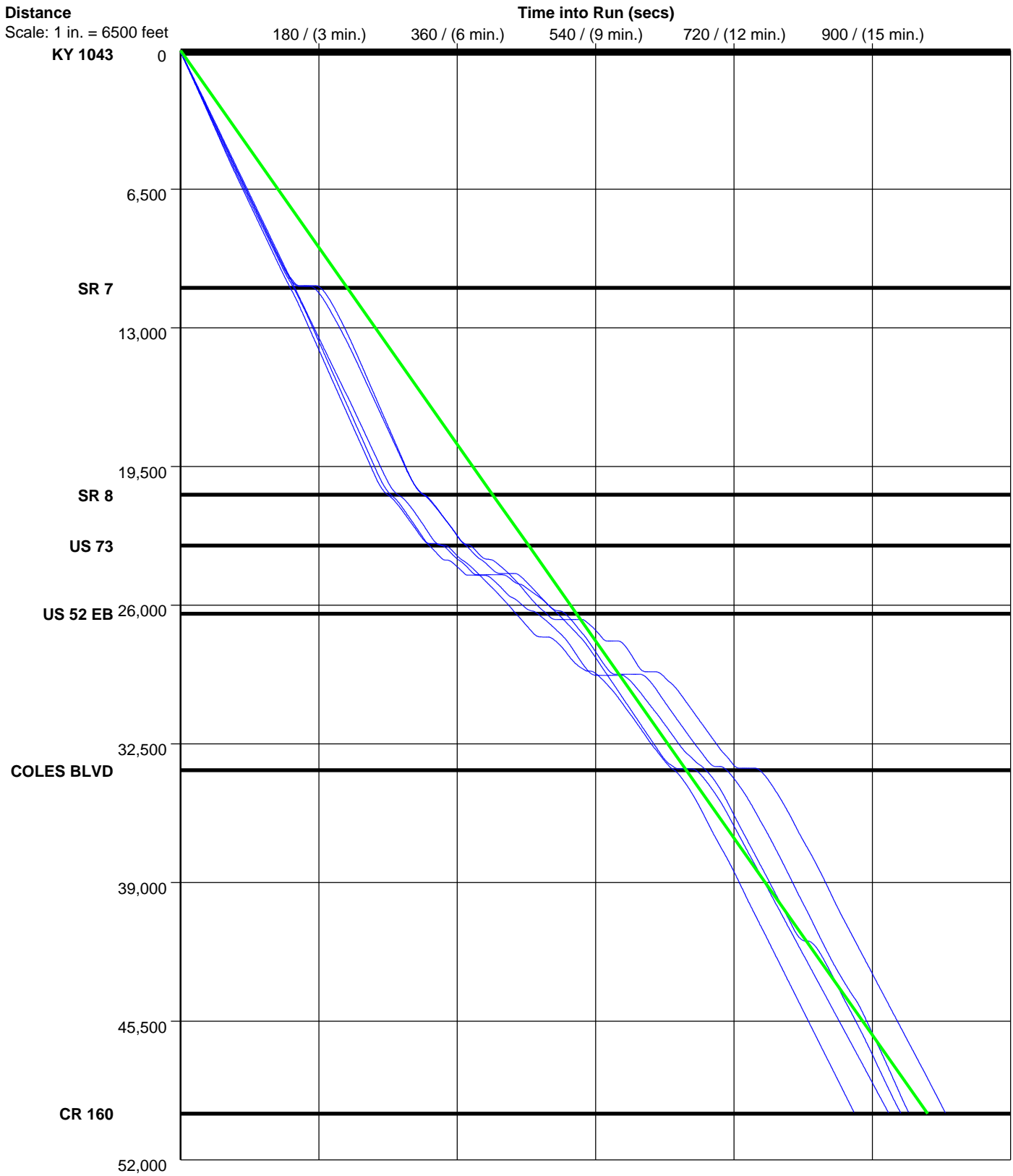
Node #	Length	Node Name	Fuel (gal)	HC (grams)	CO (grams)	NOx (grams)
1	0					
2	144	KY 1043	0.0015	0.1124	1.7283	0.0622
3	10973	SR 7	0.0947	4.2077	52.7410	1.3312
4	9697	SR 8	0.0850	4.0948	52.9561	1.6727
5	2388	US 73	0.0223	2.1342	19.5275	1.2475
6	3193	US 52 EB	0.0363	3.6663	26.9408	1.9467
7	7338	COLES BLVD	0.0735	6.8136	60.9185	3.4804
8	16096	CR 160	0.1362	8.4465	106.6672	4.0264
Total	49,829		0.4496	29.4756	321.4795	13.7671

Stats based on 5 BEFORE runs.

DLZ OHIO, INC.
 SCI-823 Portsmouth Traffic Model
 Before Travel-Time Study

Study Name : **US 23 NB OFF**
 Study Date : **8/1/2012**
 Page No. : **4**

Time/Space Trajectories of All Runs



Solid Line is Normal Speed of 35 MPH

DLZ OHIO, INC.
 SCI-823 Portsmouth Traffic Model
 Before Travel-Time Study

Study Name : **US 23 NB PM**
 Study Date : **8/1/2012**
 Page No. : **1**

Study Summary

Runs Used in This Study

Run Title	Start Date	Start Time	Length	Before/After	Run Type
US 23-NB-001	07/24/12	16:16	49696	Before	Primary
US 23-NB-002	07/24/12	16:53	49760	Before	Primary
US 23-NB-003	07/24/12	17:28	49830	Before	Primary
US 23-NB-004	07/25/12	16:58	49826	Before	Primary
US 23-NB-005	07/25/12	17:32	49529	Before	Primary

Node Info

#	Len	Name
1	0	
2	146	KY 1043
3	10922	SR 7
4	9691	SR 8
5	2401	US 73
6	3189	US 52 EB
7	7338	COLES BLVD
8	16041	CR 160

Length of Study Route = 49,728 feet

Notes:

DLZ OHIO, INC.
 SCI-823 Portsmouth Traffic Model
 Before Travel-Time Study

Study Name : **US 23 NB PM**
 Study Date : **8/1/2012**
 Page No. : **2**

Overall Output Statistics

Node #	Length	Node	Travel Time	# of Stops	Avg Speed	Total Delay	Time <= 0 MPH	Time <= 35 MPH	Time <= 55 MPH
1	0								
2	146	KY 1043	2.4	0.0	41.5	0.0	0.0	0.0	2.4
3	10922	SR 7	144.6	0.2	51.5	0.0	0.0	2.8	141.4
4	9691	SR 8	130.2	0.0	50.7	0.0	0.0	11.2	96.0
5	2401	US 73	59.0	0.4	27.7	12.2	1.4	45.4	59.0
6	3189	US 52 EB	113.2	1.2	19.2	50.6	7.2	112.8	113.2
7	7338	COLES BLVD	222.0	2.4	22.5	78.8	38.0	162.8	222.0
8	16041	CR 160	243.0	0.4	45.0	0.0	1.4	29.2	229.6
Total	49,728		914.4	4.6	37.1	141.6	48.0	364.2	863.6

Stats based on 5 BEFORE runs.
 Stops based on a Stop Speed of 5 MPH.
 Total Delay based on a Normal Speed of 35 MPH.

DLZ OHIO, INC.
 SCI-823 Portsmouth Traffic Model
 Before Travel-Time Study

Study Name : **US 23 NB PM**
 Study Date : **8/1/2012**
 Page No. : **3**

Fuel Consumption & Emissions

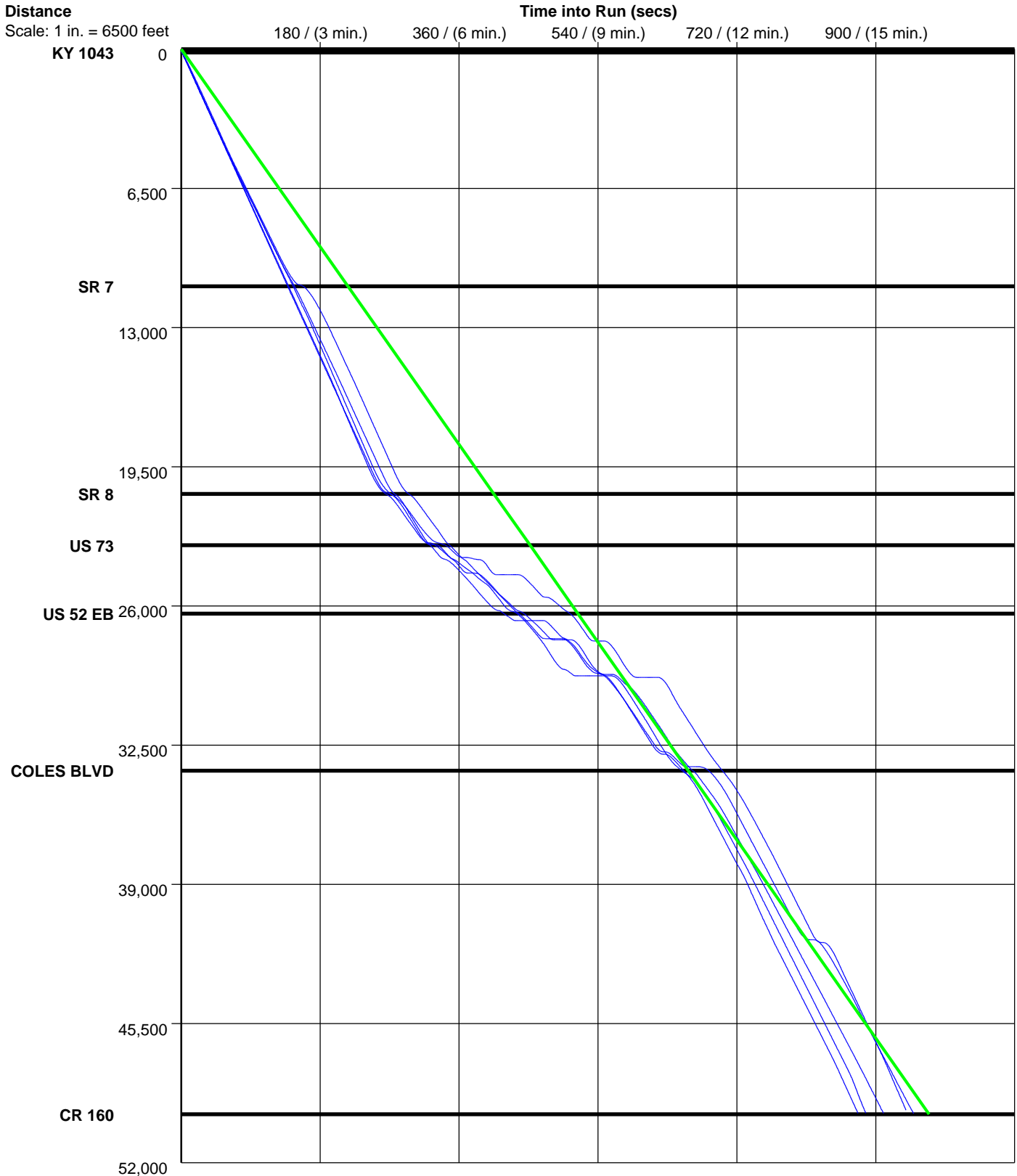
Node #	Length	Node Name	Fuel (gal)	HC (grams)	CO (grams)	NOx (grams)
1	0					
2	146	KY 1043	0.0015	0.0967	1.4120	0.0487
3	10922	SR 7	0.0937	3.7897	48.5174	1.1122
4	9691	SR 8	0.0855	3.8811	52.3858	1.4699
5	2401	US 73	0.0233	2.3018	21.4255	1.4458
6	3189	US 52 EB	0.0359	3.7176	28.3458	2.1443
7	7338	COLES BLVD	0.0798	7.9043	72.1086	4.5949
8	16041	CR 160	0.1400	9.0816	119.6218	4.5710
Total	49,728		0.4596	30.7727	343.8169	15.3868

Stats based on 5 BEFORE runs.

DLZ OHIO, INC.
 SCI-823 Portsmouth Traffic Model
 Before Travel-Time Study

Study Name : **US 23 NB PM**
 Study Date : **8/1/2012**
 Page No. : **4**

Time/Space Trajectories of All Runs



Solid Line is Normal Speed of 35 MPH

DLZ OHIO, INC.
 SCI-823 Portsmouth Traffic Model
 Before Travel-Time Study

Study Name : **US 23 SB AM**
 Study Date : **8/1/2012**
 Page No. : 1

Study Summary

Runs Used in This Study

Run Title	Start Date	Start Time	Length	Before/After	Run Type
US 23-SB-001	07/24/12	07:00	49615	Before	Primary
US 23-SB-002	07/24/12	07:37	49484	Before	Primary
US 23-SB-003	07/24/12	08:13	49465	Before	Primary
US 23-SB-004	07/25/12	07:24	49660	Before	Primary
US 23-SB-005	07/25/12	07:58	49479	Before	Primary

Node Info

#	Len	Name
1	0	
2	10	CR 160
3	16274	COLES BLVD
4	7438	US 52 EB
5	2813	US 73
6	2431	SR 8
7	9768	SR 7
8	10806	KY 1043

Length of Study Route = 49,540 feet

Notes:

DLZ OHIO, INC.
 SCI-823 Portsmouth Traffic Model
 Before Travel-Time Study

Study Name : **US 23 SB AM**
 Study Date : **8/1/2012**
 Page No. : **2**

Overall Output Statistics

Node #	Length	Node	Travel Time	# of Stops	Avg Speed	Total Delay	Time <= 0 MPH	Time <= 35 MPH	Time <= 55 MPH
1	0								
2	10	CR 160	2.8	0.2	2.4	2.8	0.0	2.8	2.8
3	16274	COLES BLVD	270.6	0.8	41.0	0.0	2.2	43.4	270.0
4	7438	US 52 EB	185.8	1.6	27.3	40.6	16.4	126.6	185.8
5	2813	US 73	173.0	3.6	11.1	118.0	51.6	173.0	173.0
6	2431	SR 8	83.6	1.0	19.8	36.0	16.4	76.4	83.6
7	9768	SR 7	143.2	0.4	46.5	0.0	2.2	22.4	111.4
8	10806	KY 1043	145.2	0.0	50.7	0.0	0.0	4.4	129.2
Total	49,540		1004.2	7.6	33.6	197.4	88.8	449.0	955.8

Stats based on 5 BEFORE runs.
 Stops based on a Stop Speed of 5 MPH.
 Total Delay based on a Normal Speed of 35 MPH.

DLZ OHIO, INC.
 SCI-823 Portsmouth Traffic Model
 Before Travel-Time Study

Study Name : **US 23 SB AM**
 Study Date : **8/1/2012**
 Page No. : **3**

Fuel Consumption & Emissions

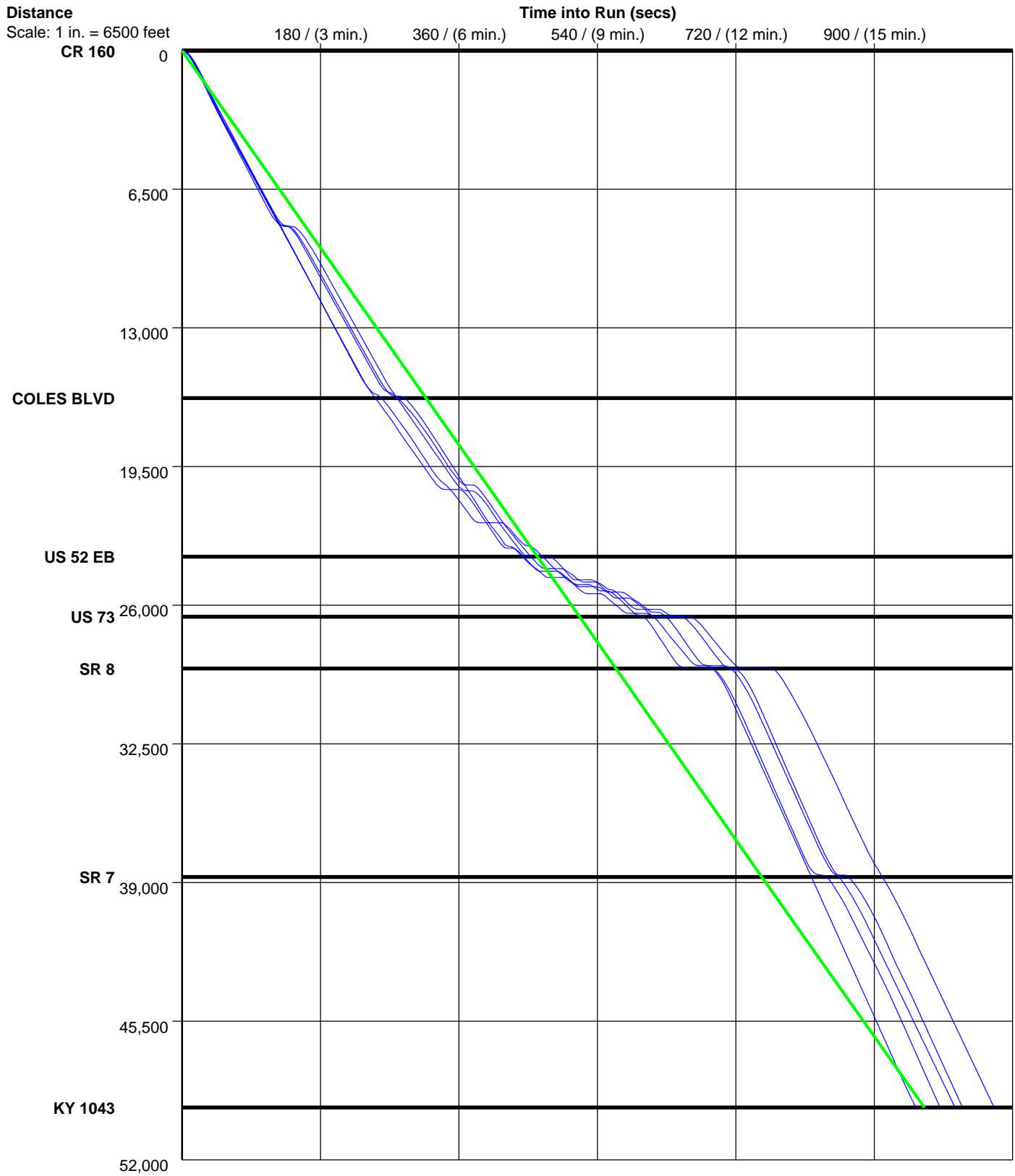
Node #	Length	Node Name	Fuel (gal)	HC (grams)	CO (grams)	NOx (grams)
1	0					
2	10	CR 160	0.0006	0.0667	0.3680	0.0283
3	16274	COLES BLVD	0.1430	9.8090	112.8234	5.1568
4	7438	US 52 EB	0.0675	5.8186	54.4613	2.9351
5	2813	US 73	0.0451	4.6515	33.1734	2.1612
6	2431	SR 8	0.0265	2.5444	22.4967	1.2775
7	9768	SR 7	0.0924	5.6396	69.7580	3.0769
8	10806	KY 1043	0.0943	4.7886	63.0209	2.0668
Total	49,540		0.4693	33.3184	356.1018	16.7027

Stats based on 5 BEFORE runs.

DLZ OHIO, INC.
 SCI-823 Portsmouth Traffic Model
 Before Travel-Time Study

Study Name : **US 23 SB AM**
 Study Date : **8/1/2012**
 Page No. : **4**

Time/Space Trajectories of All Runs



Solid Line is Normal Speed of 35 MPH

DLZ OHIO, INC.
 SCI-823 Portsmouth Traffic Model
 Before Travel-Time Study

Study Name : **US 23 SB OFF**
 Study Date : **8/1/2012**
 Page No. : **1**

Study Summary

Runs Used in This Study

Run Title	Start Date	Start Time	Length	Before/After	Run Type
US 23-SB-001	07/24/12	09:29	49418	Before	Primary
US 23-SB-002	07/24/12	10:05	49504	Before	Primary
US 23-SB-003	07/24/12	10:42	49568	Before	Primary
US 23-SB-004	07/25/12	10:01	49451	Before	Primary
US 23-SB-005	07/25/12	10:35	49550	Before	Primary

Node Info

#	Len	Name
1	0	
2	7	CR 160
3	16304	COLES BLVD
4	7454	US 52 EB
5	2798	US 73
6	2430	SR 8
7	9760	SR 7
8	10745	KY 1043

Length of Study Route = 49,498 feet

Notes:

DLZ OHIO, INC.
 SCI-823 Portsmouth Traffic Model
 Before Travel-Time Study

Study Name : **US 23 SB OFF**
 Study Date : **8/1/2012**
 Page No. : **2**

Overall Output Statistics

Node #	Length	Node	Travel Time	# of Stops	Avg Speed	Total Delay	Time <= 0 MPH	Time <= 35 MPH	Time <= 55 MPH
1	0								
2	7	CR 160	2.4	0.0	2.0	2.4	0.2	2.4	2.4
3	16304	COLES BLVD	265.2	0.4	41.9	0.0	0.2	39.4	264.8
4	7454	US 52 EB	173.2	1.2	29.3	28.0	4.8	117.0	173.2
5	2798	US 73	170.0	3.2	11.2	115.0	41.4	170.0	170.0
6	2430	SR 8	81.4	0.8	20.4	33.6	17.6	78.0	81.4
7	9760	SR 7	161.8	0.6	41.1	0.0	18.0	36.2	161.8
8	10745	KY 1043	149.4	0.2	49.0	0.0	1.4	7.2	132.4
Total	49,498		1003.4	6.4	33.6	179.0	83.6	450.2	986.0

Stats based on 5 BEFORE runs.
 Stops based on a Stop Speed of 5 MPH.
 Total Delay based on a Normal Speed of 35 MPH.

DLZ OHIO, INC.
 SCI-823 Portsmouth Traffic Model
 Before Travel-Time Study

Study Name : **US 23 SB OFF**
 Study Date : **8/1/2012**
 Page No. : **3**

Fuel Consumption & Emissions

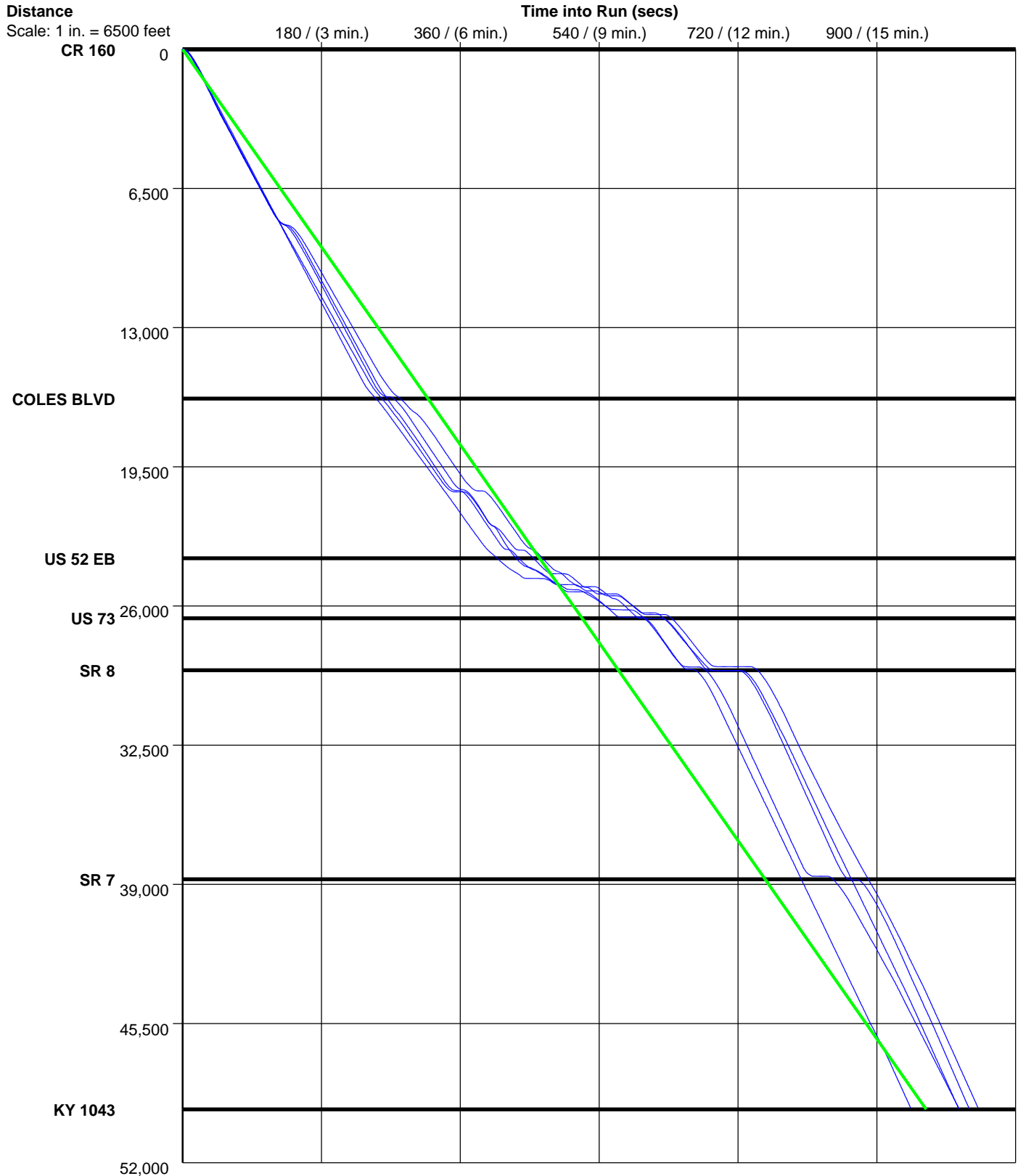
Node #	Length	Node Name	Fuel (gal)	HC (grams)	CO (grams)	NOx (grams)
1	0					
2	7	CR 160	0.0006	0.0586	0.2899	0.0269
3	16304	COLES BLVD	0.1419	9.7144	113.9158	5.1173
4	7454	US 52 EB	0.0676	6.0798	57.1968	3.4350
5	2798	US 73	0.0440	4.5005	31.3220	2.0611
6	2430	SR 8	0.0257	2.4211	21.3859	1.1805
7	9760	SR 7	0.0924	5.9193	72.3131	3.0222
8	10745	KY 1043	0.0944	5.0327	67.4136	2.2217
Total	49,498		0.4664	33.7264	363.8370	17.0646

Stats based on 5 BEFORE runs.

DLZ OHIO, INC.
 SCI-823 Portsmouth Traffic Model
 Before Travel-Time Study

Study Name : **US 23 SB OFF**
 Study Date : **8/1/2012**
 Page No. : **4**

Time/Space Trajectories of All Runs



Solid Line is Normal Speed of 35 MPH

DLZ OHIO, INC.
 SCI-823 Portsmouth Traffic Model
 Before Travel-Time Study

Study Name : **US 23 SB PM**
 Study Date : **8/1/2012**
 Page No. : 1

Study Summary

Runs Used in This Study

Run Title	Start Date	Start Time	Length	Before/After	Run Type
US 23-SB-001	07/24/12	15:58	49656	Before	Primary
US 23-SB-002	07/24/12	16:35	49705	Before	Primary
US 23-SB-003	07/24/12	17:10	49624	Before	Primary
US 23-SB-004	07/25/12	16:42	49694	Before	Primary
US 23-SB-005	07/25/12	17:15	49623	Before	Primary

Node Info

#	Len	Name
1	0	
2	13	CR 160
3	16320	COLES BLVD
4	7492	US 52 EB
5	2867	US 73
6	2458	SR 8
7	9737	SR 7
8	10773	KY 1043

Length of Study Route = 49,660 feet

Notes:

DLZ OHIO, INC.
 SCI-823 Portsmouth Traffic Model
 Before Travel-Time Study

Study Name : **US 23 SB PM**
 Study Date : **8/1/2012**
 Page No. : **2**

Overall Output Statistics

Node #	Length	Node	Travel Time	# of Stops	Avg Speed	Total Delay	Time <= 0 MPH	Time <= 35 MPH	Time <= 55 MPH
1	0								
2	13	CR 160	2.6	0.0	3.4	2.6	0.0	2.6	2.6
3	16320	COLES BLVD	256.8	0.4	43.3	0.0	5.0	34.4	249.2
4	7492	US 52 EB	203.4	2.0	25.1	57.2	26.0	128.0	203.4
5	2867	US 73	162.2	3.4	12.1	106.2	35.8	162.2	162.2
6	2458	SR 8	73.8	0.6	22.7	25.8	13.2	61.2	73.8
7	9737	SR 7	140.8	0.4	47.2	0.0	5.4	21.2	87.0
8	10773	KY 1043	146.0	0.2	50.3	0.0	0.0	6.6	121.0
Total	49,660		985.6	7.0	34.4	191.8	85.4	416.2	899.2

Stats based on 5 BEFORE runs.
 Stops based on a Stop Speed of 5 MPH.
 Total Delay based on a Normal Speed of 35 MPH.

DLZ OHIO, INC.
 SCI-823 Portsmouth Traffic Model
 Before Travel-Time Study

Study Name : **US 23 SB PM**
 Study Date : **8/1/2012**
 Page No. : **3**

Fuel Consumption & Emissions

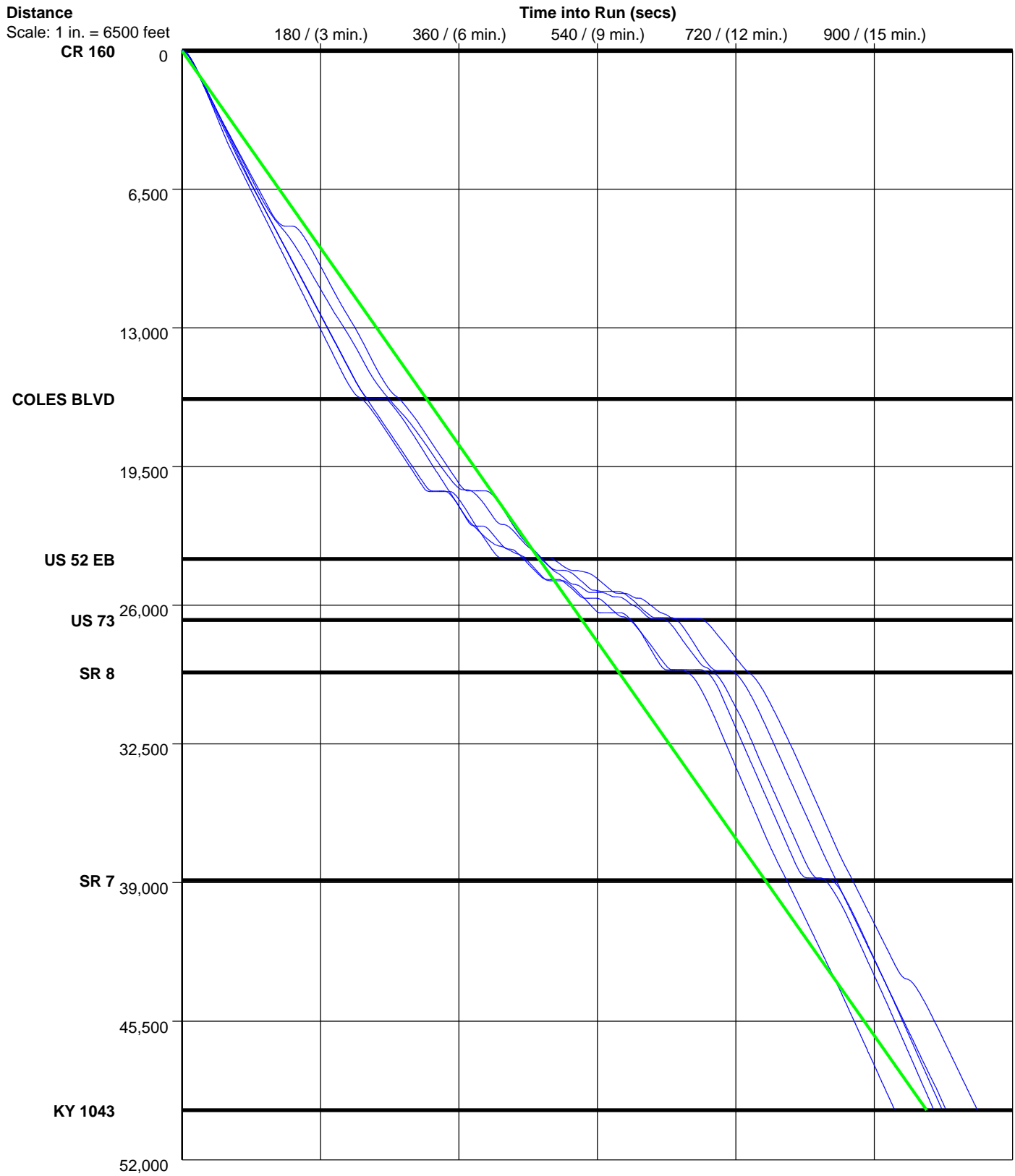
Node #	Length	Node Name	Fuel (gal)	HC (grams)	CO (grams)	NOx (grams)
1	0					
2	13	CR 160	0.0007	0.0738	0.2678	0.0432
3	16320	COLES BLVD	0.1448	9.4375	116.1949	4.8536
4	7492	US 52 EB	0.0721	6.3538	58.5913	3.2059
5	2867	US 73	0.0428	4.4053	31.0338	2.1046
6	2458	SR 8	0.0256	2.4720	22.9931	1.3502
7	9737	SR 7	0.0950	6.0918	81.1847	3.4494
8	10773	KY 1043	0.0947	4.7168	59.9708	2.0130
Total	49,660		0.4756	33.5509	370.2364	17.0199

Stats based on 5 BEFORE runs.

DLZ OHIO, INC.
 SCI-823 Portsmouth Traffic Model
 Before Travel-Time Study

Study Name : **US 23 SB PM**
 Study Date : **8/1/2012**
 Page No. : **4**

Time/Space Trajectories of All Runs



Solid Line is Normal Speed of 35 MPH

DLZ OHIO, INC.
SCI-823 PORTSMOUTH TRAFFIC MODEL
 BeforeTravel-Time Study

Study Name : **US 52 EB AM**
 Study Date : **8/3/2012**
 Page No. : 1

Study Summary

Runs Used in This Study

Run Title	Start Date	Start Time	Length	Before/After	Run Type
US 52-EB-001	07/17/12	08:46	68279	Before	Primary
US 52-EB-002	07/18/12	07:00	68463	Before	Primary
US 52-EB-003	07/18/12	07:43	68566	Before	Primary
US 52-EB-004	07/18/12	08:24	68542	Before	Primary

Node Info

#	Len	Name
1	0	
2	125	DRY RUN
3	12413	US 852/104 DIVERGE
4	2950	US 52 EB RAMP
5	7235	US 23 SB
6	9071	MALBERT ST
7	10678	SR 139
8	25990	US 52 EXIT RAMP

Length of Study Route = 68,462 feet

Notes:

DLZ OHIO, INC.
SCI-823 PORTSMOUTH TRAFFIC MODEL
 BeforeTravel-Time Study

Study Name : **US 52 EB AM**
 Study Date : **8/3/2012**
 Page No. : **2**

Overall Output Statistics

Node #	Length	Node	Travel Time	# of Stops	Avg Speed	Total Delay	Time <= 0 MPH	Time <= 35 MPH	Time <= 55 MPH
1	0								
2	125	DRY RUN	6.0	0.3	14.2	3.8	1.5	4.5	6.0
3	12413	US 852/104 DIVERGE	175.3	0.0	48.3	0.0	0.0	1.8	150.5
4	2950	US 52 EB RAMP	43.3	0.0	46.5	0.0	0.0	5.8	36.8
5	7235	US 23 SB	132.3	0.5	37.3	3.0	8.0	57.0	117.8
6	9071	MALBERT ST	229.8	2.0	26.9	52.8	15.0	215.5	229.8
7	10678	SR 139	241.0	1.3	30.2	32.8	9.3	186.5	241.0
8	25990	US 52 EXIT RAMP	372.8	0.8	47.5	0.0	5.0	87.5	254.8
Total	68,462		1200.3	4.8	38.9	92.3	38.8	558.5	1036.5

Stats based on 4 BEFORE runs.
 Stops based on a Stop Speed of 5 MPH.
 Total Delay based on a Normal Speed of 35 MPH.

DLZ OHIO, INC.
SCI-823 PORTSMOUTH TRAFFIC MODEL
 BeforeTravel-Time Study

Study Name : **US 52 EB AM**
 Study Date : **8/3/2012**
 Page No. : **3**

Fuel Consumption & Emissions

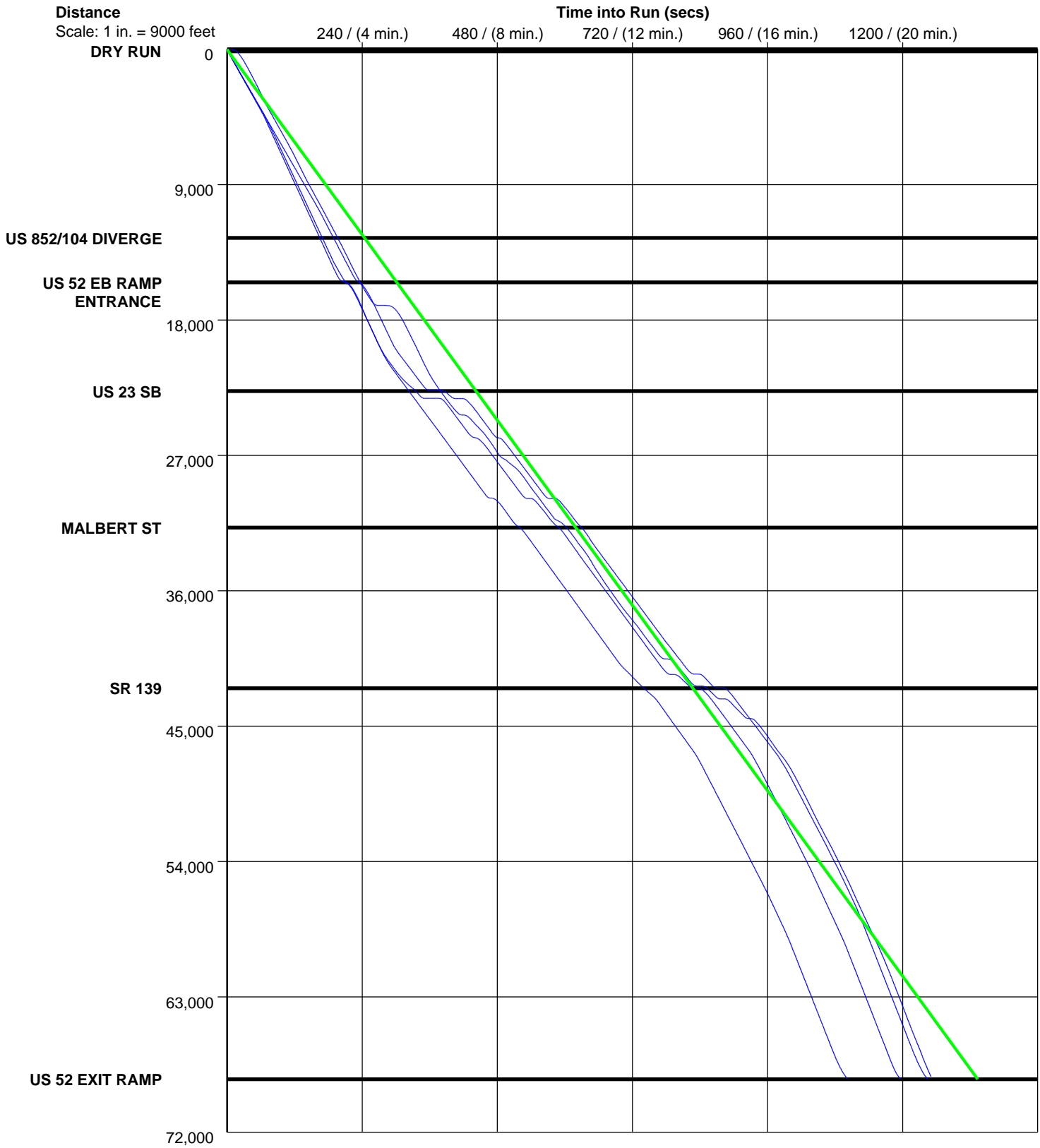
Node #	Length	Node Name	Fuel (gal)	HC (grams)	CO (grams)	NOx (grams)
1	0					
2	125	DRY RUN	0.0022	0.2057	1.1367	0.1310
3	12413	US 852/104 DIVERGE	0.1052	5.5552	74.6318	2.2293
4	2950	US 52 EB RAMP	0.0242	0.9179	9.9038	0.1962
5	7235	US 23 SB	0.0709	5.7261	73.3948	3.3514
6	9071	MALBERT ST	0.0832	7.4784	67.5185	3.9979
7	10678	SR 139	0.0876	6.7966	67.3326	2.8624
8	25990	US 52 EXIT RAMP	0.2436	13.1554	181.5268	6.0943
Total	68,462		0.6168	39.8353	475.4450	18.8624

Stats based on 4 BEFORE runs.

DLZ OHIO, INC.
SCI-823 PORTSMOUTH TRAFFIC MODEL
 Before Travel-Time Study

Study Name : **US 52 EB AM**
 Study Date : **8/3/2012**
 Page No. : **4**

Time/Space Trajectories of All Runs



Solid Line is Normal Speed of 35 MPH

DLZ OHIO, INC.
SCI-823 PORTSMOUTH TRAFFIC MODEL
 BeforeTravel-Time Study

Study Name : **US 52 EB OFF**
 Study Date : **8/3/2012**
 Page No. : **1**

Study Summary

Runs Used in This Study

Run Title	Start Date	Start Time	Length	Before/After	Run Type
US 52-EB-001	07/17/12	09:54	68502	Before	Primary
US 52-EB-002	07/17/12	10:37	68417	Before	Primary
US 52-EB-003	07/18/12	09:30	68310	Before	Primary
US 52-EB-004	07/18/12	10:15	68425	Before	Primary

Node Info

#	Len	Name
1	0	
2	128	DRY RUN
3	12393	US 852/104 DIVERGE
4	2961	US 52 EB RAMP
5	7207	US 23 SB
6	9077	MALBERT ST
7	10655	SR 139
8	25992	US 52 EXIT RAMP

Length of Study Route = 68,413 feet

Notes:

DLZ OHIO, INC.
SCI-823 PORTSMOUTH TRAFFIC MODEL
 BeforeTravel-Time Study

Study Name : **US 52 EB OFF**
 Study Date : **8/3/2012**
 Page No. : **2**

Overall Output Statistics

Node #	Length	Node	Travel Time	# of Stops	Avg Speed	Total Delay	Time <= 0 MPH	Time <= 35 MPH	Time <= 55 MPH
1	0								
2	128	DRY RUN	3.3	0.0	26.9	0.5	0.0	1.3	3.3
3	12393	US 852/104 DIVERGE	178.3	0.0	47.4	0.0	0.0	2.3	178.3
4	2961	US 52 EB RAMP	48.8	0.3	41.4	0.0	2.0	12.8	48.8
5	7207	US 23 SB	140.8	0.8	34.9	4.0	10.5	71.5	130.8
6	9077	MALBERT ST	231.5	1.3	26.7	54.5	2.8	209.8	231.5
7	10655	SR 139	254.5	1.3	28.5	46.5	13.8	214.0	254.5
8	25992	US 52 EXIT RAMP	387.0	1.0	45.8	0.0	12.0	111.5	271.0
Total	68,413		1244.0	4.5	37.5	105.5	41.0	623.0	1118.0

Stats based on 4 BEFORE runs.
 Stops based on a Stop Speed of 5 MPH.
 Total Delay based on a Normal Speed of 35 MPH.

DLZ OHIO, INC.
SCI-823 PORTSMOUTH TRAFFIC MODEL
 BeforeTravel-Time Study

Study Name : **US 52 EB OFF**
 Study Date : **8/3/2012**
 Page No. : **3**

Fuel Consumption & Emissions

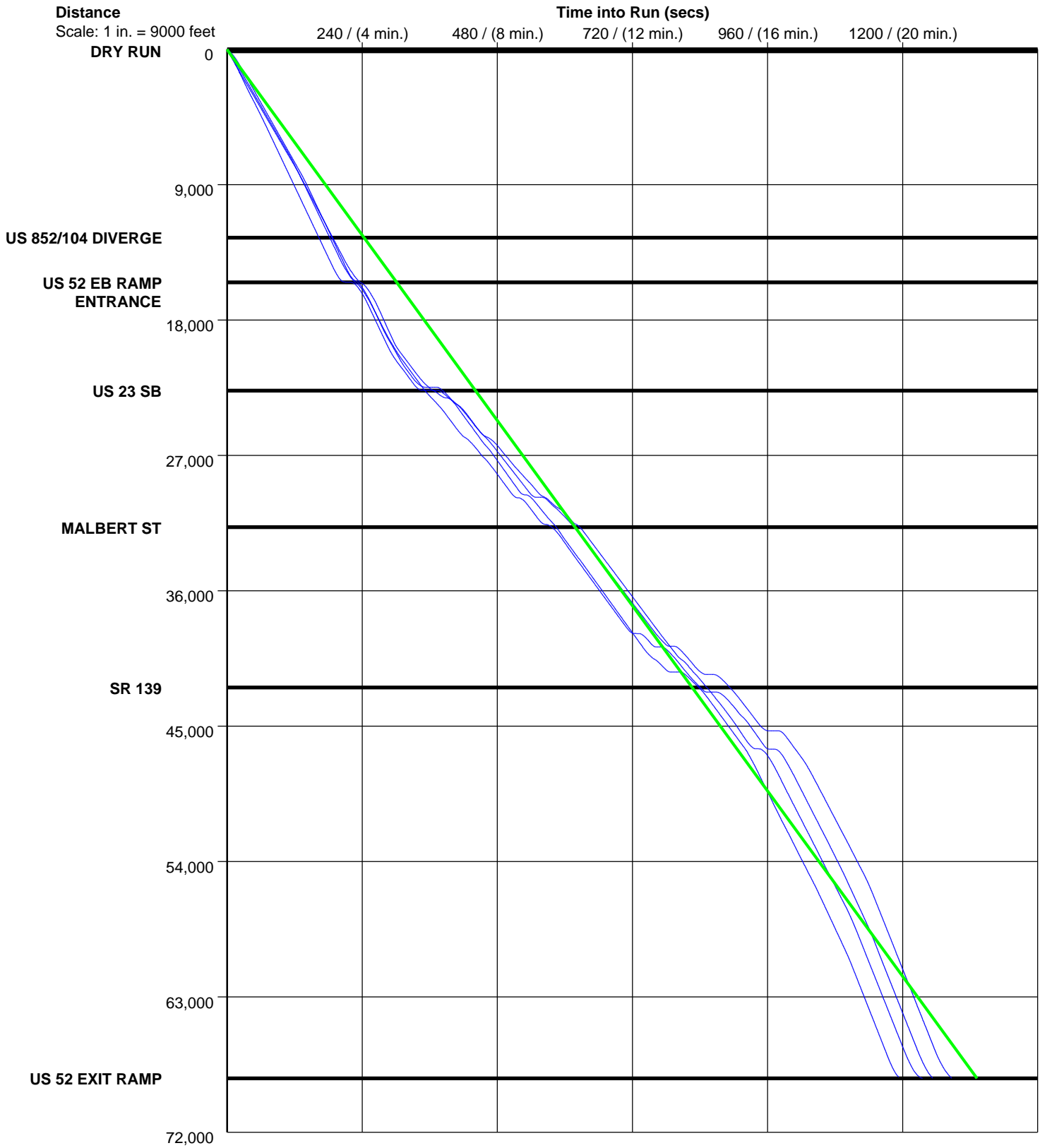
Node #	Length	Node Name	Fuel (gal)	HC (grams)	CO (grams)	NOx (grams)
1	0					
2	128	DRY RUN	0.0014	0.1098	0.7311	0.0660
3	12393	US 852/104 DIVERGE	0.1038	5.5442	72.8422	2.1937
4	2961	US 52 EB RAMP	0.0240	0.9542	9.5067	0.1655
5	7207	US 23 SB	0.0693	5.6751	69.7662	3.2215
6	9077	MALBERT ST	0.0815	7.5588	67.0432	4.1118
7	10655	SR 139	0.0877	6.7829	63.4942	2.6697
8	25992	US 52 EXIT RAMP	0.2441	12.9237	168.5544	5.8104
Total	68,413		0.6118	39.5488	451.9380	18.2385

Stats based on 4 BEFORE runs.

DLZ OHIO, INC.
SCI-823 PORTSMOUTH TRAFFIC MODEL
 Before Travel-Time Study

Study Name : **US 52 EB OFF**
 Study Date : **8/3/2012**
 Page No. : **4**

Time/Space Trajectories of All Runs



Solid Line is Normal Speed of 35 MPH

DLZ OHIO, INC.
SCI-823 PORTSMOUTH TRAFFIC MODEL
 BeforeTravel-Time Study

Study Name : **US 52 EB PM**
 Study Date : **8/3/2012**
 Page No. : 1

Study Summary

Runs Used in This Study

Run Title	Start Date	Start Time	Length	Before/After	Run Type
US 52-EB-001	07/17/12	16:35	68617	Before	Primary
US 52-EB-002	07/17/12	17:40	68508	Before	Primary
US 52-EB-003	07/18/12	16:03	68520	Before	Primary
US 52-EB-004	07/18/12	17:32	68538	Before	Primary

Node Info

#	Len	Name
1	0	
2	126	DRY RUN
3	12480	US 852/104 DIVERGE
4	2928	US 52 EB RAMP
5	7216	US 23 SB
6	9078	MALBERT ST
7	10674	SR 139
8	26043	US 52 EXIT RAMP

Length of Study Route = 68,545 feet

Notes:

DLZ OHIO, INC.
SCI-823 PORTSMOUTH TRAFFIC MODEL
 BeforeTravel-Time Study

Study Name : **US 52 EB PM**
 Study Date : **8/3/2012**
 Page No. : **2**

Overall Output Statistics

Node #	Length	Node	Travel Time	# of Stops	Avg Speed	Total Delay	Time <= 0 MPH	Time <= 35 MPH	Time <= 55 MPH
1	0								
2	126	DRY RUN	2.5	0.0	34.4	0.0	0.0	0.0	2.5
3	12480	US 852/104 DIVERGE	173.8	0.0	49.0	0.0	0.0	0.0	147.8
4	2928	US 52 EB RAMP	63.0	0.8	31.7	10.3	7.5	31.0	60.3
5	7216	US 23 SB	128.0	0.5	38.4	2.8	5.3	51.3	101.3
6	9078	MALBERT ST	241.3	2.0	25.7	64.3	20.0	210.5	241.3
7	10674	SR 139	266.3	2.0	27.3	58.0	9.8	226.3	266.3
8	26043	US 52 EXIT RAMP	372.8	1.3	47.6	0.0	3.8	80.3	228.5
Total	68,545		1247.5	6.5	37.5	135.3	46.3	599.3	1047.8

Stats based on 4 BEFORE runs.
 Stops based on a Stop Speed of 5 MPH.
 Total Delay based on a Normal Speed of 35 MPH.

DLZ OHIO, INC.
SCI-823 PORTSMOUTH TRAFFIC MODEL
 BeforeTravel-Time Study

Study Name : **US 52 EB PM**
 Study Date : **8/3/2012**
 Page No. : **3**

Fuel Consumption & Emissions

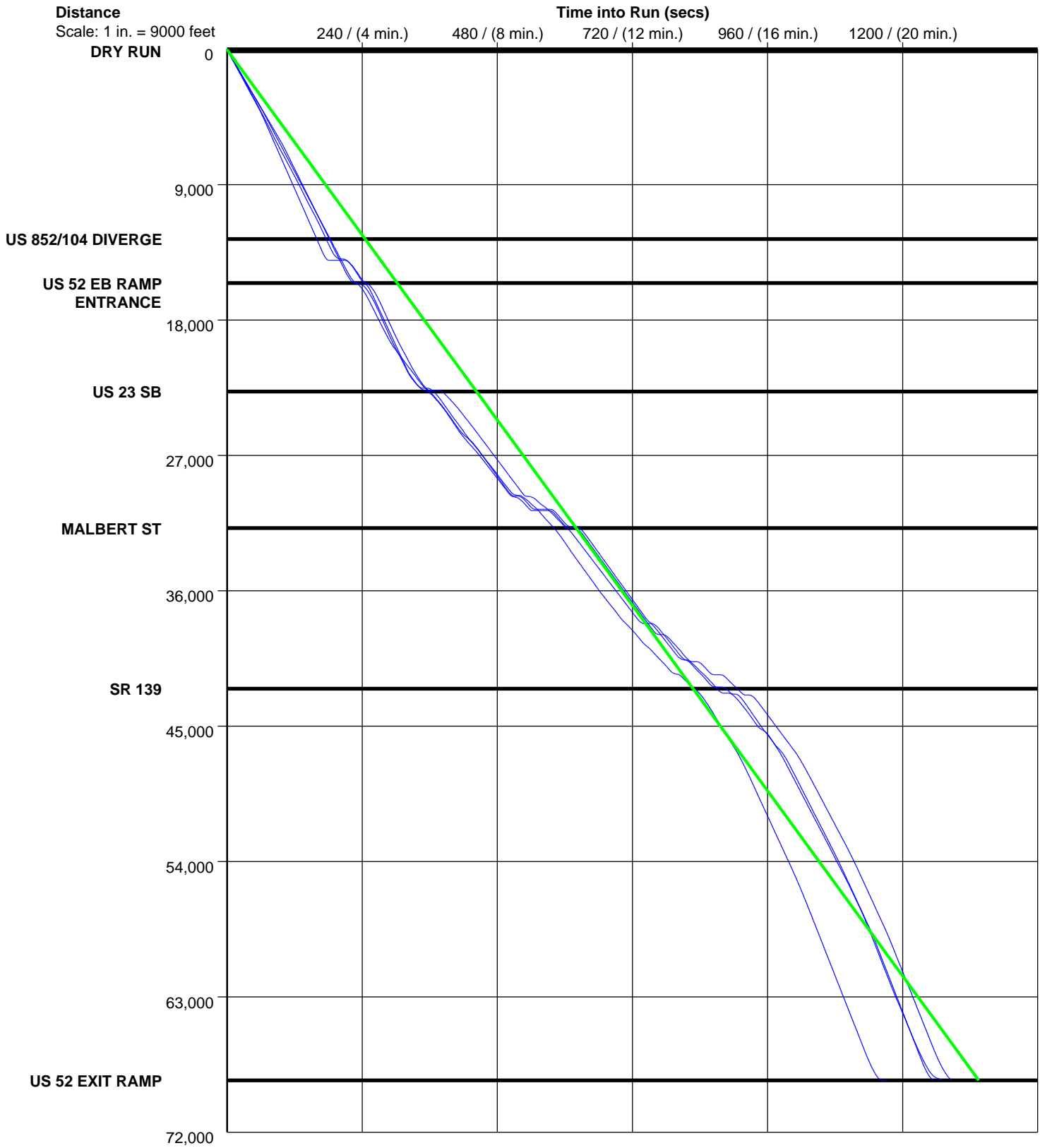
Node #	Length	Node Name	Fuel (gal)	HC (grams)	CO (grams)	NOx (grams)
1	0					
2	126	DRY RUN	0.0011	0.0450	0.4550	0.0021
3	12480	US 852/104 DIVERGE	0.1051	5.2375	71.0686	1.9256
4	2928	US 52 EB RAMP	0.0281	1.9677	19.6939	1.0102
5	7216	US 23 SB	0.0721	5.7906	73.2628	3.5213
6	9078	MALBERT ST	0.0829	7.3999	67.8303	3.6897
7	10674	SR 139	0.0937	7.9825	71.2958	3.8652
8	26043	US 52 EXIT RAMP	0.2469	13.0445	175.0122	6.1347
Total	68,545		0.6299	41.4677	478.6185	20.1488

Stats based on 4 BEFORE runs.

DLZ OHIO, INC.
SCI-823 PORTSMOUTH TRAFFIC MODEL
 BeforeTravel-Time Study

Study Name : **US 52 EB PM**
 Study Date : **8/3/2012**
 Page No. : **4**

Time/Space Trajectories of All Runs



Solid Line is Normal Speed of 35 MPH

DLZ OHIO, INC.
SCI-823 PORTSMOUTH TRAFFIC MODEL
 BeforeTravel-Time Study

Study Name : **US 52 WB AM**
 Study Date : **8/3/2012**
 Page No. : **1**

Study Summary

Runs Used in This Study

Run Title	Start Date	Start Time	Length	Before/After	Run Type
US 52-WB-001	07/17/12	08:24	67602	Before	Primary
US 52-WB-002	07/18/12	07:22	67422	Before	Primary
US 52-WB-003	07/18/12	08:02	67556	Before	Primary
US 52-WB-004	07/18/12	08:44	67598	Before	Primary

Node Info

#	Len	Name
1	0	
2	66	US 52 ENTRANCE
3	26350	SR 139
4	10648	MALBERT ST
5	8696	US 23 SB
6	9885	US 73/852 MERGE
7	11899	DRY RUN RD

Length of Study Route = 67,544 feet

Notes:

DLZ OHIO, INC.
SCI-823 PORTSMOUTH TRAFFIC MODEL
 BeforeTravel-Time Study

Study Name : **US 52 WB AM**
 Study Date : **8/3/2012**
 Page No. : **2**

Overall Output Statistics

Node #	Length	Node	Travel Time	# of Stops	Avg Speed	Total Delay	Time <= 0 MPH	Time <= 35 MPH	Time <= 55 MPH
1	0								
2	66	US 52 ENTRANCE RAMP	4.3	0.0	10.6	2.3	0.0	4.3	4.3
3	26350	SR 139	388.8	1.0	46.2	0.0	16.3	114.0	244.5
4	10648	MALBERT ST	263.5	1.5	27.6	56.0	25.5	206.5	263.5
5	8696	US 23 SB	262.8	2.8	22.6	93.0	45.0	233.3	262.8
6	9885	US 73/852 MERGE	146.5	0.3	46.0	0.0	6.8	26.3	126.5
7	11899	DRY RUN RD	157.0	0.0	51.7	0.0	0.0	0.0	120.0
Total	67,544		1222.8	5.5	37.7	151.3	93.5	584.3	1021.5

Stats based on 4 BEFORE runs.
 Stops based on a Stop Speed of 5 MPH.
 Total Delay based on a Normal Speed of 35 MPH.

DLZ OHIO, INC.
SCI-823 PORTSMOUTH TRAFFIC MODEL
 BeforeTravel-Time Study

Study Name : **US 52 WB AM**
 Study Date : **8/3/2012**
 Page No. : **3**

Fuel Consumption & Emissions

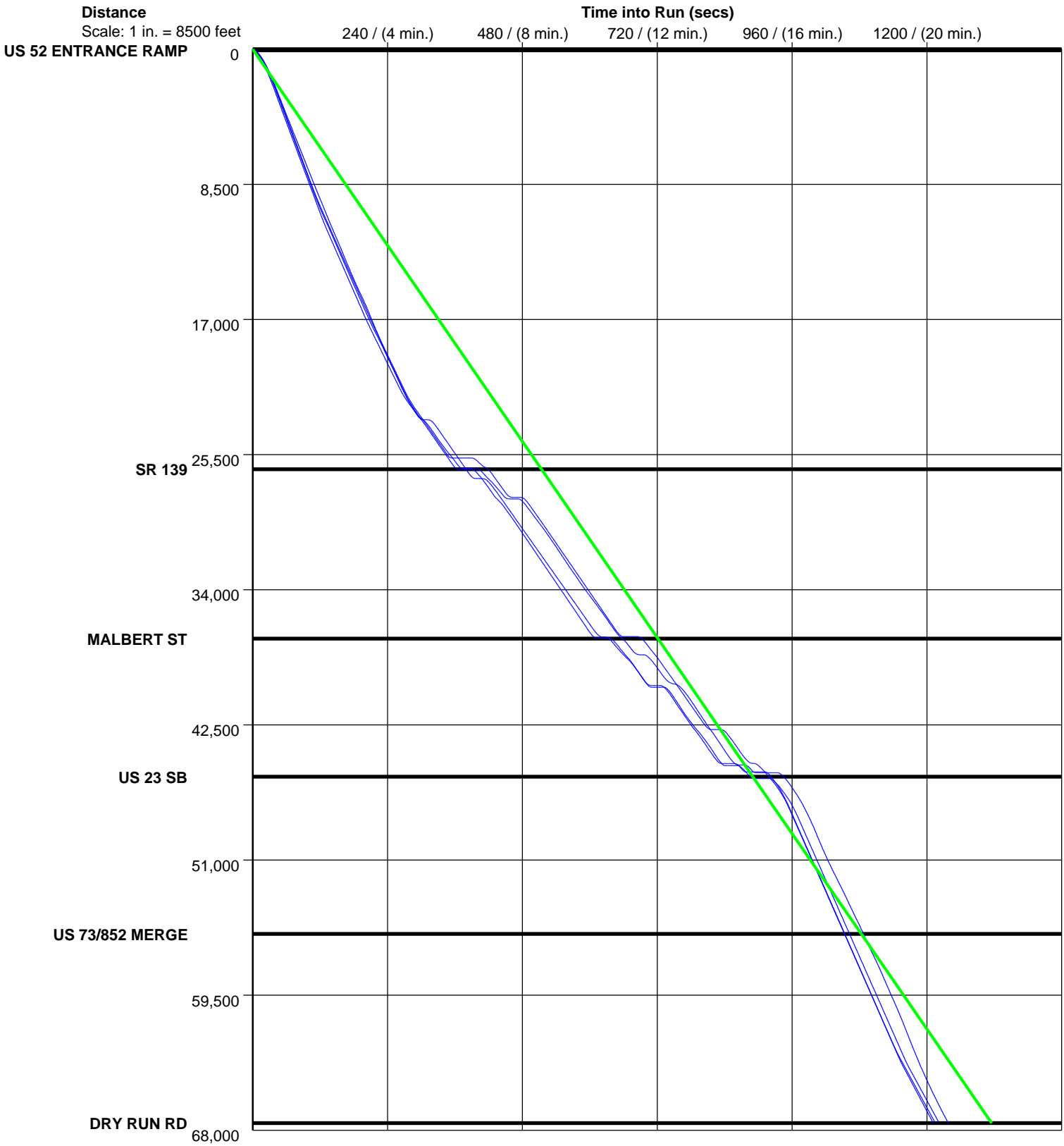
Node #	Length	Node Name	Fuel (gal)	HC (grams)	CO (grams)	NOx (grams)
1	0					
2	66	US 52 ENTRANCE RAMP	0.0014	0.1623	0.6274	0.1203
3	26350	SR 139	0.2529	13.9803	188.3569	6.6963
4	10648	MALBERT ST	0.0913	7.1009	66.6703	2.8320
5	8696	US 23 SB	0.0907	8.6904	76.7676	4.7593
6	9885	US 73/852 MERGE	0.0930	5.9004	81.2557	3.0979
7	11899	DRY RUN RD	0.1002	3.8331	48.2977	0.9590
Total	67,544		0.6295	39.6676	461.9757	18.4648

Stats based on 4 BEFORE runs.

DLZ OHIO, INC.
SCI-823 PORTSMOUTH TRAFFIC MODEL
 BeforeTravel-Time Study

Study Name : **US 52 WB AM**
 Study Date : **8/3/2012**
 Page No. : **4**

Time/Space Trajectories of All Runs



Solid Line is Normal Speed of 35 MPH

DLZ OHIO, INC.
SCI-823 PORTSMOUTH TRAFFIC MODEL
 BeforeTravel-Time Study

Study Name : **US 52 WB OFF**
 Study Date : **8/3/2012**
 Page No. : **1**

Study Summary

Runs Used in This Study

Run Title	Start Date	Start Time	Length	Before/After	Run Type
US 52-WB-001	07/17/12	09:30	67648	Before	Primary
US 52-WB-002	07/17/12	10:15	67658	Before	Primary
US 52-WB-003	07/18/12	09:50	67577	Before	Primary
US 52-WB-004	07/18/12	10:36	67628	Before	Primary

Node Info

#	Len	Name
1	0	
2	48	US 52 ENTRANCE
3	26404	SR 139
4	10667	MALBERT ST
5	8814	US 23 SB
6	9802	US 73/852 MERGE
7	11892	DRY RUN RD

Length of Study Route = 67,627 feet

Notes:

DLZ OHIO, INC.
SCI-823 PORTSMOUTH TRAFFIC MODEL
 BeforeTravel-Time Study

Study Name : **US 52 WB OFF**
 Study Date : **8/3/2012**
 Page No. : **2**

Overall Output Statistics

Node #	Length	Node	Travel Time	# of Stops	Avg Speed	Total Delay	Time <= 0 MPH	Time <= 35 MPH	Time <= 55 MPH
1	0								
2	48	US 52 ENTRANCE RAMP	3.3	0.0	10.1	2.3	0.0	3.3	3.3
3	26404	SR 139	408.5	1.5	44.1	0.0	13.3	130.8	272.8
4	10667	MALBERT ST	244.3	0.8	29.8	36.3	5.0	194.3	244.3
5	8814	US 23 SB	264.3	2.8	22.7	92.3	29.3	238.3	264.3
6	9802	US 73/852 MERGE	135.0	0.0	49.5	0.0	0.0	10.5	112.8
7	11892	DRY RUN RD	159.0	0.0	51.0	0.0	0.0	0.0	116.0
Total	67,627		1214.3	5.0	38.0	130.8	47.5	577.0	1013.3

Stats based on 4 BEFORE runs.
 Stops based on a Stop Speed of 5 MPH.
 Total Delay based on a Normal Speed of 35 MPH.

DLZ OHIO, INC.
SCI-823 PORTSMOUTH TRAFFIC MODEL
 BeforeTravel-Time Study

Study Name : **US 52 WB OFF**
 Study Date : **8/3/2012**
 Page No. : **3**

Fuel Consumption & Emissions

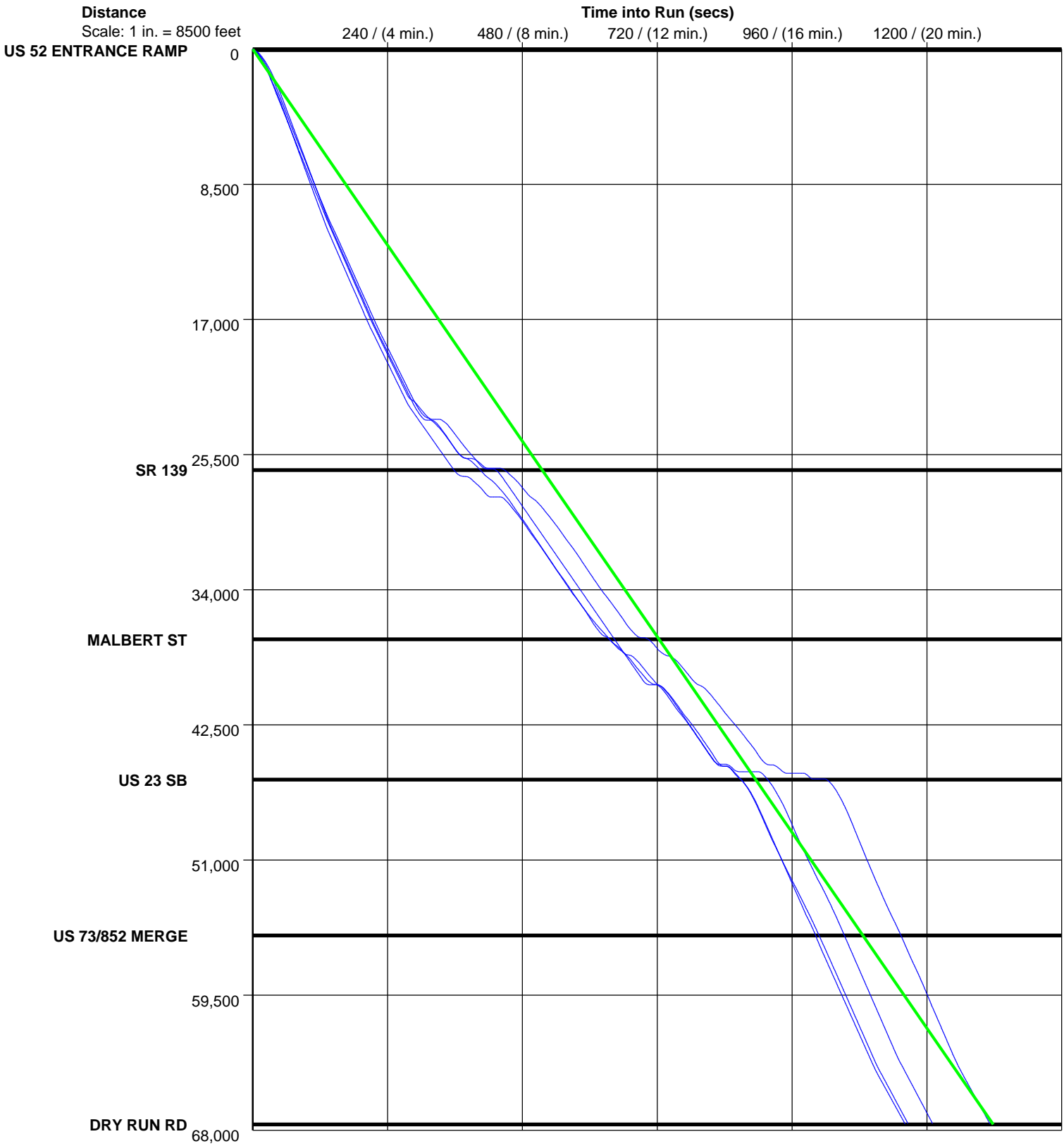
Node #	Length	Node Name	Fuel (gal)	HC (grams)	CO (grams)	NOx (grams)
1	0					
2	48	US 52 ENTRANCE RAMP	0.0009	0.1014	0.4364	0.0636
3	26404	SR 139	0.2549	14.8123	193.3366	7.3582
4	10667	MALBERT ST	0.0862	6.7108	64.7689	2.7634
5	8814	US 23 SB	0.0880	8.2545	71.1539	4.3226
6	9802	US 73/852 MERGE	0.0925	6.5368	96.1449	3.8211
7	11892	DRY RUN RD	0.0995	3.7942	47.1751	0.8916
Total	67,627		0.6220	40.2098	473.0158	19.2205

Stats based on 4 BEFORE runs.

DLZ OHIO, INC.
SCI-823 PORTSMOUTH TRAFFIC MODEL
 Before Travel-Time Study

Study Name : **US 52 WB OFF**
 Study Date : **8/3/2012**
 Page No. : **4**

Time/Space Trajectories of All Runs



Solid Line is Normal Speed of 35 MPH

DLZ OHIO, INC.
SCI-823 PORTSMOUTH TRAFFIC MODEL
 BeforeTravel-Time Study

Study Name : **US 52 WB PM**
 Study Date : **8/3/2012**
 Page No. : **1**

Study Summary

Runs Used in This Study

Run Title	Start Date	Start Time	Length	Before/After	Run Type
US 52-WB-001	07/17/12	16:08	67615	Before	Primary
US 52-WB-002	07/17/12	17:18	67411	Before	Primary
US 52-WB-003	07/18/12	16:25	67571	Before	Primary
US 52-WB-004	07/18/12	17:53	67459	Before	Primary

Node Info

#	Len	Name
1	0	
2	42	US 52 ENTRANCE
3	26363	SR 139
4	10662	MALBERT ST
5	8766	US 23 SB
6	9765	US 73/852 MERGE
7	11916	DRY RUN RD

Length of Study Route = 67,514 feet

Notes:

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Overall Output Statistics

Node #	Length	Node	Travel Time	# of Stops	Avg Speed	Total Delay	Time <= 0 MPH	Time <= 35 MPH	Time <= 55 MPH
1	0								
2	42	US 52 ENTRANCE RAMP	4.5	0.0	6.4	3.5	0.5	4.5	4.5
3	26363	SR 139	402.0	1.0	44.7	0.0	10.5	118.5	272.5
4	10662	MALBERT ST	271.3	1.5	26.8	63.3	14.5	260.5	271.3
5	8766	US 23 SB	280.5	2.8	21.3	109.3	44.0	270.3	280.5
6	9765	US 73/852 MERGE	134.8	0.0	49.4	0.0	0.0	10.3	119.5
7	11916	DRY RUN RD	159.5	0.0	50.9	0.0	0.0	0.0	136.8
Total	67,514		1252.5	5.3	36.8	176.0	69.5	664.0	1085.0

Stats based on 4 BEFORE runs.
 Stops based on a Stop Speed of 5 MPH.
 Total Delay based on a Normal Speed of 35 MPH.

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Fuel Consumption & Emissions

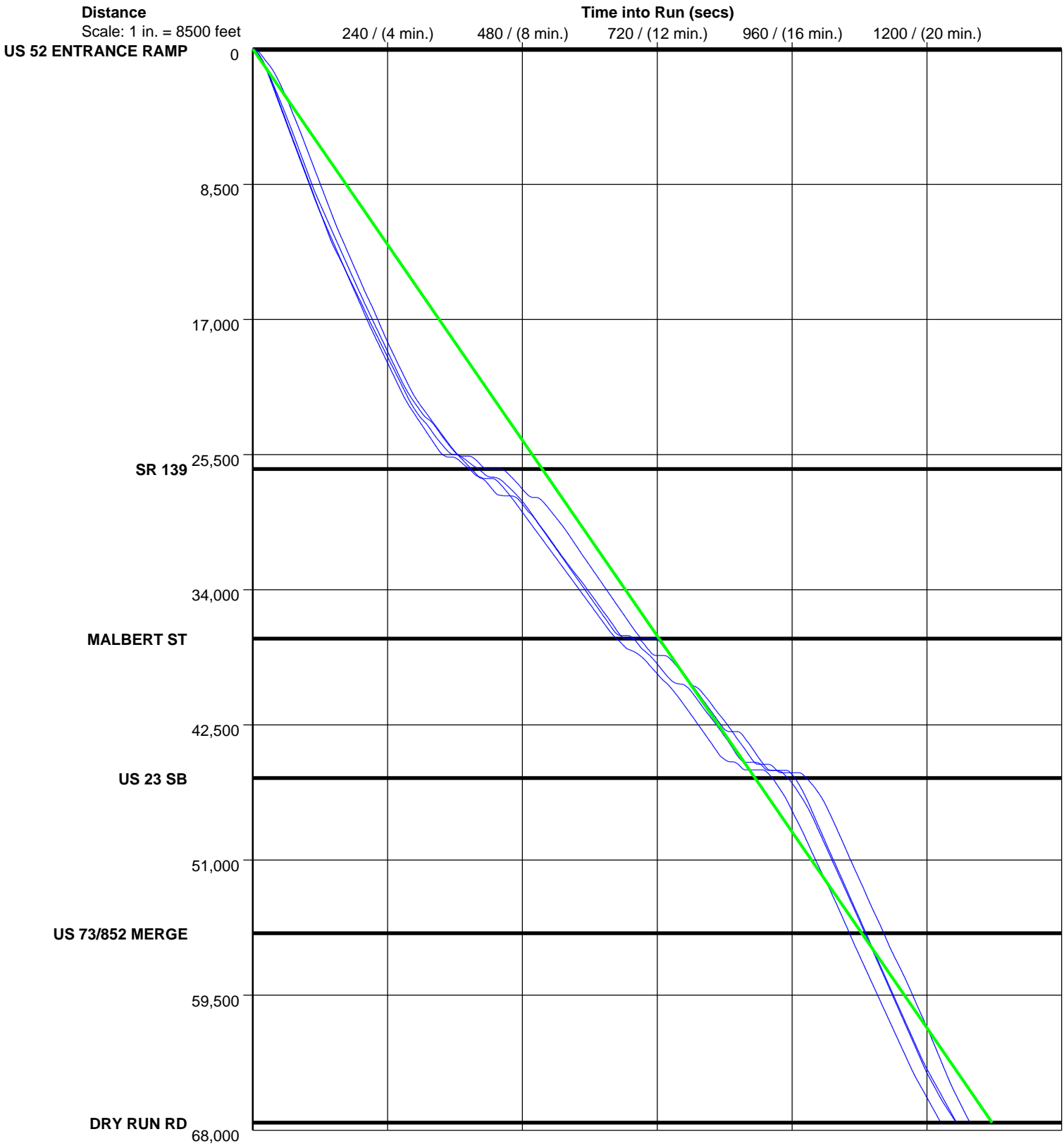
Node #	Length	Node Name	Fuel (gal)	HC (grams)	CO (grams)	NOx (grams)
1	0					
2	42	US 52 ENTRANCE RAMP	0.0015	0.1742	0.5084	0.1332
3	26363	SR 139	0.2532	14.6665	200.9780	7.0983
4	10662	MALBERT ST	0.0903	7.1023	64.8506	2.7548
5	8766	US 23 SB	0.0924	8.8847	76.6640	4.6970
6	9765	US 73/852 MERGE	0.0901	5.9901	88.4468	3.2831
7	11916	DRY RUN RD	0.1002	4.1378	53.2846	1.2186
Total	67,514		0.6275	40.9555	484.7324	19.1849

Stats based on 4 BEFORE runs.

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Time/Space Trajectories of All Runs



Solid Line is Normal Speed of 35 MPH