FORM 696-1 WORK ZONE CONSTRAINT TABLE EXAMPLE

	Work Zone Alternative		
Constraint	***Part Width***	***Crossover***	***Contra Flow***
Ability to meet the Work Zone Policy	**Impact: Medium** Policy can be met if some ramp and work area reductions can be tolerated due to ramp fly-over column constraint at 275+00 (the lanes have been shifted towards the existing median leaving a pinch point between Phases 1 and 2. This pinch point may not allow for reasonable cut lines between existing and proposed beam lines.)	**Impact: Medium** Policy can be met if some ramp and work area reductions can be tolerated due to ramp fly-over column constraints at 275+00 (during Phases 1 and 2, NB shoulder width will need to be reduced.)	**Impact: None** Policy can be met.
Ability to maintain all entrance and exit ramps	**Impact: Medium** The policy cannot be fully met. On I-75, all required lanes will be open. However, 3 ramps will need to be closed during parts of some phases.(Phase 1 - I-75 NB ramp to US 35 can be maintained but the proposed profile is 4 ft lower in this area requiring a pavement wedge. US 35 to I-75 SB ramp can be maintained with part-width methods. However, doing the same with US 35 to Stewart St. ramp becomes very complex due to maintaining both ramps around work in the same area of project (same in Phase 2.)) (Phase 2 - both ramps at 232+00 will be buried under the fill needed for the termporary pavement to shift traffic back to normal operations). *See Ramp Table.*	**Impact: Medium** The policy cannot be fully met. On I-75, all required lanes will be open. However, 3 ramps will need to be closed during parts of some phases. (Phase 1 - fill needed for temporary pavement to cross traffic back to lanes will bury the I-75 SB ramp to Edward C. Moses Blvd. Ramp from US 35 to I-75 SB can be maintained using part width methods. However, maintaining the US 35 ramp to Stewart St will make the part-width methods extremely complex due to this ramp and the US 35 to I-75 SB ramp both needing to shift around work in the area. Ramp from US 35 to I-75 SB could be run in the contra flow fashion to reduce temporary widening needs.) (Phase 2 - fill needed for temporary pavement to cross traffic back to lanes will bury the Edwin C. Moses Blvd ramp to I-75 NB. Ramp from I-75 NB to US 35 can be maintained part-width. Profile difference of 4 ft will require temporary wedge to return ramp to proper elevation. This ramp can be run in a contra flow fashion to reduce termporary widening needs.) *See Ramp Table.*	**Impact: Medium** The policy cannot be fully met. On I-75, all required lanes will be open. However, 3 ramps will need to be closed during parts of some phases. See Part Width Option description. *See Ramp Table.*
Ability to provide required entrance ramp merge decision sight distance	**Impact: None** Provided for open ramps. See Ramp Table.	**Impact: None** Provided for open ramps. See Ramp Table.	**Impact: None** Provided for open ramps. See Ramp Table.
Right-of-way impacts	**Impact: Medium** Relatively significant temporary widening needs on high fill may create a need for temporary right-of-way or wall construction to eliminate this need. Costs between part-width and crossover are not expected to be significant.	**Impact: Medium** Relatively significant temporary widening needs on high fill may create a need for temporary right-of-way or wall construction to eliminate this need. Costs between part-width and crossover are not expected to be significant.	**Impact: None** No impacts expected.
Environmental impacts	**Impact: Low** Temporary right-of-way needs may create a need for some environmental field reviews. However, the highly urban nature of the surrounding environment is not expected to produce signifcant issues. (Phase 1 - widening will be into the fill slope for the I-75 NB to US 35 ramp.)	**Impact: Low** Temporary right-of-way needs may create a need for some environmental field reviews. However, the highly urban nature of the surrounding environment in not expected to produce signifcant issues. (Phase 1 - widening will be into the fill slope for the I-75 NB to US 35 ramp.)	**Impact: None** No impacts expected.
Bridge widths	**Impact: Very High Cost and Duration** Existing bridges will require significant widening with substructures that will affect the roadway below. Proposed bridge widths will be affected and types cannot be determined without knowledge of MOT widening needs. (Phase 2 - temp. structure at 240+00 will close the sidewalk on Cincinnati St. and be very close to roadway - may require lane reduction or closure on Cincinnati St. Temporary widening at structures 240+00 and 247+00 may create clearance issues. Changes in substructure will not allow a common cut line (b/w existing and proposed deck) making the requirement for spacing b/w phases potentially larger than shown leading to additional temporary pavement and substructure.) **Cost: $14,800,000**	**Impact: Very High Cost and Duration** Existing bridges will require significant widening with substructures that will affect the roadway below. Proposed bridge widths will be affected and types cannot be determined without knowledge of MOT widening needs. (Phase 1 - temporary bridge widening at structures 240+00 and 247+00 may create clearance issues. About 20 ft of widening is needed with 2 decks at 240+00 and 255+00. Deck widening may cause clearance issues. A closure of one lane in each direction on I-75 will eliminate 95% of widening.) (Phase 2 - temporary structure for bridge widening at 240+00 will close the sidewalk on Cincinnati St and be very close to roadway - may require lane reduction or closure on Cincinnati St. **Cost: $13,200,000**	**Impact: Low Cost and Duration** Existing bridge widths are adequate except for relatively minor widening. Future bridge widths may be slightly wider in some areas but not to a significant enough amount to affect type selection or cost/schedule. **Cost: $1,400,000**
Significant impacts for construction duration and construction costs	**Impact: Very High Cost, Duration and Constructability** Part-width construction of existing T-type substructures will be costly, delicate, and expensive beyond the rules-of-thumb used for temporary substructures placed for temporary widening. A cut line well off the center of the T-type substructure may be impractical. This will also affect bridge design. Significant temporay widening on high fill will affect costs and duration. Fill will be borrow during Phase 1 adding to costs; transport of materials will also be an issue. MOT for surface streets under bridges will be relatively substantial. The nature of part-width construction will make a 2-year construction period difficult. **Cost: See Cost Comparison Table**	**Impact: Very High Cost and Duration; Very Low Constructability** Significant temporay widening on high fill will affect costs and duration. Fill will be borrow during Phase 1adding to costs; transport of materials will also be an issue. MOT for surface streets under bridges will be relatively substantial. **Cost: See Cost Comparison Table**	**Impact: Very High Duration and Constructability; Very Low Cost** Part-width construction of existing T-type substructures will be costly, delicate, and expensive beyond the rules-of-thumb used for temporary substructures placed for temporary widening. A cut line well off the center of the T-type substructure may be impractical. This will also affect bridge design. With the 4-phase nature of this scenario, a 2-year construction period may be difficult due to the time needed for part-width construction and to build a crossover. **Cost: See Cost Comparison Table**
Significant impacts to earthwork, retaining walls, pier clearances, profile differences, etc.	**Impact: Very High Cost and Duration; Very Low Constructability** Borrow or retaining walls will be needed for temporary widening. Profile differences will make some ramp maintenance costly, time consuming and challenging. Differences in profile of greater than 2 ft will require more widening or temporary shoring. **Cost: See Cost Comparison Table**	**Impact: Very High Duration; Medium Cost and Very Low Constructability** Borrow or retaining walls will be needed for temporary widening. Profile differences will make some ramp maintenance costly, time consuming and challenging. **Cost: See Cost Comparison Table**	**Impact: Medium Duration; Very Low Cost and Constructability** Profile differences will make some ramp maintenance costly, time consuming and challenging. Differences in profile of greater than 2 ft will require more widening or temporary shoring. **Cost: See Cost Comparison Table**
	Impact: Medium Cost and Duration; None Quality and Constructability	**Impact: Medium Cost and Duration; None Quality and Constructability**	**Impact: Low Cost and Duration; None Quality and Constructability**

	Work Zone Alternative		
Constraint	***Part Width***	***Crossover***	***Contra Flow***
Ability to maintain existing drainage and lighting systems	Existing lighting can be maintained in Phase 1. However, temporary lighting may be necessary in Phase 2 due to median reconstruction. Some drainage structures (e.g. catch basin at 240+25, 241+00, and 247+00). Also significant temporary widening sloping to the outside could speed runoff and overload the off pavement system. Median inlets can be maintained in Phase 1 (where traffic will be.) **Cost: $20,000**	Existing lighting can be maintained in Phase 1. However, temporary lighting may be necessary in Phase 2 due to median reconstruction. Some drainage structures (e.g. catch basin at 240+25, 241+00, and 247+00). Also significant temporary widening sloping to the outside could speed runoff and overload the off pavement system. Median inlets can be maintained in Phase 1 (where traffic will be.) **Cost: $61,000**	Existing lighting can be maintained during Phase 1, 2 and 3. However, temporary lighting may be necessary in Phase 4 due to median reconstruction. Drainage structures can be maintained until Phase 4, but at that time traffic will be on pavement sloping outward. **Cost: $0**
Constructability and construction equipment access	**Impact: High Cost, Duration and Constructability** As mentioned above, T-type demolition and construction part-width will be a major issue. Borrow for the temporary widening will likely not be allowed to use surface streets creating safety issues if they enter and exit I-75 directly and access issues due to providing access down 2:1 slopes to create fill. Maintaining the US 35 ramps on the south side of the interchange will inhibit the contractor from traveling from the north end to the south end of the project. If local streets are not an option, they will have to enter and exit I-75 work zone traffic to make this movement, creating safety issues. **Cost: See Cost Comparison Table**	**Impact: High Cost, Duration and Constructability** As mentioned above, T-type demolition and construction part-width will be a major issue. Borrow for the temporary widening will likely not be allowed to use surface streets creating safety issues if they enter and exit I-75 directly and access issues due to providing access down 2:1 slopes to create fill. Maintaining the US 35 ramps on the south side of the interchange will inhibit the contractor from traveling from the north end to the south end of the project. If local streets are not an option, they will have to enter and exit I-75 work zone traffic to make this movement, creating safety issues. **Cost: See Cost Comparison Table**	**Impact: High Duration; Medium Cost and Constructability** The 4 Phase nature of this alternative will constantly shift access points to the work area. Maintaining the US 35 ramps on the south side of the interchange will inhibit the contractor from traveling from the north end to the south end of the project. If local streets are not an option, they will have to enter and exit I-75 work zone traffic to make this movement, creating safety issues. **Cost: See Cost Comparison Table**
Location of crossovers	**Impact: None** No crossover needed.	**Impact: Low** Yes. Some creative crossover placement will be needed on the north end of the job in Phase 2.	**Impact: Low** Yes. Some creative crossover placement will be needed on the north end of the job in Phase 3 and 4.
Access impacts to important traffic generators such as hospitals, fire departments, industries, etc.	**Impact: Medium** Downtown Dayton has all these generators plus others. Closed exits may cause confusion to non-local traffic or delays following a lengthy or complex detour.	**Impact: Medium** Downtown Dayton has all these generators plus others. Closed exits may cause confusion to non-local traffic or delays following a lengthy or complex detour.	**Impact: Medium** Downtown Dayton has all these generators plus others. Closed exits may cause confusion to non-local traffic or delays following a lengthy or complex detour.
Longitudinal joint locations for concrete pavement	**Impact: Low** Joints on lane lines will probably not be possible unless additional temporary widening is used.	**Impact: None** Concrete pavement in an option.	**Impact: None** Concrete pavement is an option.
Estimated Maintenance of Traffic Cost	See Cost Comparison Table for all the major cost generators and total Maintenance of Traffic Estimated Cost.	See Cost Comparison Table for all the major cost generators and total Maintenance of Traffic Estimated Cost.	See Cost Comparison Table for all the major cost generators and total Maintenance of Traffic Estimated Cost.

* All constraints that require any additions need to have a cost estimate associated with the alternative.

FORM 696-1 WORK ZONE CONSTRAINT TABLE

	Work Zone Alternative		
Constraint	***Part Width***	***Crossover***	***Contra Flow***
Ability to meet the Work Zone Policy	Indicate areas where the policy (# lanes, widths of lanes/shoulders, etc) can and can not be maintained. Include information on what is needed to meet the policy and associated costs.		
Ability to maintain all entrance and exit ramps	Include a Ramp Table. This table shall include ramp designation, number of lanes, ramp volume, ramp truck volume, decision sight distance, whether the ramp will be closed or open for each phase of construction, duration of closure, and detour for closure. If the ramp operates with more than one lane and this will be reduced in any phases of MOT, include this information as well. if a detour is noted - can ramps being used handle additional traffic or will modifications be needed such as widening on the ramp and/or signal work at ramp termini.		
Ability to provide required entrance ramp merge decision sight distance	Provide the proposed decision sight distance at each entrance ramp for each phase in the ramp table. If it does not meet the required DSD in the TEM, how much does it not meet by or what will it take to meet it? This information should be included in the ramp table described above.		
Right-of-way impacts	Explain the project ramifications of overcoming this constraint (e.g. cost of additional ROW, cost of retaining walls used). Include associated impacts to the schedule.		
Environmental impacts	Indicate areas where additional widening, bridge widening, etc. would cause impacts to streams, rivers, etc. Cost impacts and schedule impacts shall be included.		
Bridge widths	Include a Bridge Table. This table shall include extent of work being completed, length of bridge, type of bridge, existing pier spacing, existing bridge width, bridge width needed for each phase of MOT, future bridge width, and additional cost of width needed for each MOT scheme.		
Significant impacts for construction duration and construction costs	Include an estimated time of construction for each alternative. Describe additional costs for each alternative.		
Significant impacts to earthwork, retaining walls, pier clearances, profile differences, etc.	Include information such as amount of retaining wall needed, cost of retaining wall, significant fills or cuts and associated costs, etc.		
Ability to maintain existing drainage and lighting systems	Include information such as removal of median lighting, temporary wedging to allow for drainage, etc. Include any adiditional costs associated with concerns.		
Constructability and construction equipment access	Discuss issues and costs associated with contractor access and ability to construct the project. If alternatives vary greatly in cost or time describe why.		
Location of crossovers	How do the locations of the crossovers on each end of the project affect existing ramps? Are bridge structures going to be constraints in areas of crossovers?		
Access impacts to important traffic generators such as hospitals, fire departments, industries, etc.	Indicate if any ramp closures impact major traffic generators or emergency services in the area. If so, how may this be handled during closure.		
Longitudinal joint locations for concrete pavement			
Estimated Maintenance of Traffic Cost	Include a Cost Comparison Table with the major costs differences between the alternatives analyzed. A total cost for each alternative shall also be included.		

* All constraints that require any additions need to have a cost estimate associated with the alternative.

FORM 696-4 COST COMPARISON TABLE EXAMPLE

	Part-Width Construction	Crossover Construction	Contra Flow Construction
	Cost	Cost	Cost
Additional Right-of-Way	$20,000	$22,000	$0
Retaining Walls	$150,000	$175,000	$0
Additional Bridge Structure	$14,800,000	$13,200,000	$1,400,000
Cut/Fill/Shoring	$1,300,000	$1,000,000	$0
Lighting	$0	$41,000	$0
Drainage	$20,000	$20,000	$0
Temporary Pavement	$4,000,000	$4,500,000	$114,000
Portable Concrete Barrier	$310,000	$150,000	$310,000
Subtotal:	$20,500,000	$19,108,000	$1,824,000
15% Contingency	$3,100,000	$2,900,000	$274,000
MOT RELATED COST	**$23,600,000**	**$22,008,000**	**$2,098,000**
Project Duration	30 months	26 months	32 months

FORM 696-4 COST COMPARISON TABLE

	Part-Width Construction	Crossover Construction	Contra Flow Construction
	Cost	Cost	Cost
Additional Right-of-Way			
Retaining Walls			
Additional Bridge Structure			
Cut/Fill/Shoring			
Lighting			
Drainage			
Temporary Pavement			
Portable Concrete Barrier			
Subtotal:			
15% Contingency			
MOT RELATED COST			
Project Duration			

FORM 696-2 BRIDGE TABLE EXAMPLE

								Part-Width Construction			Crossover Construction			Contra flow Construction		
BRIDGE NAME	STATION	EXTENT OF WORK	TYPE OF BRIDGE	LENGTH OF BRIDGE (ft)	EXISTING PIER SPACING	EXISTING BRIDGE WIDTH (ft)	FUTURE BRIDGE WIDTH (ft)	WIDTH NEEDED FOR PART-WIDTH	COST OF 32" PCB BRIDGE MOUNTED	COST OF ADDITIONAL BRIDGE WIDENING	WIDTH NEEDED FOR CROSSOVER	COST OF 32" PCB BRIDGE MOUNTED	COST OF ADDITIONAL BRIDGE WIDENING	WIDTH NEEDED FOR CONTRA FLOW (crossover lane/contra flow lane)	COST OF 32" PCB BRIDGE MOUNTED	COST OF ADDITIONAL BRIDGE WIDENING
Cincinnati St (L)	239+75	Deck Replacement	Overpass	160	46'-64-46'	54	69	80	$9,344	$520,000	74	$4,672	-	52' / 27'	$9,344	-
Cincinnati St (R)	239+75	Deck Replacement	Overpass	160	46'-64-46'	53.5	57	80	$9,344	$530,000	74	$4,672	$410,000	52' / 27'	$9,344	-
Stewart St (L)	247+25	Replace substructure and superstructure	Overpass	199	44'-100'-44'	54	69	80	$11,622	$64,830,220	74	$5,811	-	52' / 27'	$11,622	-
Stewart St (R)	247+25	Replace substructure and superstructure	Overpass	199	44'-100'-44'	53.5	57	80	$11,622	$659,188	74	$5,811	$509,938	52' / 27'	$11,622	-
Abandoned RR Crossing (L)	262+25	Eliminated	Overpass	145	44'-53'-44'	84	Bridge Eliminated	80.5	$8,468	$0	74	$4,234	-	52' / 27'	$8,468	-
Abandoned RR Crossing (R)	262+25	Eliminated	Overpass	145	44'-53'-44'	41.5	Bridge Eliminated	80.5	$8,468	$706,875	74	$4,234	$589,063	52' / 27'	$8,468	$56,333
Albany St (L)	268+75	Replace substructure and superstructure	Overpass	125	35'-50'-35'	40	57	59	$7,300	$296,875	52	$3,650	-	41' / 16'	$7,300	$4,625
Albany St (R)	268+75	Replace substructure and superstructure	Overpass	125	35'-50'-35'	40	57	59	$7,300	$296,875	52	$3,650	$187,500	41' / 16'	$7,300	$4,625
US 35 (L)	275+35	Replace superstructure	Overpass	97	46'-46'	50	54.5	55.5	$5,665	$66,688	52	$2,832	-	41' / 16'	$5,665	-
US 35 (R)	275+35	Replace superstructure	Overpass	97	46'-46'	54.5	54.5	57	$5,665	$8,973	52	$2,832	-	41' / 16'	$5,665	-
Washington St/CSX (L)	282+00	Replace substructure and superstructure	Overpass	686	51'-64'-74'-104'-104'-57'-83'-82'-58'	41	60	58	$40,062	$1,457,750	52	$20,031	-	41' / 16'	$40,062	-
Washington St/CSX (R)	282+00	Replace substructure and superstructure	Overpass	686	51'-64'-74'-104'-104'-57'-83'-82'-58'	40	60	58	$40,062	$1,543,500	52	$20,031	$1,029,000	41' / 16'	$40,062	$25,382
Washington St/CSX (L)	286+00	Replace substructure and superstructure	Overpass	686	51'-64'-74'-104'-104'-57'-83'-82'-58'	64	84	58	$40,062	$0	96	$20,031	$1,029,000	63' / 38'	$40,062	-
Washington St/CSX (R)	286+00	Replace substructure and superstructure	Overpass	686	51'-64'-74'-104'-104'-57'-83'-82'-58'	64	84	58	$40,062	$0	96	$20,031	$2,744,000	63' / 41'	$40,062	-
Edwin C. Moses (L)	294+75	Replace substructure and superstructure	Overpass	605	77'-117'-59'-59'-117'-100'-66'	64	84	80	$35,332	$1,210,000	96	$17,666	$907,500	63' / 41'	$35,332	-
Edwin C. Moses (R)	294+75	Replace substructure and superstructure	Overpass	605	77'-117'-59'-59'-117'-100'-66'	64	84	80	$35,332	$1,210,000	96	$17,666	$2,420,000	63' / 41'	$35,332	-

FORM 696-2 BRIDGE TABLE

								Part-Width Construction			Crossover Construction			Contra flow Construction		
BRIDGE NAME	STATION	EXTENT OF WORK	TYPE OF BRIDGE	LENGTH OF BRIDGE	EXISTING PIER SPACING	EXISTING BRIDGE WIDTH	FUTURE BRIDGE WIDTH	WIDTH NEEDED FOR PART-WIDTH	COST OF 32" PCB BRIDGE MOUNTED	COST OF ADDITIONAL BRIDGE WIDENING	WIDTH NEEDED FOR CROSSOVER	COST OF 32" PCB BRIDGE MOUNTED	COST OF ADDITIONAL BRIDGE WIDENING	WIDTH NEEDED FOR CONTRA FLOW (crossover lane/contra flow lane)	COST OF 32" PCB BRIDGE MOUNTED	COST OF ADDITIONAL BRIDGE WIDENING

FORM 696-3 RAMP TABLE EXAMPLE

RAMP DESIGNATION	NUMBER OF LANES	RAMP VOLUME (% TRUCKS)	RAMP CLOSURE											DETOUR
			PART-WIDTH			CROSS-OVER			CONTRA FLOW					
			PHASE 1	PHASE 2	DURATION OF CLOSURE	PHASE 1	PHASE 2	DURATION OF CLOSURE	PHASE 1	PHASE 2	PHASE 3	PHASE 4	DURATION OF CLOSURE	
I-75 NB Entrance from Edwin C. Moses	1	9950 (11)	N	N	N/A	N	N	N/A	N	N	N	N	N/A	Ramp will be open.
I-75 SB Exit to Edwin C. Moses	1	10460 (11)	N	N	N/A	N	N	N/A	N	N	N	N	N/A	Ramp will be open.
I-75 NB exit to US 35	1	19890 (10)	N	N	N/A	N	N	N/A	N	N	N	N	N/A	Ramp will be open and shifted around the work with a wedge to reach new profile when needed.
I-75 SB entrance to US 35	1	20300 (10)	N	N	N/A	N	N	N/A	N	N	N	N	N/A	Ramp will be open and shifted around the work with a wedge to reach new profile when needed.
Stewart St from US 35	1	-	Y	N	6-8 mos	Y	N	6-8 mos	Y	N	N	N	6-8 mos	This ramp can not be totally detoured on state roadways. Discussions with Dayton are required.
I-75 NB entrance from Albany St	1	Permanent Closure	Y	Y	Forever	Y	Y	Forever	Y	Y	Y	Y	Forever	No detour - permanent closure.
I-75 SB exit to Albany St	1	Permanent Closure	Y	Y	Forever	Y	Y	Forever	Y	Y	Y	Y	Forever	No detour - permanent closure.
I-75 NB entrance from US 35	2	15490 (10)	Y	N	8-10 mos	N	Y	8-10 mos	Y	N	Y	N	8-10 mos	US 35 EB detour: US 35 EB , I-675 NB, I-70 WB, US 35 WB detour: This detour will utilize some local routes, discussions with Dayton will follow.
I-75 SB exit to US 35	2	20820 (10)	Y	N	8-10 mos	Y	N	8-10 mos	Y	N	Y	N	8-10 mos	I-75 SB, I-675 NB
I-75 NB exit to Third St	1		N	N	N/A	N	N	N/A	N	N	N	N	N/A	Ramp will be open.

FORM 696-3 RAMP TABLE

RAMP DESIGNATION	NUMBER OF LANES	RAMP VOLUME (% TRUCKS)	RAMP CLOSURE											DETOUR
			PART-WIDTH			CROSS-OVER			CONTRA FLOW					
			PHASE 1	PHASE 2	DURATION OF CLOSURE	PHASE 1	PHASE 2	DURATION OF CLOSURE	PHASE 1	PHASE 2	PHASE 3	PHASE 4	DURATION OF CLOSURE	