

INTER-OFFICE COMMUNICATION

OHIO DEPARTMENT OF TRANSPORTATION

District - 08 Planning Department

DATE: August 15, 2014

TO: Mary Bapu-Tamaskar, PE, CO Roadway Engineering Services

FROM: E. Thomas Arnold, Jr., PE, District 8 Planning Department

SUBJECT: HAM-75 & IR-275 Study (PID 97429) Preliminary Weave Analysis

Summary

In 2014, D8 retained Gannett Fleming to complete an Alternative Evaluation Report (AER) to evaluate options to eliminate the weaves that exist at the IR-75 & IR-275 interchange between Ramps F and Ramp B and between Ramp B and Ramp G. Please refer to Appendix A for a location map of the interchange.

In July of 2014, ODOT D8 met with ORES and discussed an option to construct one flyover ramp from SB IR-275 to EB IR-275. This alternative would replace the existing Ramp B Loop ramp with a fly over ramp. While this fly over ramp would eliminate both weaves between Ramps F and Ramp B and between Ramp B and Ramp G, it would add traffic to a downstream weave along IR-275 between Ramp H and the eastbound exit to Mosteller Road. The purpose of this IOC is to analyze this weave.

Traffic Counts

Certified Traffic was generated for the interchange in January of 2013. Please refer to Appendix B for more information. For the purposes of this analysis, only the AM 2034 volumes were analyzed since this scenario represented the highest mix of volume. While weave volumes are not certified, it was assumed that the eastbound IR-275 exit ramp is comprised of 50% traffic from IR-275 and 50% from IR-75. Please refer to Appendix C for the volume summary.

Capacity Analysis

Using 2010 HCS, the weave analysis for this weave of eastbound IR-275 to Mosteller Road was LOS E. Please refer to Appendix D for the output.

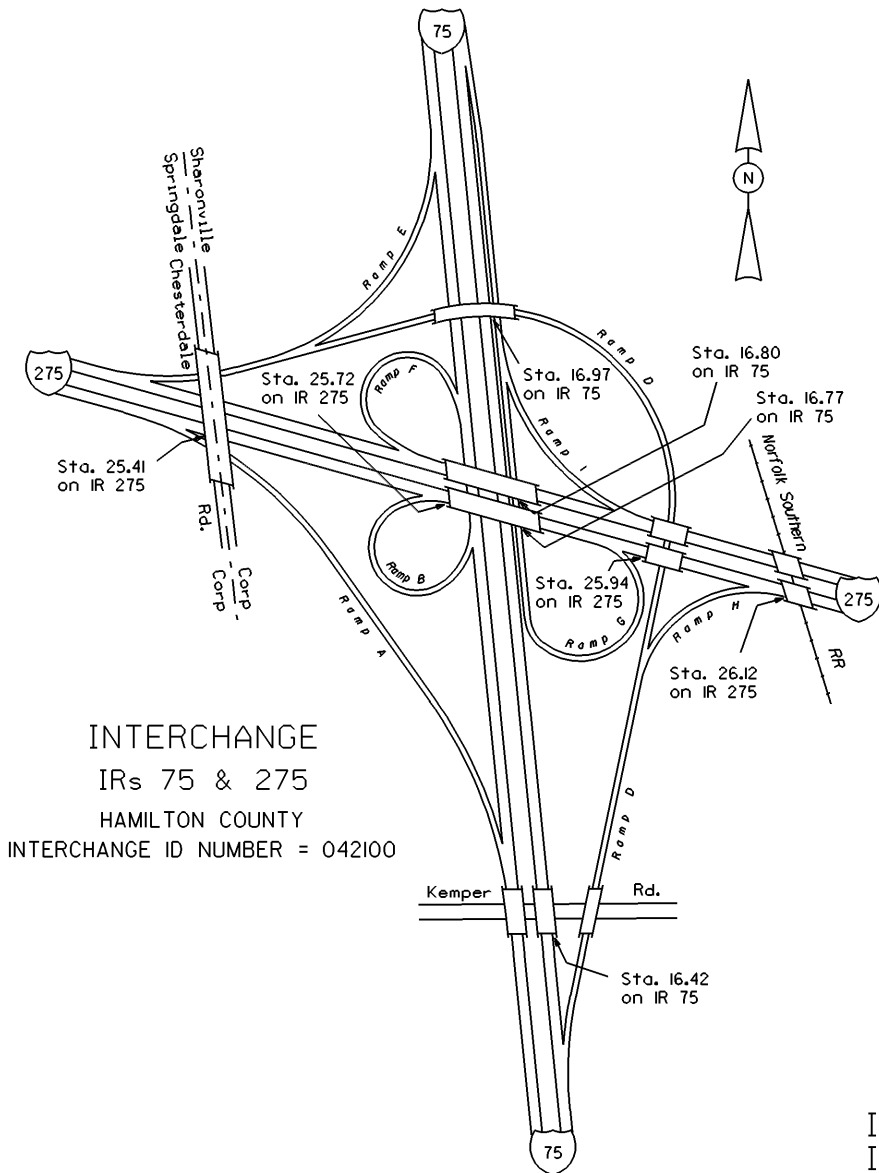
Recommendation

While the LOS for this weave is not D or above, a LOS E for this urban scenario would represent a major improvement for the area, eliminating two failing weaves and allowing a two lane exit from southbound IR-75 to IR-275. It is recommended that analysis proceed with an IMS.

CC:
Jay Hamilton
Brianne Millard
File

Appendix A

Location Map



INTERCHANGE
 IRs 75 & 275
 HAMILTON COUNTY
 INTERCHANGE ID NUMBER = 042100

Appendix B

Certified Traffic

INTER-OFFICE COMMUNICATION

TO: Jennifer F. Elston, Pavement Engineer, District 8

FROM: Becky Salak, Transportation Planner, Office of Statewide Planning and Research

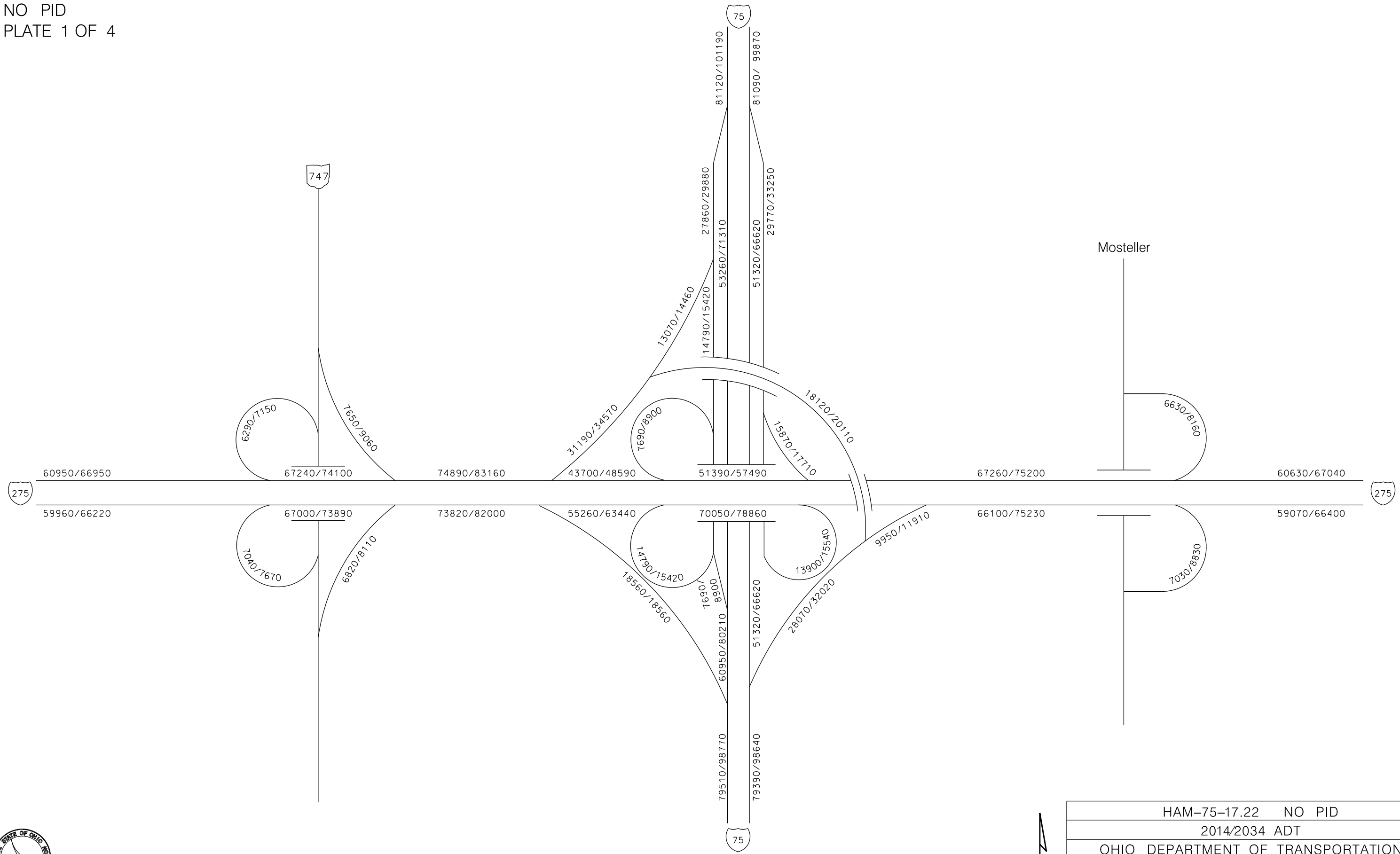
SUBJECT: HAM-75-17.22, No PID

DATE: January 25, 2013

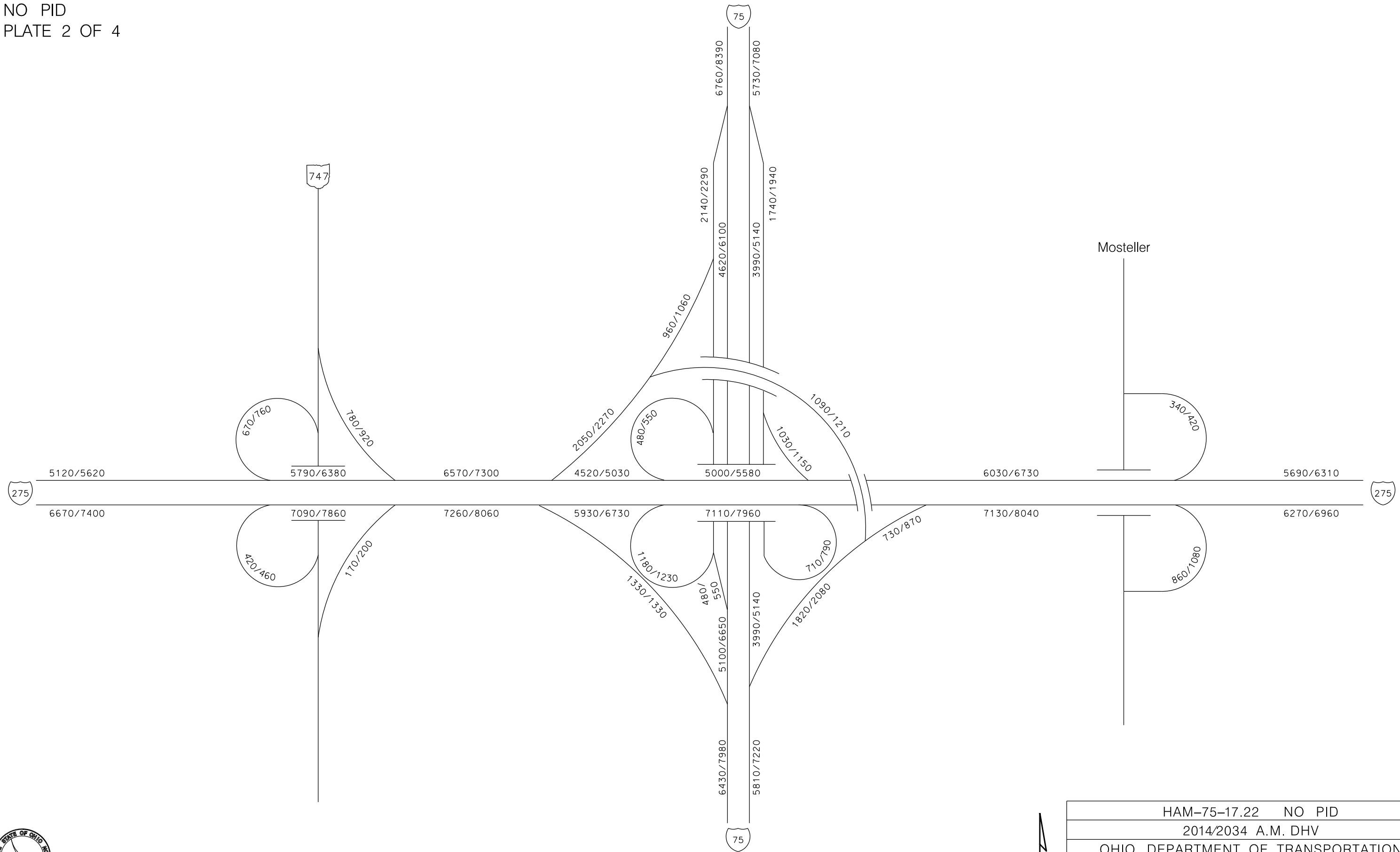
In reply to a request dated January 2, 2013, plates are attached showing 2014/2034 ADT, A.M. DHV, P.M. DHV and truck factors. K & D factors can be calculated from the plates as needed. The requested weaves for the loop ramps are not provided. Please refer to Leigh's response regarding these weaves from the original 2008 request (attached to this IOC).

If you have any questions, please contact me at (614) 644-8195.

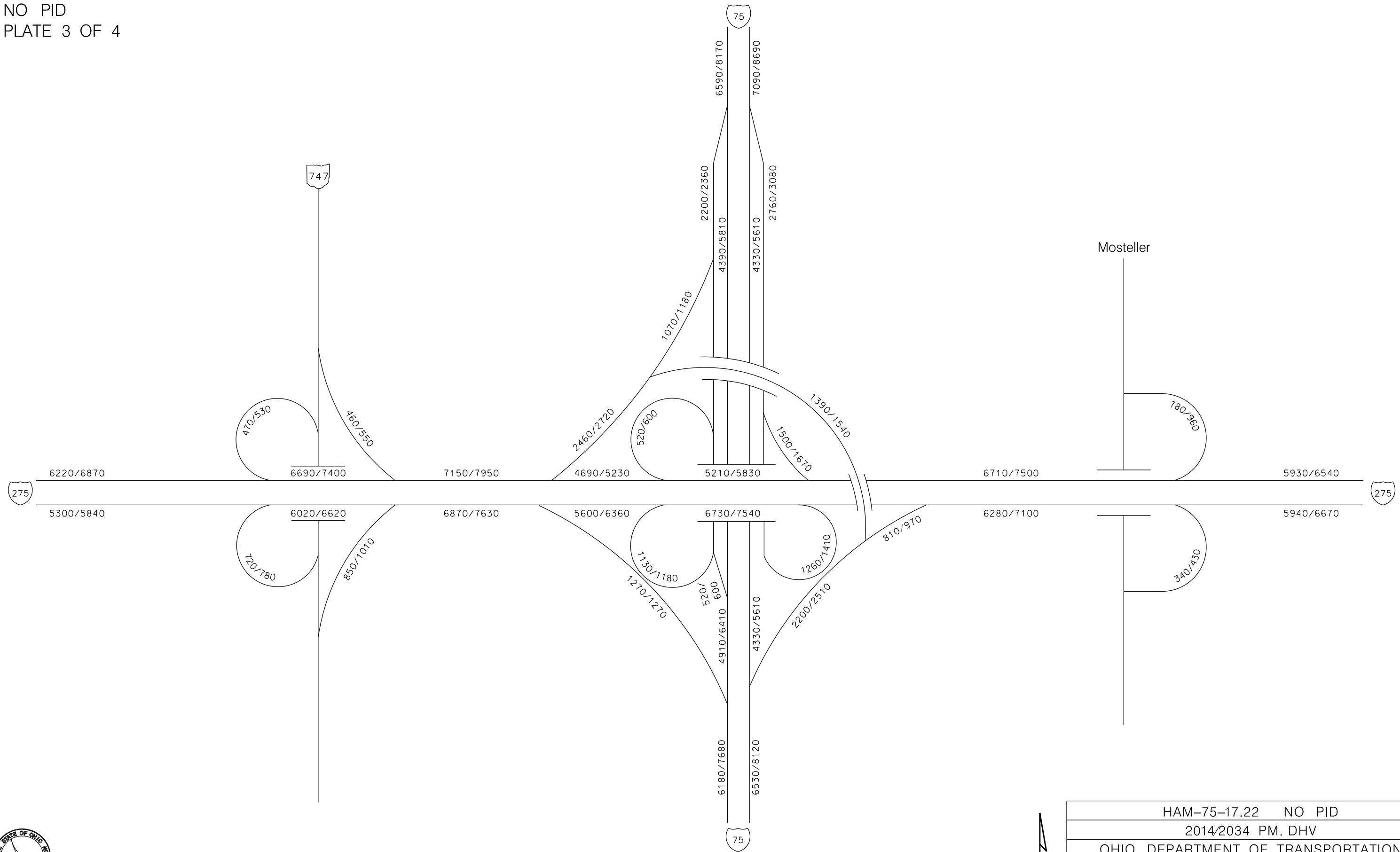
c: M. Byram, OSPR – G. Giaimo, OSPR – File



HAM-75-17.22 NO PID	
2014/2034 ADT	
OHIO DEPARTMENT OF TRANSPORTATION	
OFFICE OF STATEWIDE PLANNING & RESEARCH	
JANUARY 25, 2013	NOT TO SCALE

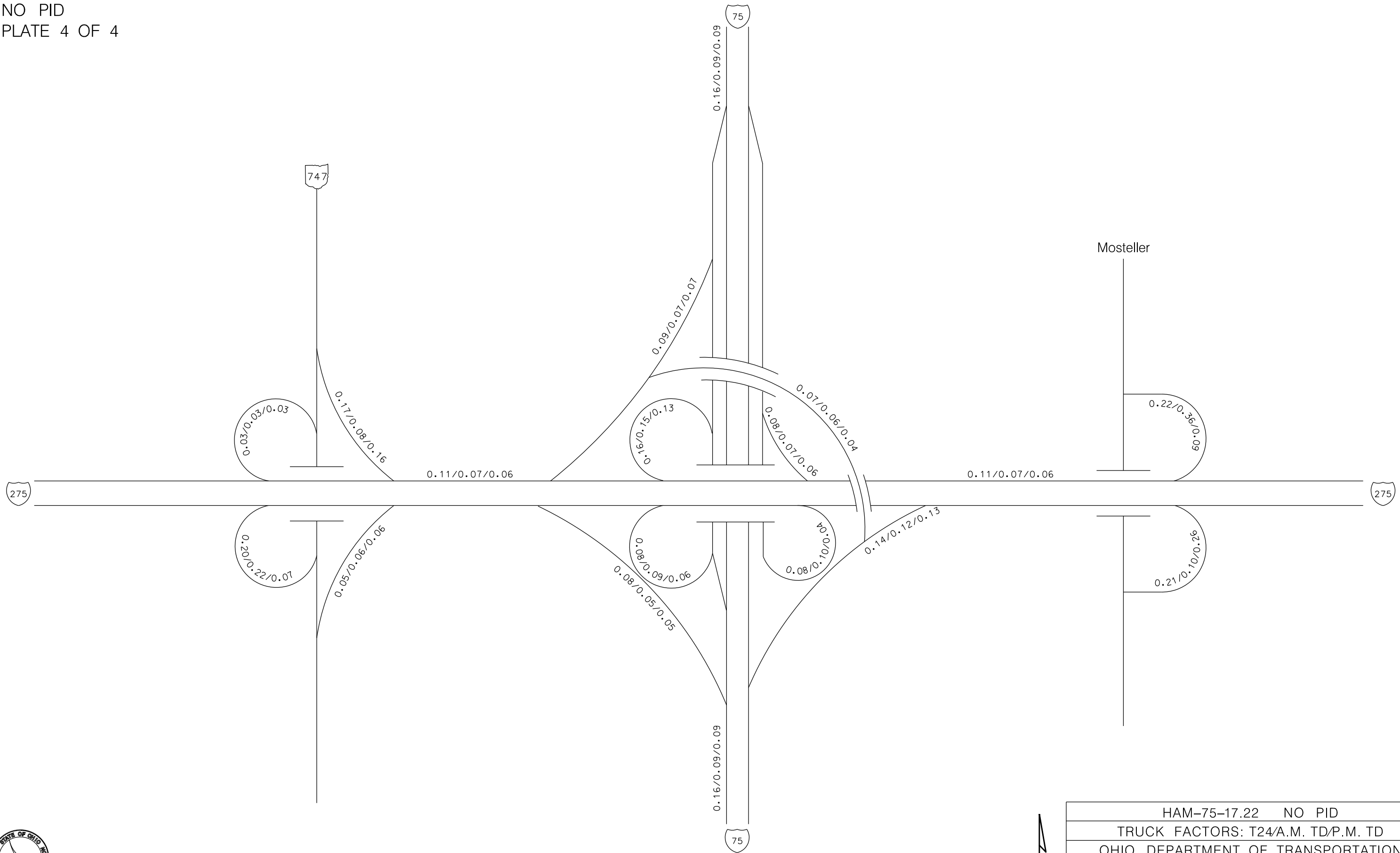


HAM-75-17.22 NO PID	
2014/2034 A.M. DHV	
OHIO DEPARTMENT OF TRANSPORTATION	
OFFICE OF STATEWIDE PLANNING & RESEARCH	
JANUARY 25, 2013	NOT TO SCALE



HAM-75-17.22 NO PID	
2014/2034 PM. DHV	
OHIO DEPARTMENT OF TRANSPORTATION	
OFFICE OF STATEWIDE PLANNING & RESEARCH	
JANUARY 25, 2013	NOT TO SCALE

HAM-75-17.22
 NO PID
 PLATE 4 OF 4



HAM-75-17.22 NO PID	
TRUCK FACTORS: T24/A.M. TDP/M. TD	
OHIO DEPARTMENT OF TRANSPORTATION	
OFFICE OF STATEWIDE PLANNING & RESEARCH	
JANUARY 25, 2013	NOT TO SCALE


**Leigh
Oesterling/TechServices/CEN/O
DOT**

10/07/2008 08:52 AM

To Tom Arnold/Planning/D08/ODOT@ODOT

cc

bcc

Subject Re: Fw: (2) cert traffic requests from D-8 with turning movements
(HAM-75/275 PID 84425) 

Hi Tommy,

I just sent out the design traffic for this project to you and Jennifer. I wanted to explain the weaving data that a did (and did not) provide.

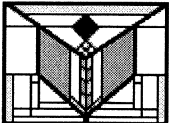
I did provide the weave data for EB IR 275 between IR 75 NB entrance ramp and the exit ramp to Mosteller Road. Select link data from the OKI model was used to develop the weaves.

I did not provide the weaving data for the other two requested locations. For the loop ramps, the weaves are implicit in the actual ramp volumes. For example, the total volume on the IR 75 SB to IR 275 EB loop ramp comes from IR 75 SB. None of the volume is assumed to come from IR 275 WB, as this would be an illogical movement (kind of like making a U-turn). In reality, it is possible that vehicles will make this illogical movement (i.e. when they've missed their exit and need to turn around), but we do not normally show any of these types of illogical movements. I guess if you are designing the ramps to account for this occasional illogical movement, then you could assume something like 1% of the vehicles making the illogical movement.

Let me know if you have any questions, or wish to discuss this further.

Leigh

Tom Arnold/Planning/D08/ODOT



**Tom
Arnold/Planning/D08/ODOT**
09/24/2008 09:00 AM

To Leigh Oesterling/TechServices/CEN/ODOT@ODOT

cc Jennifer Elston/Planning/D08/ODOT@ODOT

Subject Re: Fw: (2) cert traffic requests from D-8 with turning movements
(HAM-75/275 PID 84425) 

Leigh:

I would like to see the following weaves:

- the southbound weave on the C-D system linking the two loop ramps on the west side of IR-75 (loop ramp from westbound IR-275 to southbound IR-75 C-D and the loop ramp from southbound IR-75 C-D to eastbound IR-275).
- the eastbound weave on IR-275 between the two loops on the south side of IR-275 (loop ramp from southbound IR-75 C-D to eastbound IR-275 and the loop ramp from eastbound IR-275 to northbound IR-75 C-D)
- the eastbound weave on IR-275 between the northbound IR-75 entrance to eastbound IR-275 and the eastbound IR-275 exit to Mosteller Road. (There is an auxiliary lane between these two interchanges.)

Please let me know if this info helps, or if you need any additional information. Thanks for your help, as always.

Thanks,

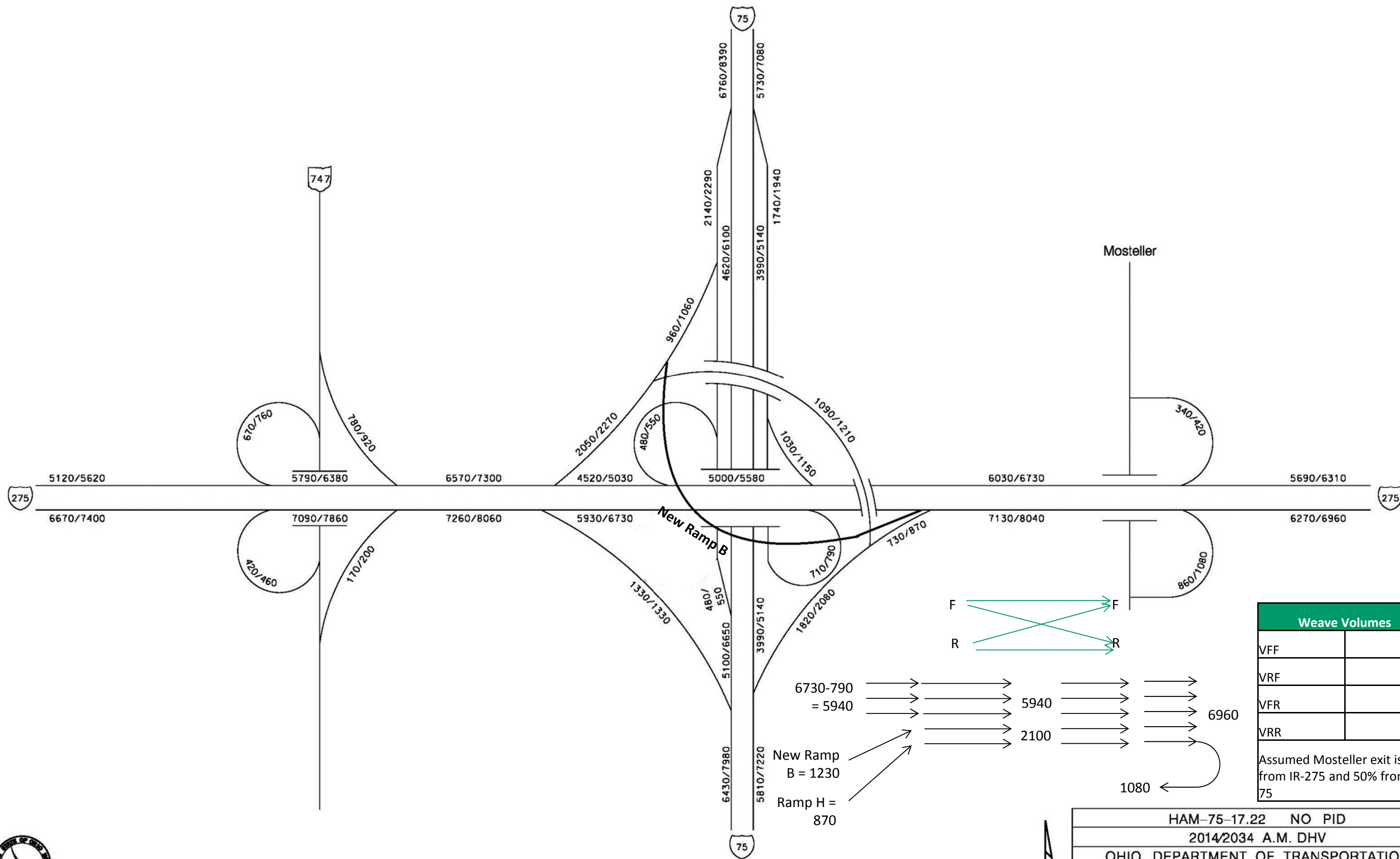
Tommy Arnold, P.E.

Transportation Engineer

District 8 Planning Department

Appendix C

Weave Volume Calculation



Weave Volumes	
VFF	5400
VRF	1560
VFR	540
VRR	540
Assumed Mosteller exit is 50% from IR-275 and 50% from IR-75	

HAM-75-17.22 NO PID
 2014/2034 A.M. DHV
 OHIO DEPARTMENT OF TRANSPORTATION
 OFFICE OF STATEWIDE PLANNING & RESEARCH
 JANUARY 25, 2013 | NOT TO SCALE



Appendix D

HCS Weave Analysis

Phone:
E-mail:

Fax:

-----Operational Analysis-----

Analyst: eta
 Agency/Co.: ODOT D8
 Date Performed: 8/6/2014
 Analysis Time Period: AM Build
 Freeway/Dir of Travel: EB IR-275
 Weaving Location: IR-75 to Mosteller
 Analysis Year: 2034
 Description: HAM-75 & IR-275 Study (PID 97429)

-----Inputs-----

Segment Type	Freeway	
Weaving configuration	One-Sided	
Number of lanes, N	5	ln
Weaving segment length, LS	1360	ft
Freeway free-flow speed, FFS	65	mi/h
Minimum segment speed, SMIN	15	mi/h
Freeway maximum capacity, cIFL	2350	pc/h/ln
Terrain type	Level	
Grade	0.00	%
Length	0.00	mi

-----Conversion to pc/h Under Base Conditions-----

	Volume Components				veh/h
	VFF	VRF	VFR	VRR	
Volume, V	5400	1560	540	540	
Peak hour factor, PHF	0.94	0.94	0.94	0.94	
Peak 15-min volume, v15	1436	415	144	144	
Trucks and buses	7	12	21	21	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.966	0.943	0.905	0.905	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	5946	1759	635	635	pc/h
Volume ratio, VR		0.267			

-----Configuration Characteristics-----

Number of maneuver lanes, NWL	3	ln
Interchange density, ID	1.0	int/mi
Minimum RF lane changes, LCRF	1	lc/pc
Minimum FR lane changes, LCFR	2	lc/pc
Minimum RR lane changes, LCRR		lc/pc
Minimum weaving lane changes, LCMIN	3029	lc/h
Weaving lane changes, LCW	3582	lc/h
Non-weaving vehicle index, INW	895	
Non-weaving lane change, LCNW	1130	lc/h
Total lane changes, LCALL	4712	lc/h

-----Weaving and Non-Weaving Speeds-----

Weaving intensity factor, W	0.602
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Average weaving speed, SW	46.2	mi/h
Average non-weaving speed, SNW	34.6	mi/h

_____Weaving Segment Speed, Density, Level of Service and Capacity_____

Weaving segment speed, S	37.1	mi/h
Weaving segment density, D	48.4	pc/mi/ln
Level of service, LOS	E	
Weaving segment v/c ratio	0.826	
Weaving segment flow rate, v	8975	pc/h
Weaving segment capacity, cW	10502	veh/h

_____Limitations on Weaving Segments_____

If limit reached, see note.

	Minimum	Maximum	Actual	Note
Weaving length (ft)	300	3664	1360	a,b
Density-based capacity, cIWL (pc/h/ln)		2350	2174	c
v/c ratio		1.00	0.826	d

Notes:

- In weaving segments shorter than 300 ft, weaving vehicles are assumed to make only necessary lane changes.
- Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments."
- The density-based capacity exceeds the capacity of a basic freeway segment, under equivalent ideal conditions.
- Volumes exceed the weaving segment capacity. The level of service is F.
