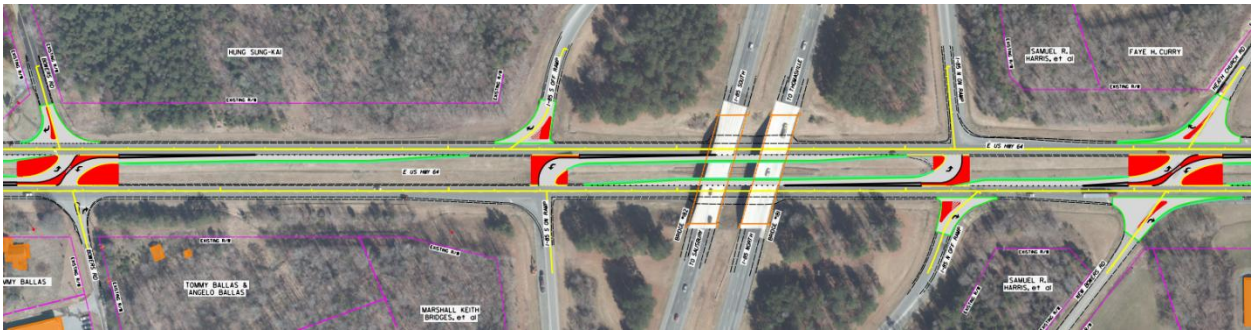
Directory of 125 Four-Legged Service Interchange Concepts

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bbBB	Single roundabout	20
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bbBB	Tight diamond with two one-way bypasses	22
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biDH	One loop A with displaced left from freeway	31
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ccCH	Standard diamond one displaced left	37
ccCH	Standard diamond one displaced left with roundabout	38
ccCL	Half Milwaukee B	39
ccCL	Half Milwaukee B with roundabout	40
ccFF	Standard diamond standard contraflow	41
ccJJ	Superstreet	42
ccLL	Standard diamond u-turn over freeway with slip ramp	43
ccMM	Standard diamond St. Aug.	44
cdIL	One loop B one Milwaukee B	45
chCH	Offset SPUI	46
chCH	Offset SPUI with roundabout	47
chCH	One-sided DDI	48
ciDL	One loop A one Milwaukee B	49
ciDL	One loop A one Milwaukee B with right ramp	50
ciDL	One loop A one Milwaukee B with roundabout	51
ciDL	One loop A one Milwaukee B with roundabout and right ramp	52
clCL	Elevated Double U	53
clCL	Elevated Double U with roundabout	54
clCL	V	55
clCL	V with one roundabout	56
ddAA	Three point	57
ddBB	Spread diamond tight diamond	58
ddDD	Spread diamond	59
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ddII	Parclo B	61
ddJJ	Spread diamond u-turn on arterial	62
dhBI	One loop B displaced left	63
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eeJJ	Synchronized with two one-way bypasses	75
ffCC	Contraflow	76
ffFF	Super DDI	77
ffLL	Milwaukee B	78
ggAA	Spread contraflow single point	79
ggBB	Spread contraflow tight diamond	80
ggGG	Spread contraflow	81
ggII	Folded	82
hhAA	Displaced single point	83
hhBB	Displaced tight diamond	84
hhBH	Three-quarters displaced	85
hhCC	Displaced left	86
hhDD	Displaced spread diamond	87
hhFF	Displaced standard contraflow	88
hhHH	Displaced displaced	89
hhII	Continuous flow	90
hiDI	Parclo AB with CFI	91
hiDL	Single quadrant half DDI	92
hiDL	Single quadrant loop	93
iiDD	Parclo A	94
iiDH	Parclo A with displaced left from freeway	95
iiDI	Three loop missing B	96
iiGG	Parclo ProgressA	97
iiHH	Loop displaced	98
iiII	Cloverleaf	99
iiJJ	Loop u-turn on arterial	100
iiMM	Loop St. Aug.	101
jjAA	U-turn on arterial single point	102
jjBB	U-turn on arterial tight diamond	103
jjCC	U-turn on arterial standard diamond	104
jjFF	U-turn on arterial standard contraflow	105
jjJJ	Signalized FRE	106
jjKK	U-turn on arterial u-turn over freeway	107
jjLL	U-turn on arterial u-turn over freeway with slip	108
kkBB	Median u-turn	109
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Contents, Continued.

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kkLL	U-turn over freeway u-turn over freeway with slip	114
llBB	U-turn over freeway with slip tight diamond	115
llCC	Milwaukee A	116
llFF	U-turn over freeway with slip standard contraflow	117
llII	U-Turn over freeway with slip loops	118
llJJ	U-turn over freeway with slip u-turn on arterial	119
llKK	U-turn over freeway with slip u-turn over freeway	120
llLL	W	121
mmAA	St. Aug. single point	122
mmBB	St. Aug. tight diamond	123
mmCC	St. Aug. standard diamond	124
mmFF	St. Aug. standard contraflow	125
mmMM	St. Aug. St. Aug.	126
nnBB	Split diamond tight diamond	127
nnCC	Split diamond standard diamond	128
nnEE	Split diamond tight contraflow	129
nnFF	Split diamond standard contraflow	130
nnKK	Split diamond u-turn over freeway	131
nnLL	Split diamond u-turn over freeway with slip	132
None	Over-under	133
None	Three level center turn	134
None	Three level roundabout	135
None	Three level traditional	136

Matrix of Symmetric Two-Level Concepts

Name = Known to be built and/or published; Letters = Promising new interchange; Blank = Likely no application potential

Tight means about 200 ft between ramp terminals, standard means about 600 ft, spread means about 1200 ft

Lefts from fwy: Lefts from arterial	A. Single point	B. Tight dia.	C. Std. dia.	D. Spread dia.	E. Tight Contra-flow	F. Std. Contra-flow	G. Spread Contra-flow	H. Dis-placed	I. Loop	J. U-turn on arterial	K. U-turn over fwy.	L. U-turn over fwy. w/ slip	M. St. Aug. u-turn
a. Single point	Single point			aaDD				aaHH					
b. Tight diamond	bbAA	Tight dia.					bbGG	bbHH		bbJJ	bbKK		
c. Std. diamond			Std. dia.			ccFF				Super-street		ccLL	ccMM
d. Spread diamond	Three point	ddBB		Spread dia.				ddHH	Parclo B	ddJJ			
e. Tight contraflow				Offset dia.						Synchro-nized			
f. Std. contraflow			Contra-flow			Super DDI						Milwaukee B	
g. Spread contraflow	ggAA	ggBB					ggGG		Folded				
h. Displaced	hhAA	hhBB	Displaced left	hhDD		hhFF		hhHH	CFI				
i. Loop				Parclo A			Parclo ProgressA	iiHH	Clover-leaf	iiJJ			iiMM
j. U-turn on arterial	jjAA	Median u-turn on art.	jjCC			jjFF				Signalized FRE	jjKK	jjLL	
k. U-turn over fwy.		Median u-turn								(Same as jjKK)	kkKK	kkLL	
l. U-turn over fwy. w/ slip ramp		llBB	Milwaukee A			llFF			I-41	llJJ	llKK	W	
m. St. Aug. u-turn	mmAA	mmBB	St. Aug. u-turn			mmFF							mmMM
n. Split diamond		nnBB	Split diamond		nnEE	nnFF					nnKK	nnLL	

Interchange Concept Scoring Criteria

We judged interchange concepts in 12 categories. Within each category we used a scale of zero to five points, with zero representing the poorest quality of service and five representing the best.

Efficiency

Capacity

5) Arterial AADT at capacity, vpd = 42667 (L+T, 2 phases)
4) Arterial AADT at capacity, vpd = 32000 (2L+T, 2 phases)
3) Arterial AADT at capacity, vpd = 30000 (2L+T, 3 phases)
2) Arterial AADT at capacity, vpd = 25600 (3L+T, 2 phases)
1) Arterial AADT at capacity, vpd = 24000 (3L+T or L+2T, 3 phases)
0) Arterial AADT at capacity, vpd = 21333 or lower (4L+T or 2L+2T, 3 or 4 phases)

Quality of Progression

5) Number of full signals = 0
4) Number of full signals = 1, number of phases = 2
3) Number of full signals = 1, number of phases = 3; or one or more roundabouts with one or more half signals in each direction and no full signals
2) Number of full signals = 1, number of phases = 4; or one or more roundabouts with no signals
1) Number of full signals = 2, number of phases = 2 or 2.5; or one or more roundabouts with one full signal
0) Number of full signals = 2, number of phases = 3; or one or more roundabouts with two full signals

Extra Distance Travelled

5) Total = 800 ft or lower
4) Total = 801 to 2000 ft
3) Total = 2001 to 3000 ft
2) Total = 3001 to 4000 ft
1) Total = 4001 to 6000 ft
0) Total = 6001 ft or higher

Safety

Conflict Points

5) Weighted total = 10 or lower
4) Weighted total = 11 to 14
3) Weighted total = 15 to 18
2) Weighted total = 19 to 22
1) Weighted total = 23 to 26
0) Weighted total = 27 or higher

Unusual Maneuvers
5) Total = 0
4) Total = 1 or 2
3) Total = 3 or 4
2) Total = 5 or 6
1) Total = 7 or 8
0) Total = 9 or more

Wrong Way Potential
5) Five “no” values to questions related to type of wrong way movements
4) Four “no” values
3) Three “no” values
2) Two “no” values
1) One “no” values
0) Zero “no” values

Pedestrian Quality
5) Weighted total number of crossings = 0 to 2
4) Weighted total = 3 to 4
3) Weighted total = 5 to 6
2) Weighted total = 7 to 8
1) Weighted total = 9 to 10
0) Weighted total = 11 or higher
Subtract one point for any design that causes pedestrians to have to walk more than 500 feet longer than the straight line distance.

Speed Control
5) Two or more curving geometric elements in each direction plus one or more half signals in each direction that are not in the curves (in other words, three or more total speed control features in each direction). Examples include the nnBB split diamond tight diamond and the mmFF St Aug. standard contraflow.
4) Two curving geometric elements in each direction. Examples include the ccCC double roundabout and ccCC diverging diamond.
3) Two or more half signals in each direction, or one curving element in each direction plus one half signal not in a curve in each direction. Examples include the eeJJ synchronized interchange and the ddll parclo B.
2) One curving geometric element in each direction. Examples include the bbBB single roundabout and the chCH offset SPUI with roundabout.
1) One half signal in each direction. Examples include the chCH one-sided DDI and the ddHH spread diamond displaced.
0) None of the above. Examples include the ccCC standard diamond and the diDI parclo AB.

Cost

Bridge Size

5) Total = 14,000 sf or lower
4) Total = 14,001 to 16,000 sf
3) Total = 16,001 to 18,000 sf
2) Total = 18,001 to 20,000 sf
1) Total = 20,001 to 22,000 sf
0) Total = 22,001 sf or higher

Right of Way

5) Total = 200,000 sf or lower
4) Total = 200,001 to 400,000 sf
3) Total = 400,001 to 600,000 sf
2) Total = 600,001 to 800,000 sf
1) Total = 800,001 to 1,000,000 sf
0) Total = 1,000,001 sf or higher

Extent Along Freeway

5) Total = 2000 ft or lower
4) Total = 2001 to 2700 ft
3) Total = 2701 to 3600 ft
2) Total = 3601 to 5000 ft
1) Total = 5001 to 7000 ft
0) Total = 7001 ft or higher

Extent Along Arterial

5) Total = 400 ft or lower
4) Total = 401 to 800 ft
3) Total = 801 to 1200 ft
2) Total = 1201 to 1600 ft
1) Total = 1601 to 2000 ft
0) Total = 2001 ft or higher

Top Performing Interchanges

Top total scores

Rank	Code	Name	Score
1	eeJJ	Synchronized	46
2	ccCC	Double roundabout	45
3	nnEE	Split diamond tight contraflow	44
4	nnBB	Split diamond tight diamond	44
5	mmAA	St. Aug. single point	43
6	nnLL	Split diamond u-turn over freeway with slip	42
7	eeJJ	Synchronized with two one-way bypasses	42
8	ccJJ	Superstreet	42
9	jjJJ	Signalized FRE	42
10	bbJJ	Tight diamond u-turn on arterial	42

Top efficiency scores

Rank	Code	Name	Score
1	None	Three level roundabout	15
1	None	Three level traditional	15
1	None	Three level center turn	15
4	aaHH	Single point displaced	14
4	ffFF	Super DDI	14
4	hhAA	Displaced single point	14
7	hhBH	Three-quarters displaced	13
7	hhFF	Displaced standard contraflow	13
7	hhHH	Displaced displaced	13
7	None	Over-under	13

Top safety scores

Rank	Code	Name	Score
1	ccCC	Double roundabout	21
1	nnLL	Split diamond u-turn over freeway with slip	21
3	bbBB	Single roundabout	19
3	bdBI	One loop B with roundabout	19
3	ccLL	Standard diamond u-turn over freeway with slip ramp	19
3	cdIL	One loop B one Milwaukee B	19
3	chCH	Offset SPUI with roundabout	19
3	ddII	Parclo B	19
3	diDI	Parclo AB with two roundabouts	19
3	eeJJ	Synchronized with two one-way bypasses	19
3	kkBB	RCI over freeway	19
3	kkKK	ILAC over freeway	19

Top cost scores

Rank	Code	Name	Score
1	bbBB	Tight diamond	20
1	bjBJ	One downstream u-turn	20
3	bbJJ	Tight diamond u-turn on arterial	19
3	jjBB	U-turn on arterial tight diamond	19
3	jjJJ	Signalized FRE	19
6	bbAA	Tight diamond single point	17
6	eeJJ	Synchronized	17
8	ccCC	Double roundabout	16
8	ccCC	Diverging diamond (DDI)	16
8	ccCH	Standard diamond one displaced left with roundabout	16
8	hiDL	Single quadrant half DDI	16
8	mmBB	St. Aug. tight diamond	16
8	nnBB	Split diamond tight diamond	16

Common interchange designs

Rank	Code	Name	Score
1	ccCC	Double roundabout	45
2	ddII	Parclo B	40
2	bbBB	Tight diamond	40
4	bbBB	Single roundabout	39
5	ccCC	Diverging diamond (DDI)	38
6	ccCC	Standard diamond	34
7	aaAA	Single point (SPUI)	33
8	iiDD	Parclo A	29
9	diDI	Parclo AB	28
9	iiII	Cloverleaf	28
11	ddDD	Spread diamond	27

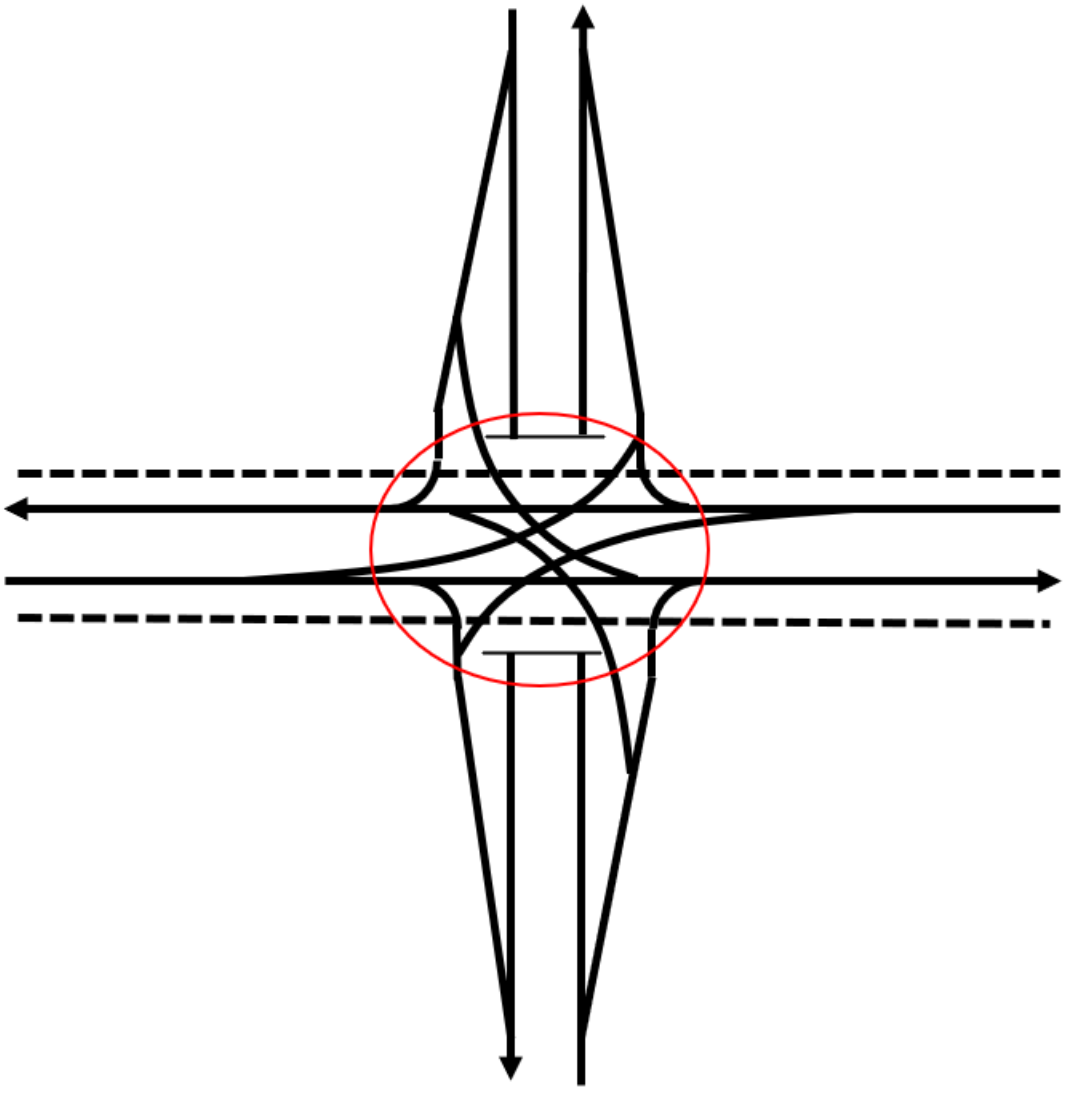
aaAA, Single Point (SPUI)

Summary: Supplies good efficiency in a small right of way. Requires a large bridge, results in a large number of conflict points, and provides minimal speed control.

History: Invented in the 1960s, spread slowly through the 1970s and 1980s, installed at a steady pace during the 1990s. Now common, typically at high-demand spots with tight right of way.

Rank: 80 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
3	3	5	0	3	2	2	0	0	5	5	5	11	7	15	33



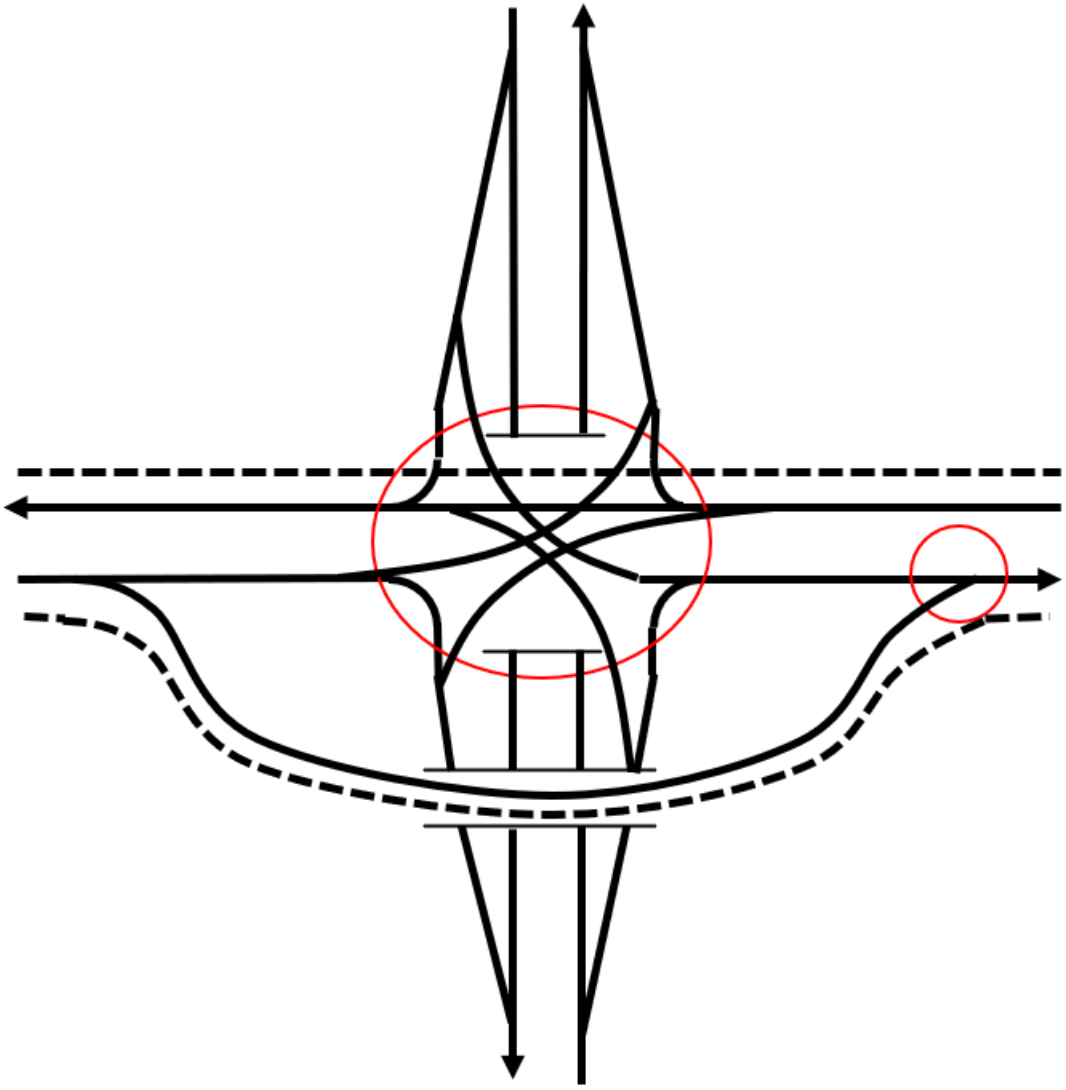
aaAA, Single Point with One-Way Bypass

Summary: Provides good efficiency but requires a large bridge with an additional bypass bridge. Also has a large number of conflict points.

History: This is a new design.

Rank: 37 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
3	5	4	1	4	3	3	2	0	3	5	4	12	13	12	37



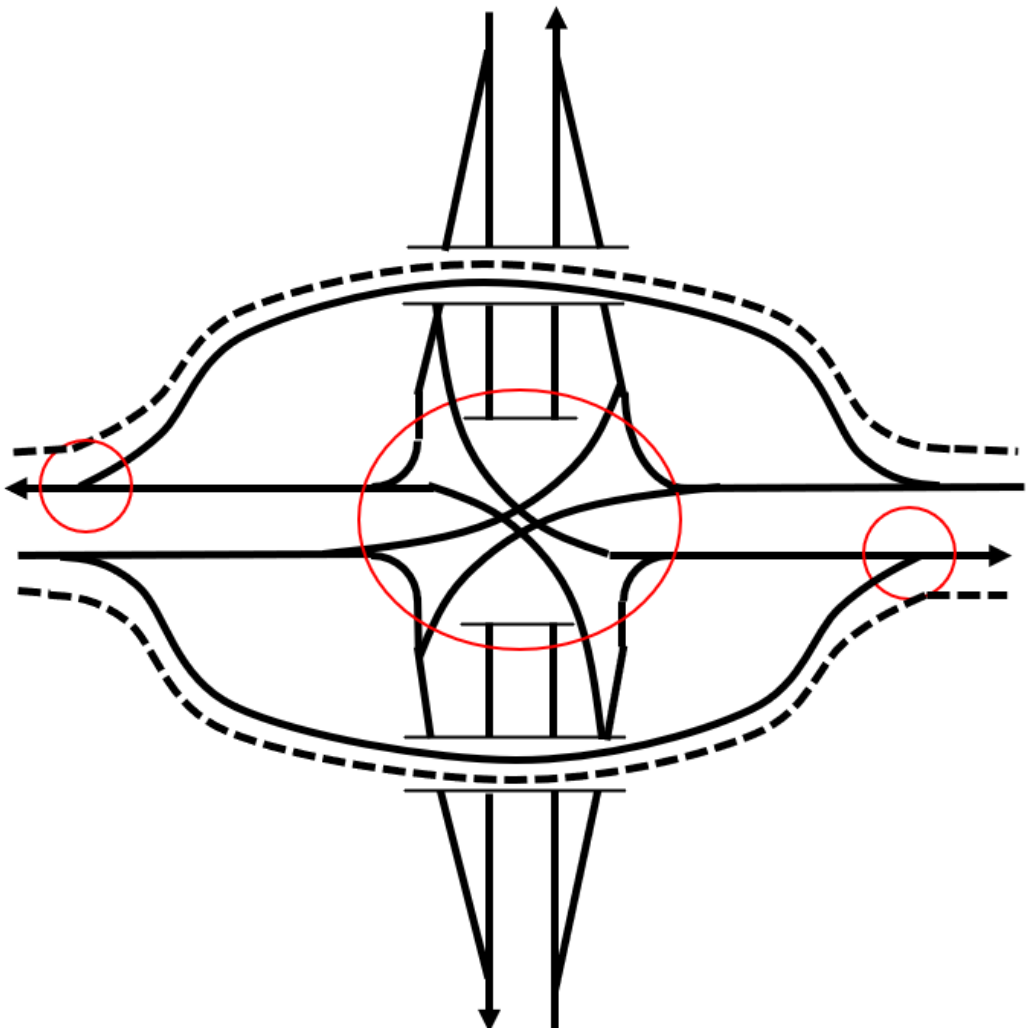
aaAA, Single Point with Two One-Way Bypasses

Summary: Provides good efficiency but requires a large bridge and two additional bypass bridges. Could be a retrofit for an over-capacity single point interchange.

History: This is a new design.

Rank: 16 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
5	5	2	2	4	3	4	5	0	2	5	3	12	18	10	40



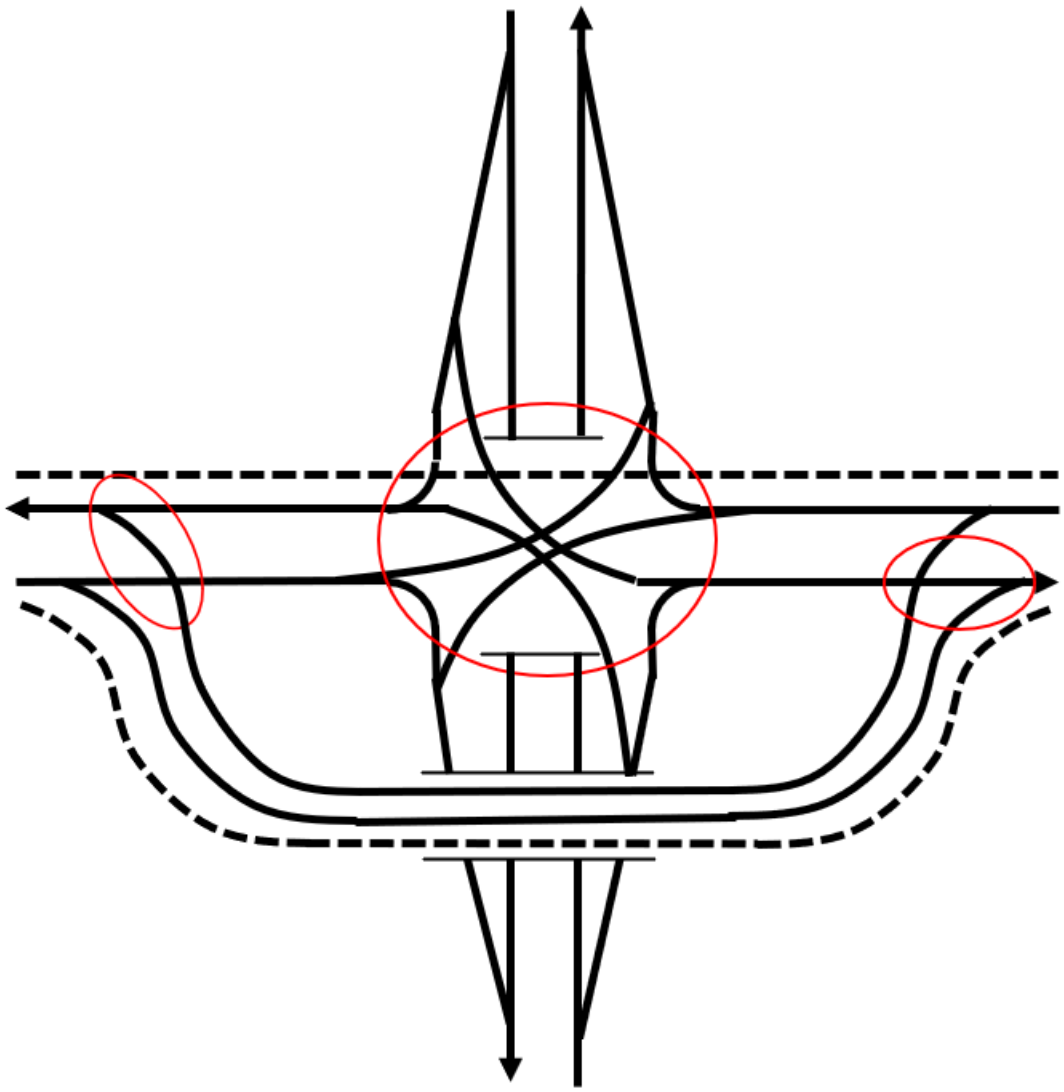
aaAA, Single Point with Two-Way Bypass

Summary: Provides average efficiency, safety, and cost performance. Requires a large bridge and results in a large number of conflict points but has a small extent along the freeway.

History: This is a new design.

Rank: 36 of 125.

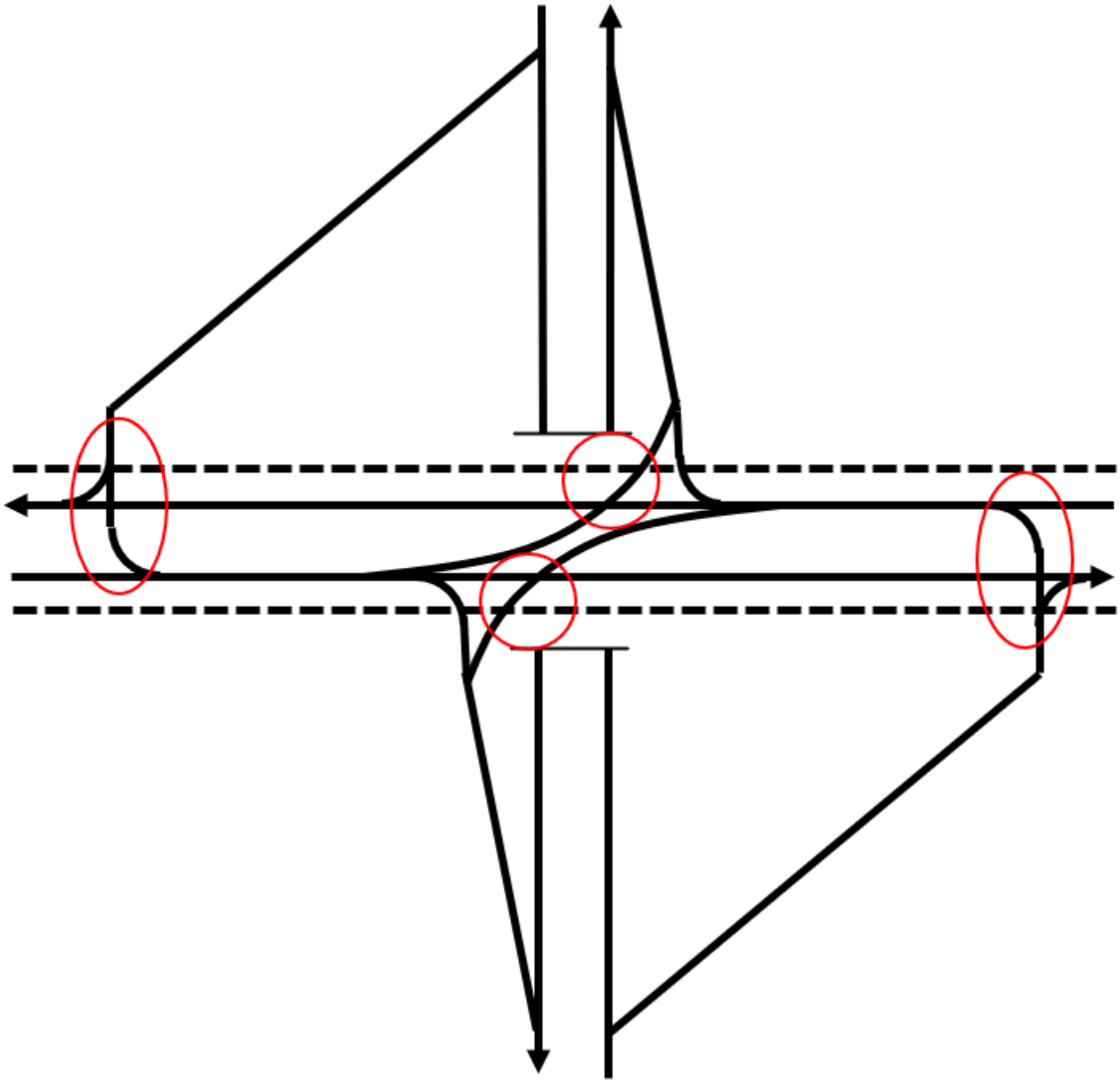
Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	4	2	1	4	3	3	5	0	3	5	3	10	16	11	37



aaDD, Single Point Spread Diamond

Summary: Has several good features but provides poor progression and speed control.
History: This is a new design.
Rank: 95 of 125.

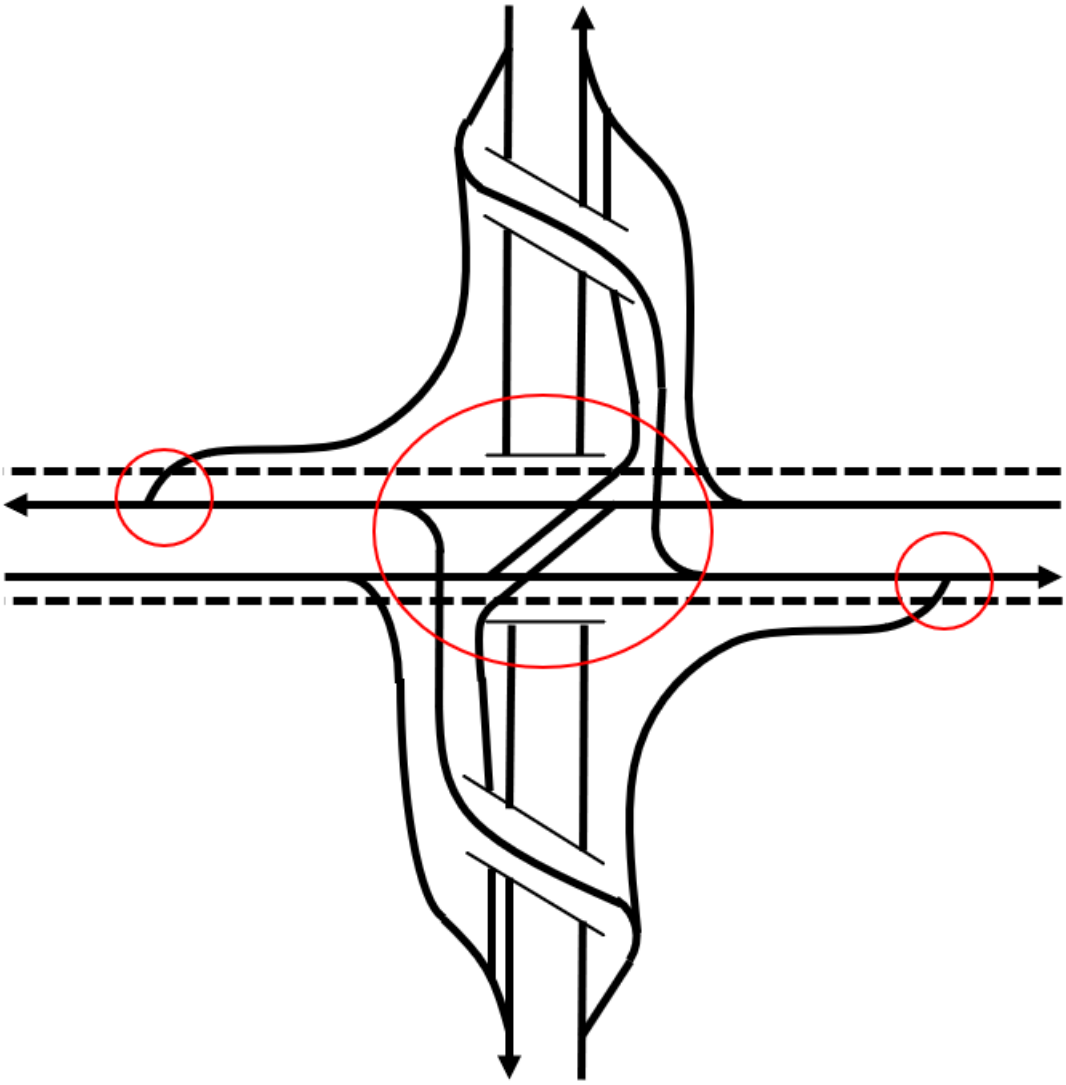
Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	1	4	2	4	3	2	0	2	4	3	2	9	11	11	31



aaHH, Single Point Displaced

Summary: Provides great efficiency but requires a large bridge and a lengthy extent along the freeway.
History: This is a new design.
Rank: 72 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
5	4	5	2	4	2	4	1	0	2	1	3	14	13	6	33



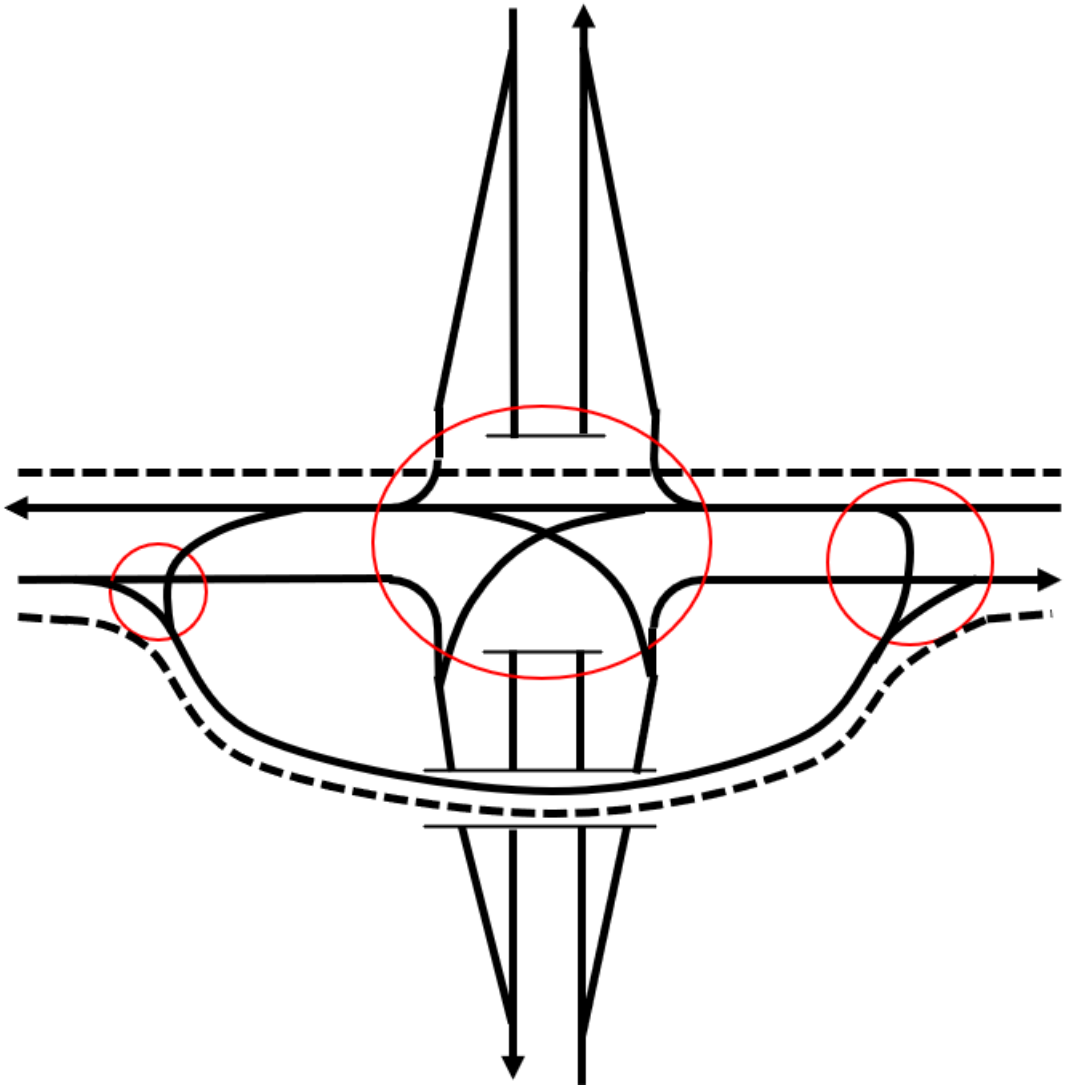
ajAJ, Half Single Point

Summary: Provides good cost scores and performs well in safety, but has low capacity and adds significant travel distances.

History: This is a new design.

Rank: 39 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
1	5	1	3	3	3	4	3	2	4	5	3	7	16	14	37



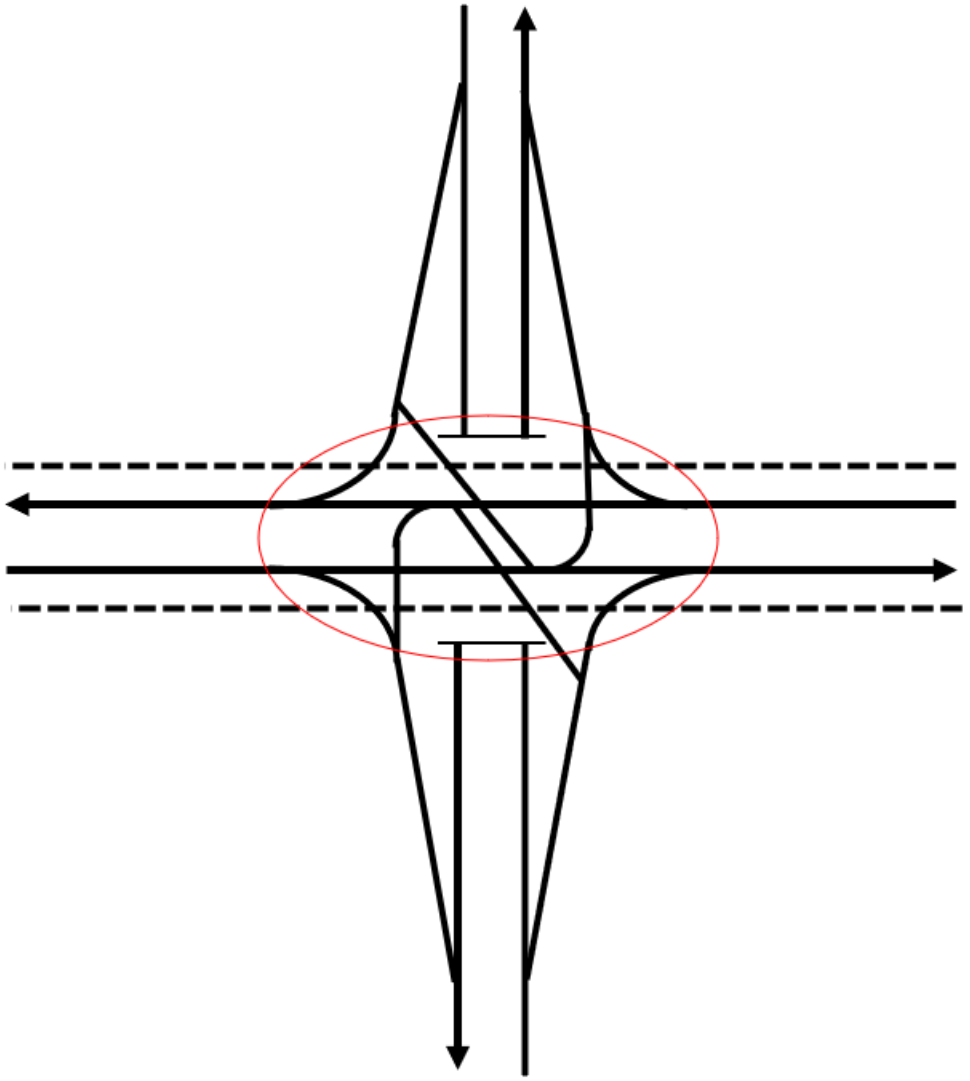
bbAA, Tight Diamond Single Point

Summary: Provides great cost scores. Adds minimal extra travel distance and is great for pedestrians, but has high wrong way potential and poor speed control.

History: This is a new design.

Rank: 34 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
1	3	5	2	4	1	5	0	2	5	5	5	9	12	17	38



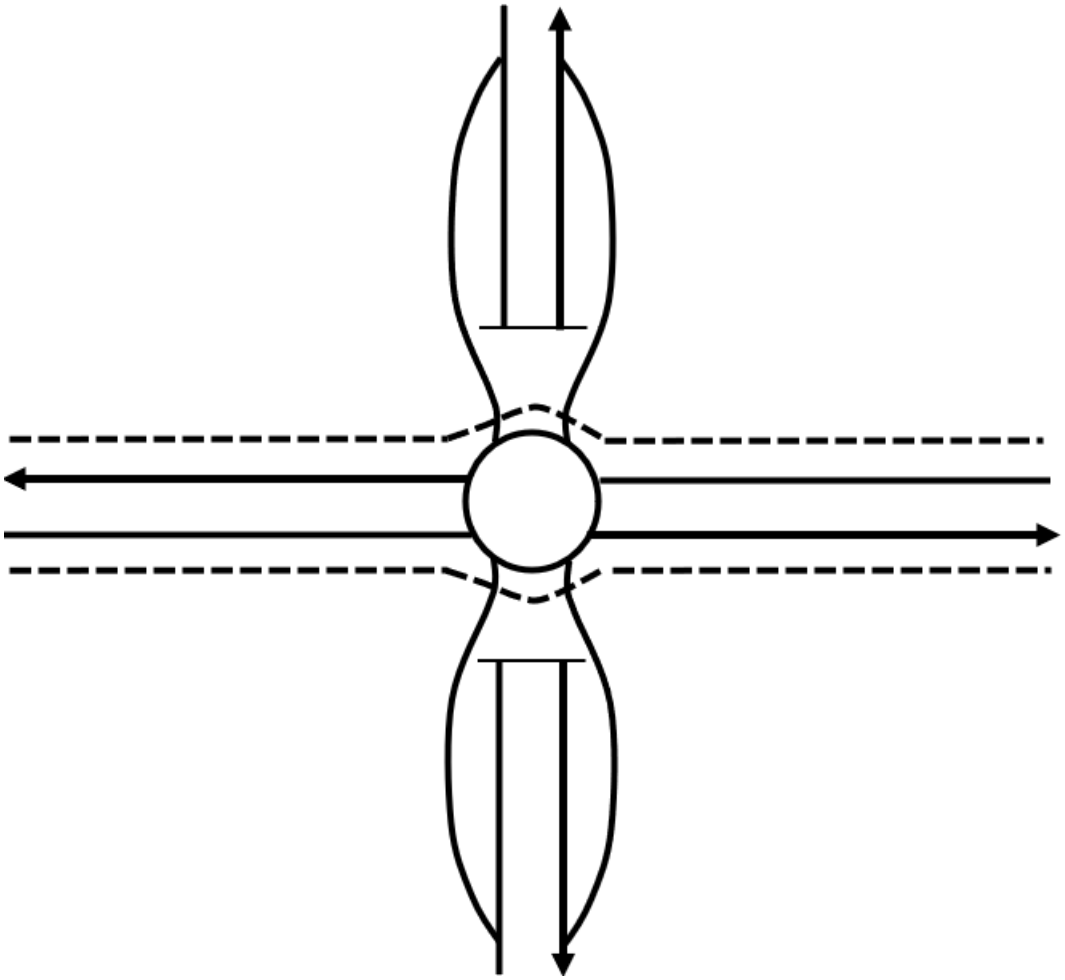
bbBB, Single Roundabout

Summary: Scores well for distance travelled and on several safety criteria. Provides better capacity than, and therefore may be competitive with, a tight diamond, but needs a large bridge. A version with a peanut-shaped roundabout likely reduces the bridge size.

History: Common in other countries and becoming more common in the US.

Rank: 23 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
2	2	5	5	5	4	3	2	0	4	4	3	9	19	11	39



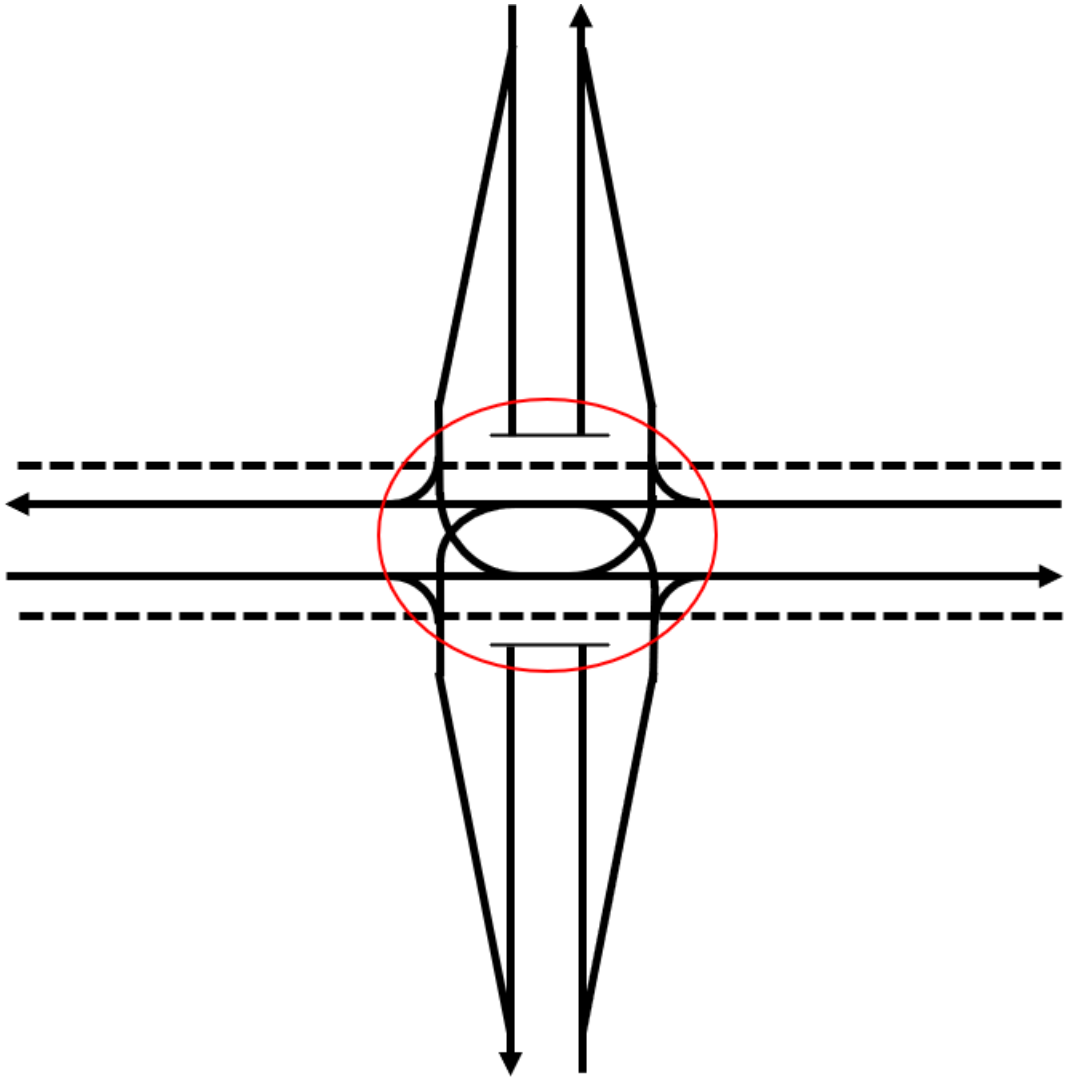
bbBB, Tight Diamond

Summary: Ideal for cost and has great pedestrian performance, but has poor capacity and speed control.

History: Many tight diamonds are in place in the US. They seem to be growing in popularity due to the low cost.

Rank: 21 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
0	2	5	1	4	3	5	0	5	5	5	5	7	13	20	40



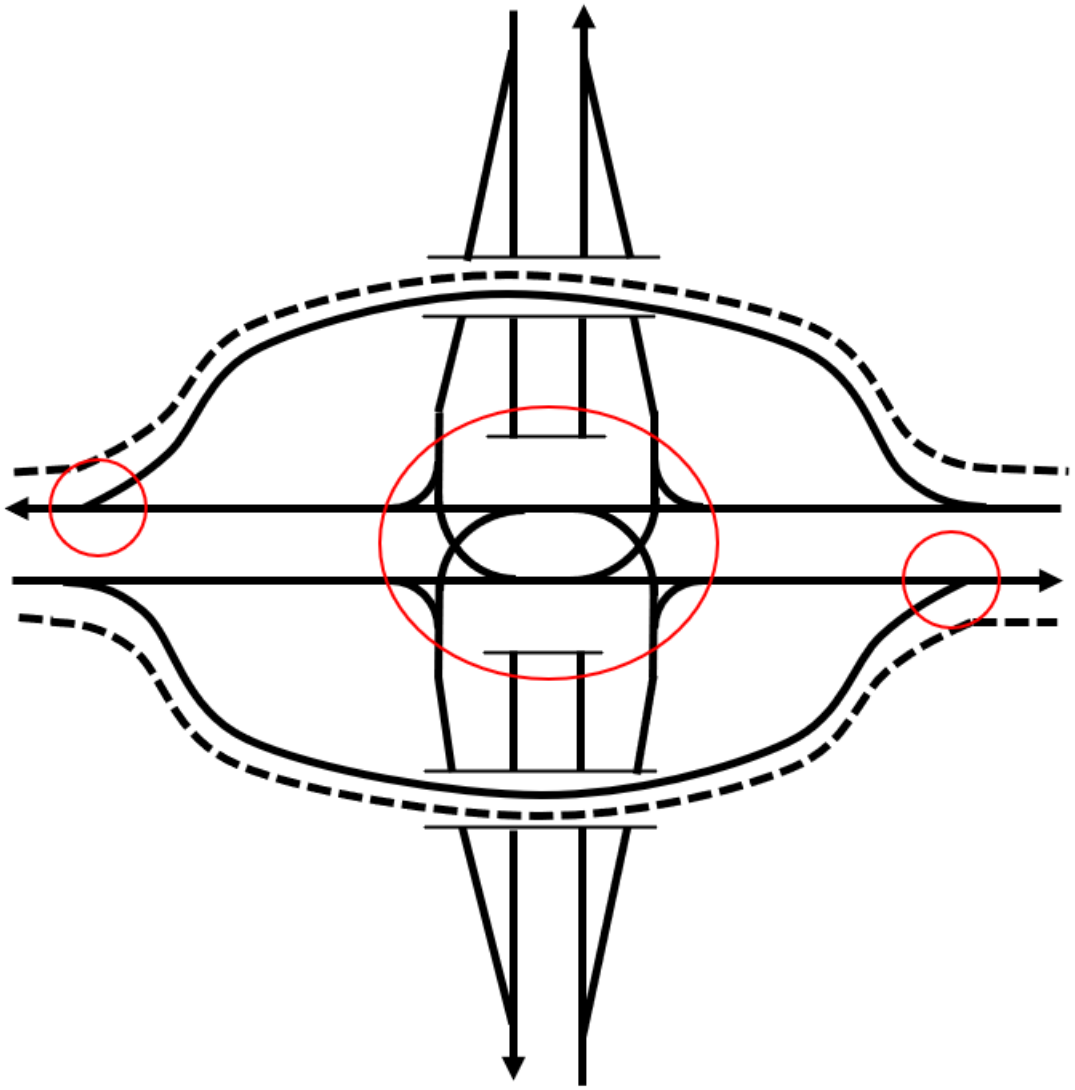
bbBB, Tight Diamond with Two One-Way Bypasses

Summary: Provides good efficiency and good cost scores, but requires two bypass bridges and results in a large number of conflict points. It could be a retrofit for an over-capacity tight diamond.

History: This is a new design.

Rank: 11 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
5	5	2	0	4	2	4	5	4	2	5	3	12	15	14	41



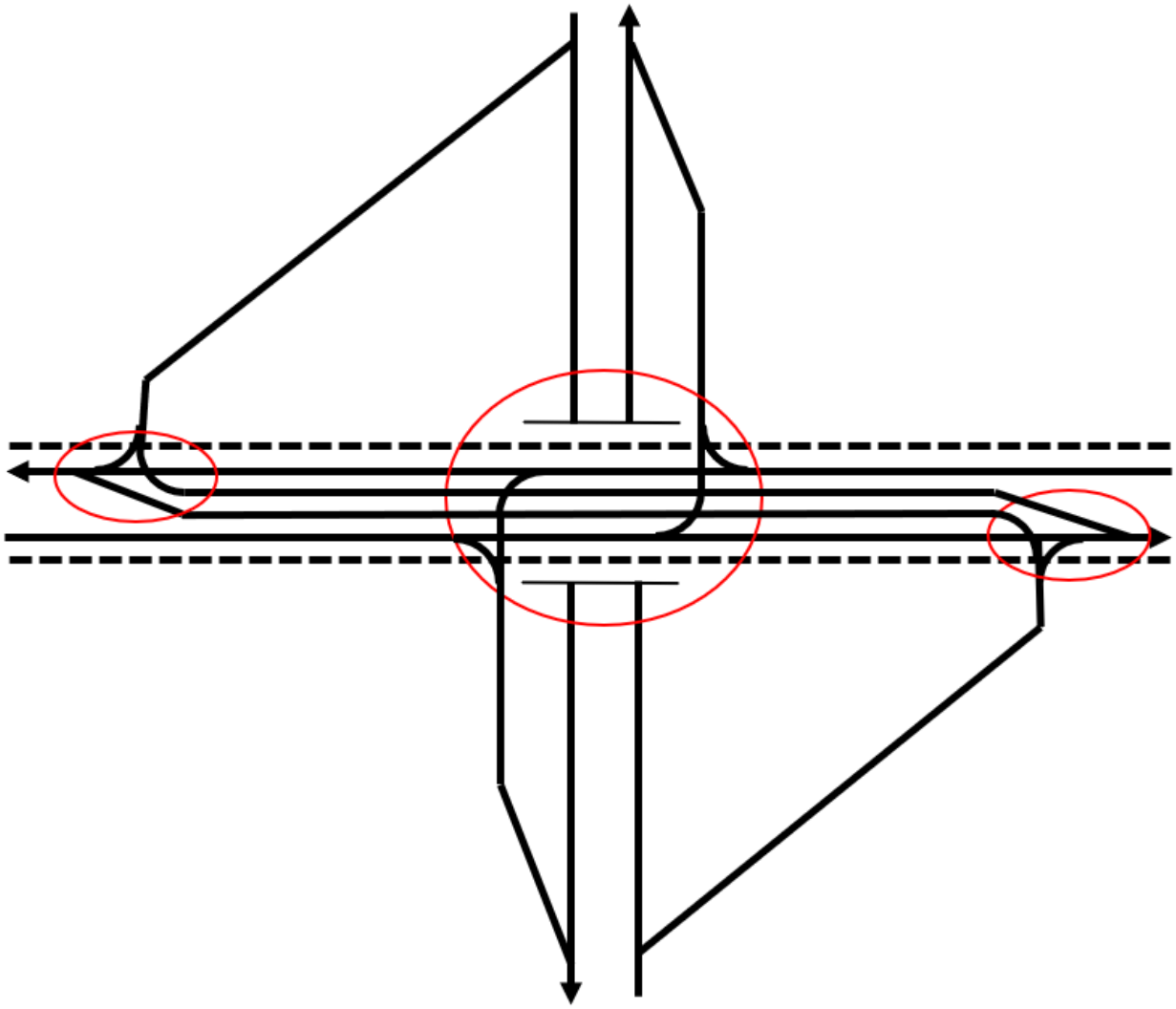
bbGG, Tight Diamond Spread Contraflow

Summary: Provides good efficiency in a small right of way. Requires a large bridge and results in a large number of conflict points. It could be a retrofit for a parclo A.

History: This is a new design.

Rank: 56 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	3	4	0	4	4	4	1	1	4	4	2	11	13	11	35



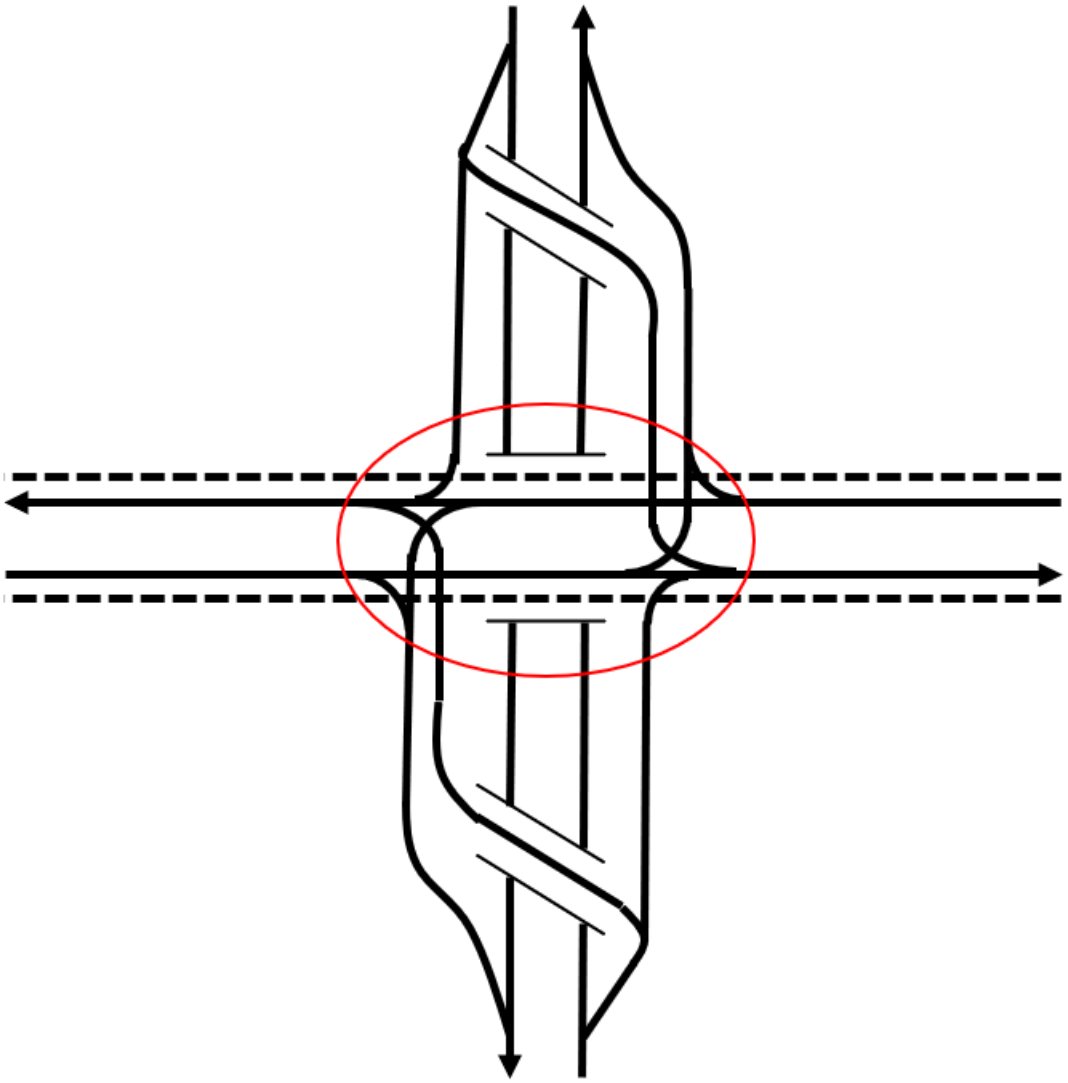
bbHH, Tight Diamond Displaced

Summary: This design is great for pedestrians and has a low number of unusual maneuvers. However, it also has low capacity, a high number of conflict points, and poor speed control.

History: This is a new design.

Rank: 67 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
1	3	5	1	5	2	5	0	2	4	1	5	9	13	12	34



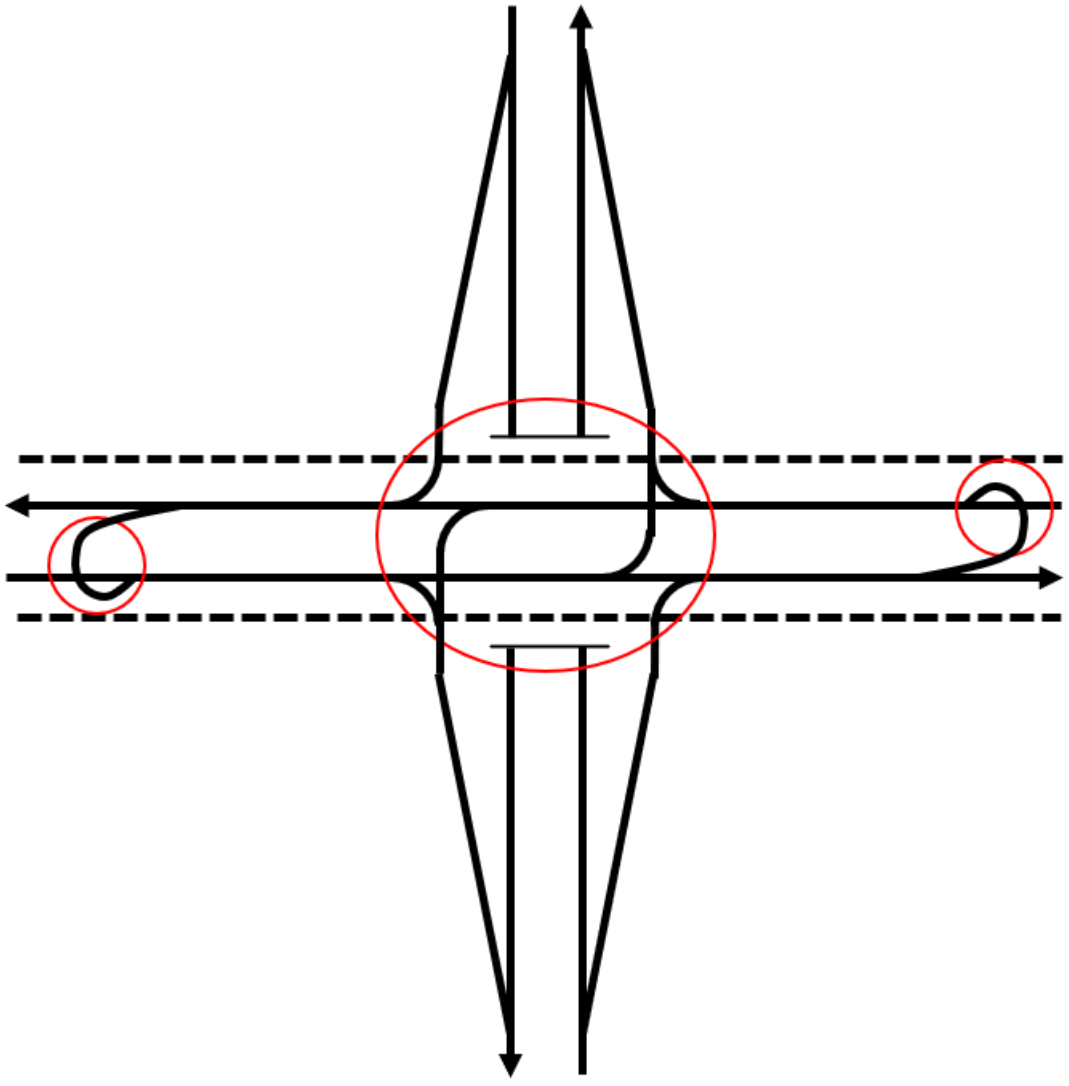
bbJJ, Tight Diamond U-Turn on Arterial

Summary: Provides great cost scores with good safety performance. Has poor capacity. In a low-demand spot with room for the u-turn crossovers this could compete with the tight diamond.

History: This is a new design.

Rank: 10 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
0	4	3	3	3	4	5	1	5	5	5	4	7	16	19	42



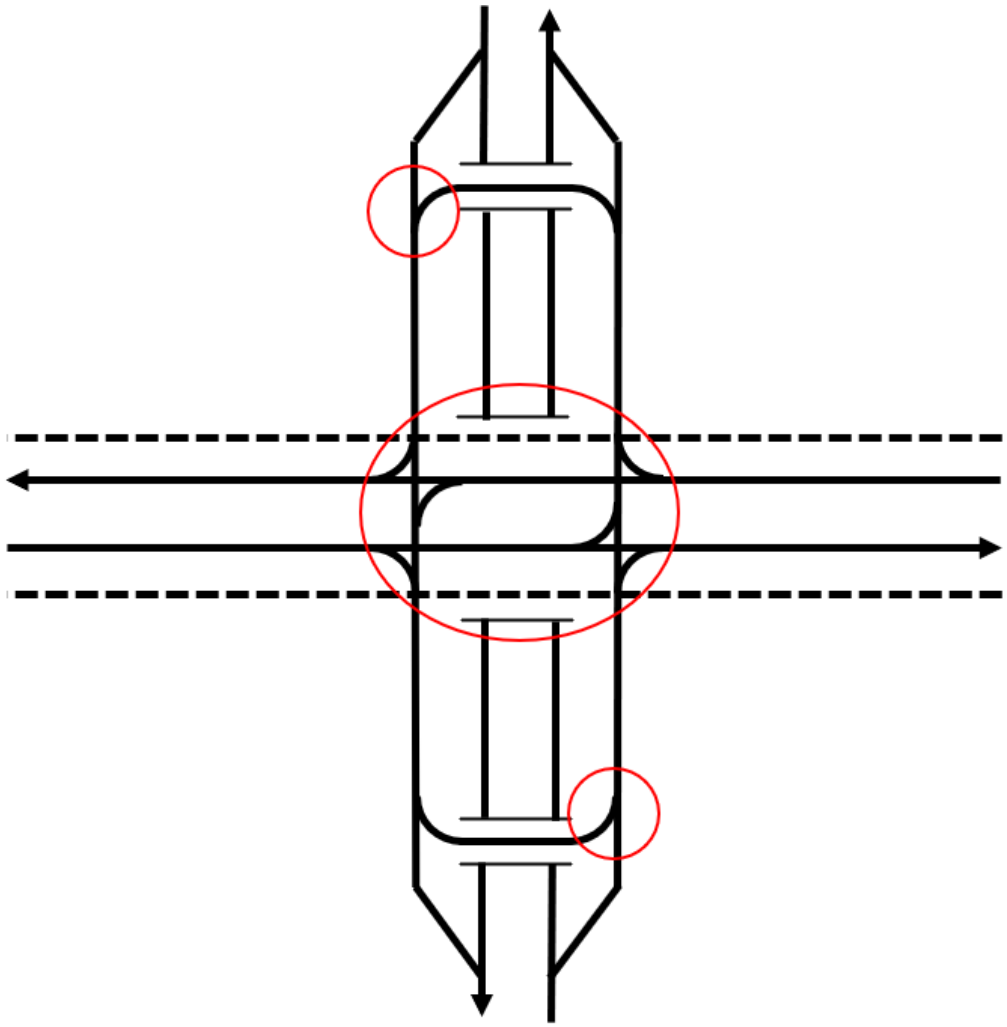
bbKK, Tight Diamond U-Turn over Freeway

Summary: Provides good cost scores but has low capacity, a large number of conflict points, and poor speed control. Most agencies would likely choose kkBB (median u-turn or RCI) concepts.

History: This is a new design.

Rank: 96 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
1	3	3	1	2	2	5	0	3	4	2	5	7	10	14	31



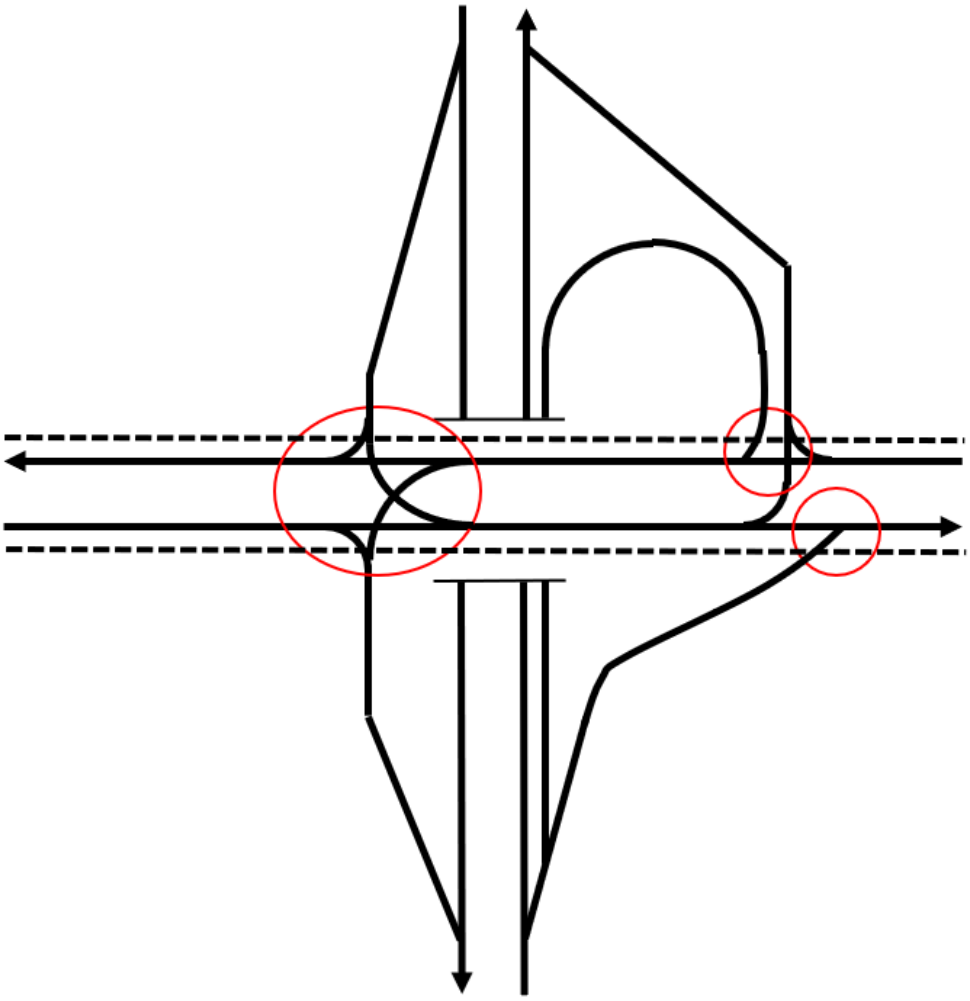
bdBI, One Loop B

Summary: Provides good safety performance with a small bridge but has low capacity and provides poor speed control.

History: This is a relatively rare design.

Rank: 65 of 125.

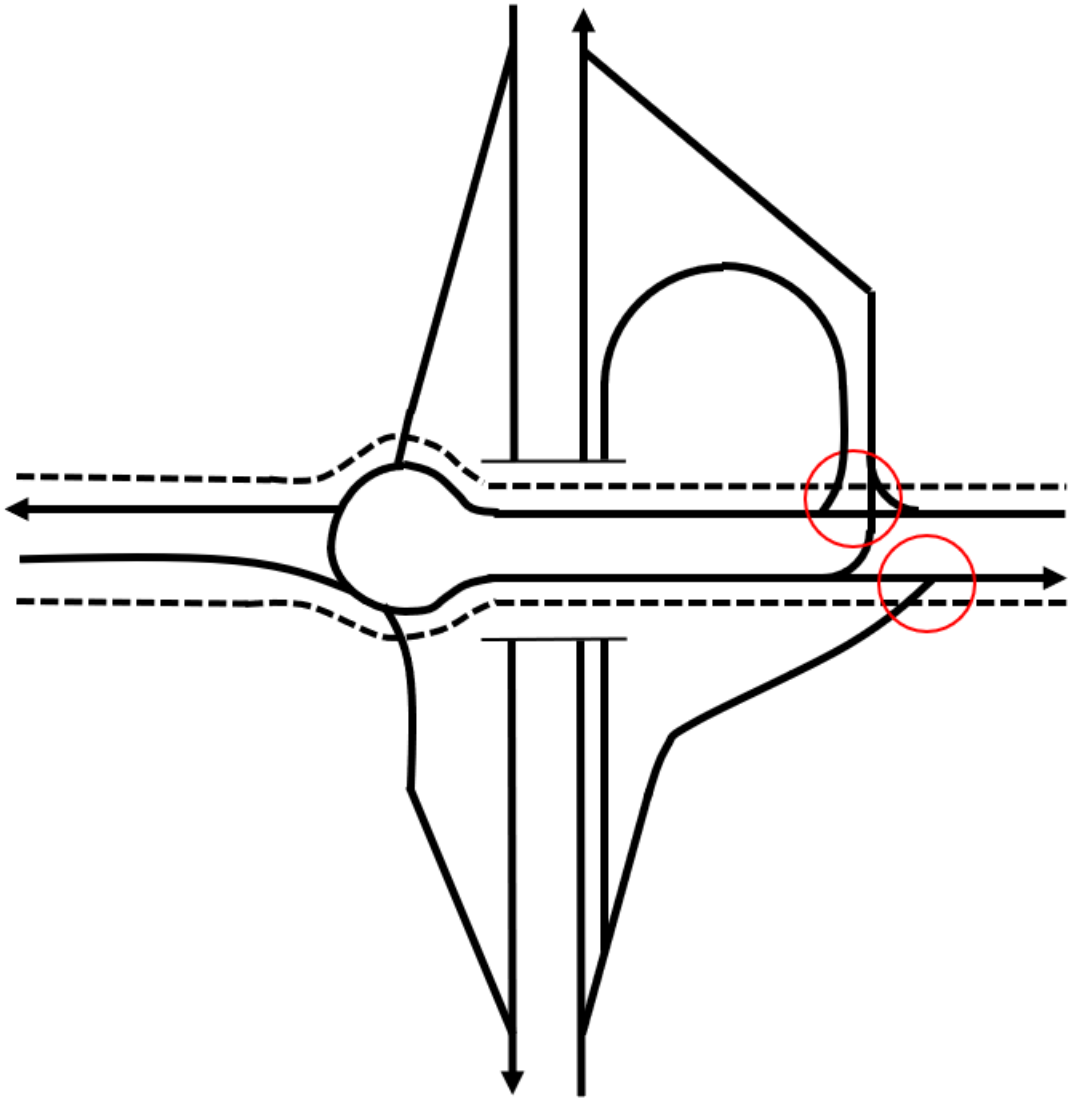
Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
1	3	2	2	5	4	4	1	4	3	3	2	6	16	12	34



bdBI, One Loop B With Roundabout

Summary: Provides excellent safety scores with a small bridge. Has no major weaknesses.
History: This is a new design.
Rank: 25 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
2	3	2	4	5	4	3	3	5	3	3	2	7	19	13	39



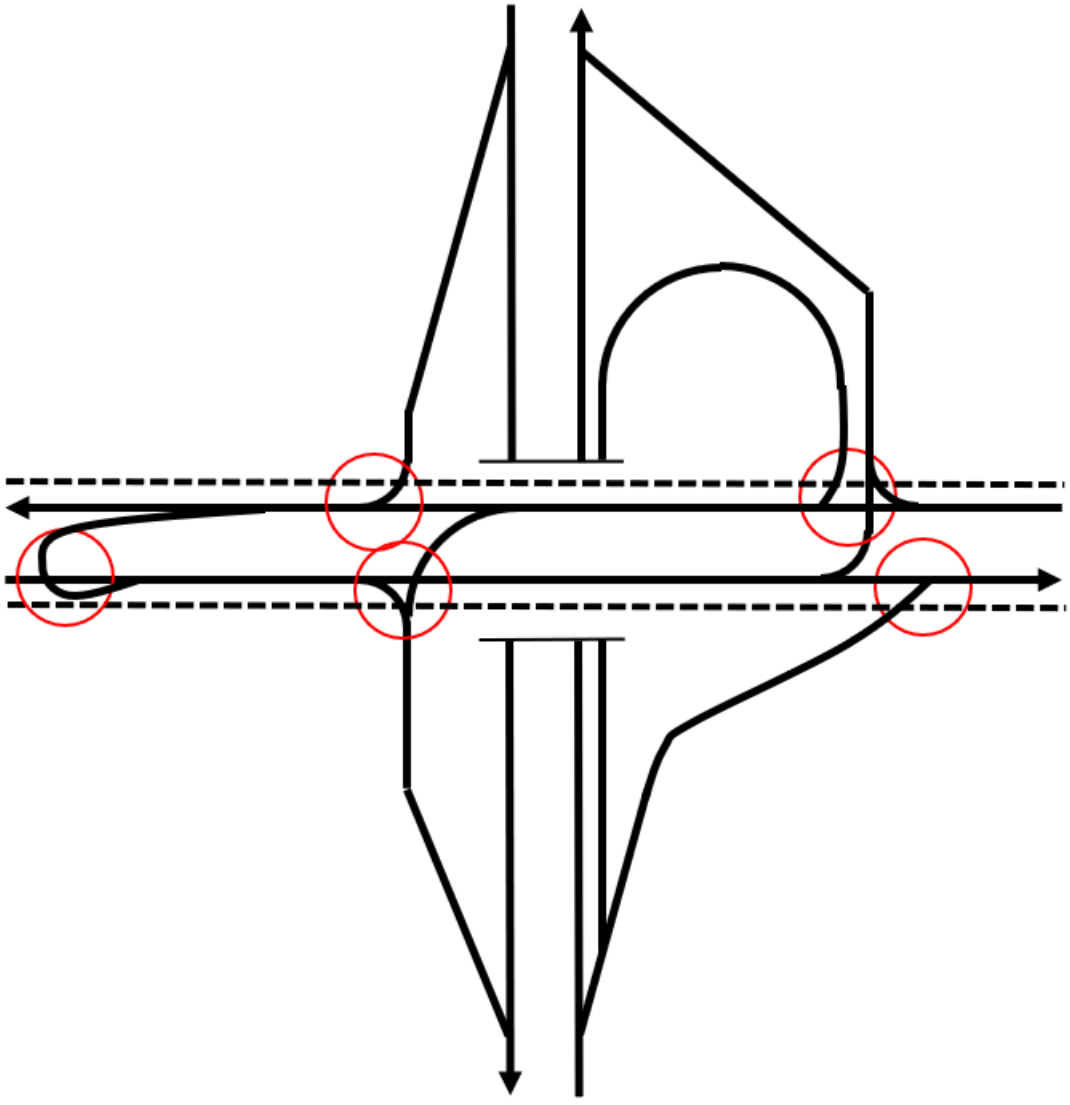
bdIJ, One Loop B One U-Turn

Summary: Provides top score for progression, has a weak score for distance travelled, and otherwise has pretty middling values.

History: This is a new design.

Rank: 48 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
2	5	1	3	4	3	4	3	3	3	3	2	8	17	11	36



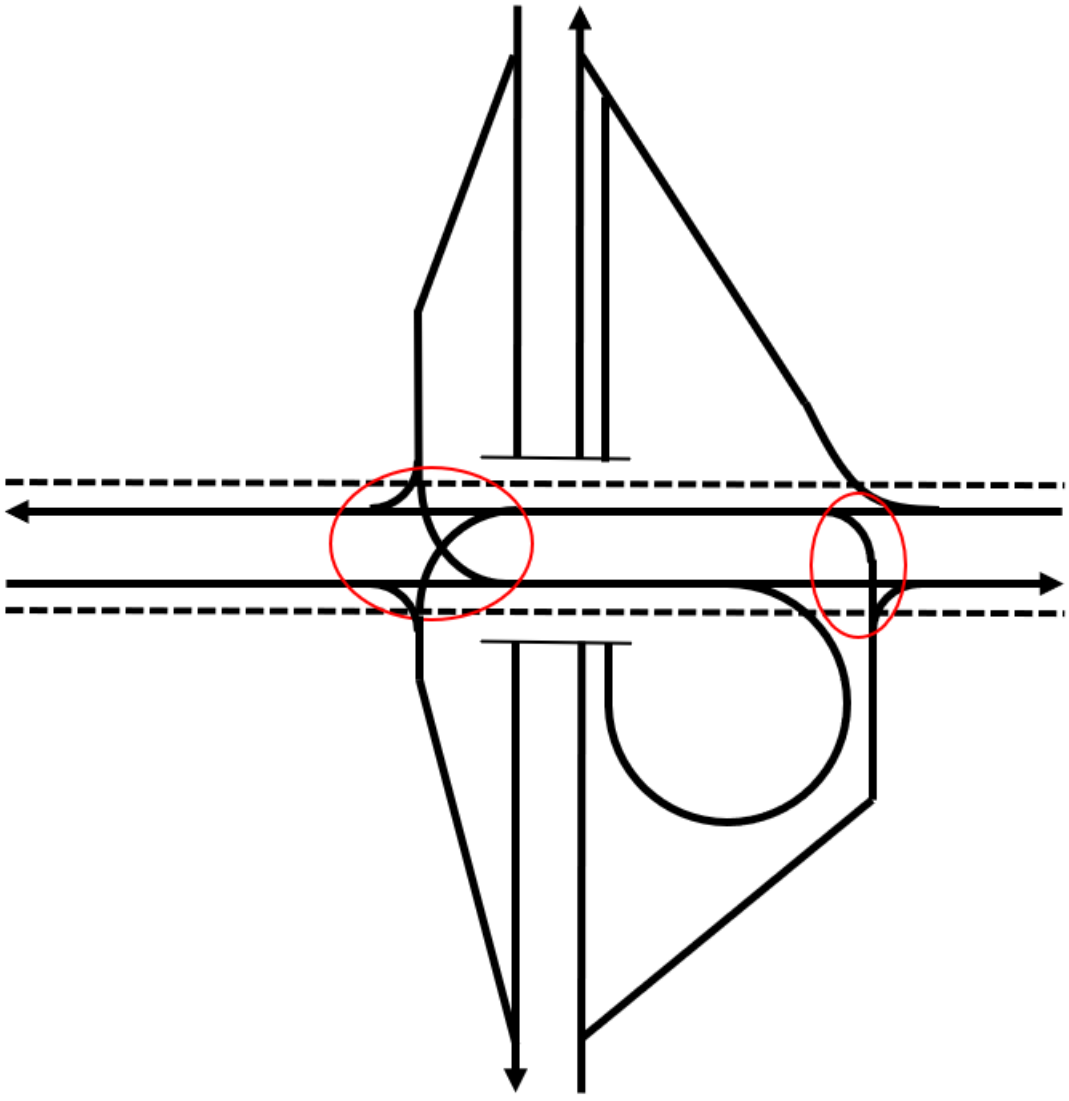
biBD, One Loop A

Summary: Provides poor efficiency and speed control. Other safety categories and cost categories have mediocre scores.

History: This is a relatively rare design.

Rank: 106 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
1	1	2	2	4	4	3	0	4	3	3	2	4	13	12	29



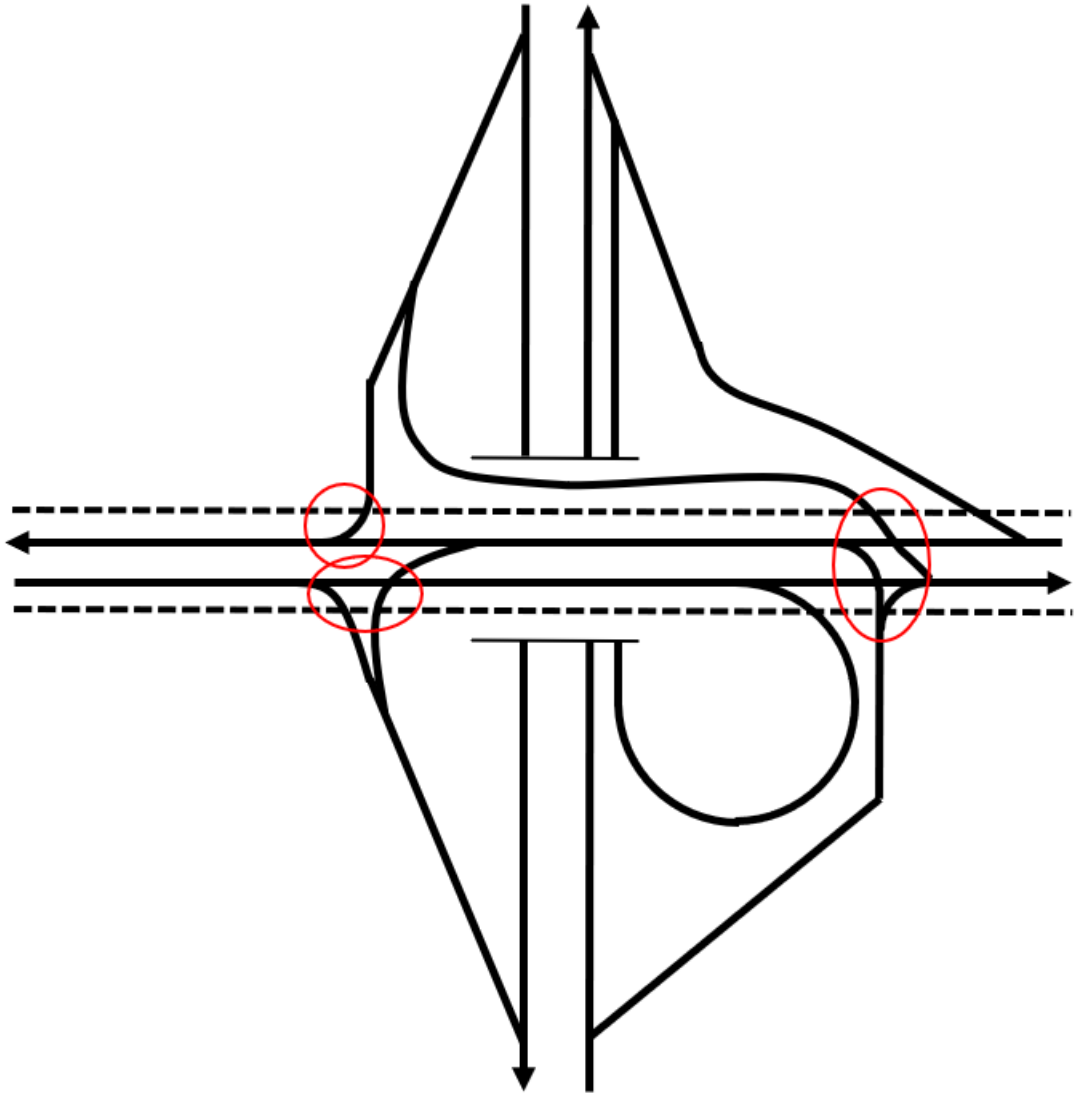
biDH, One Loop A with Displaced Left from Freeway

Summary: Provides poor cost scores. Has a low wrong way potential but poor capacity and requires a lengthy extent along the arterial.

History: This is a rare design.

Rank: 112 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
1	3	3	3	3	4	2	1	3	2	2	1	7	13	8	28



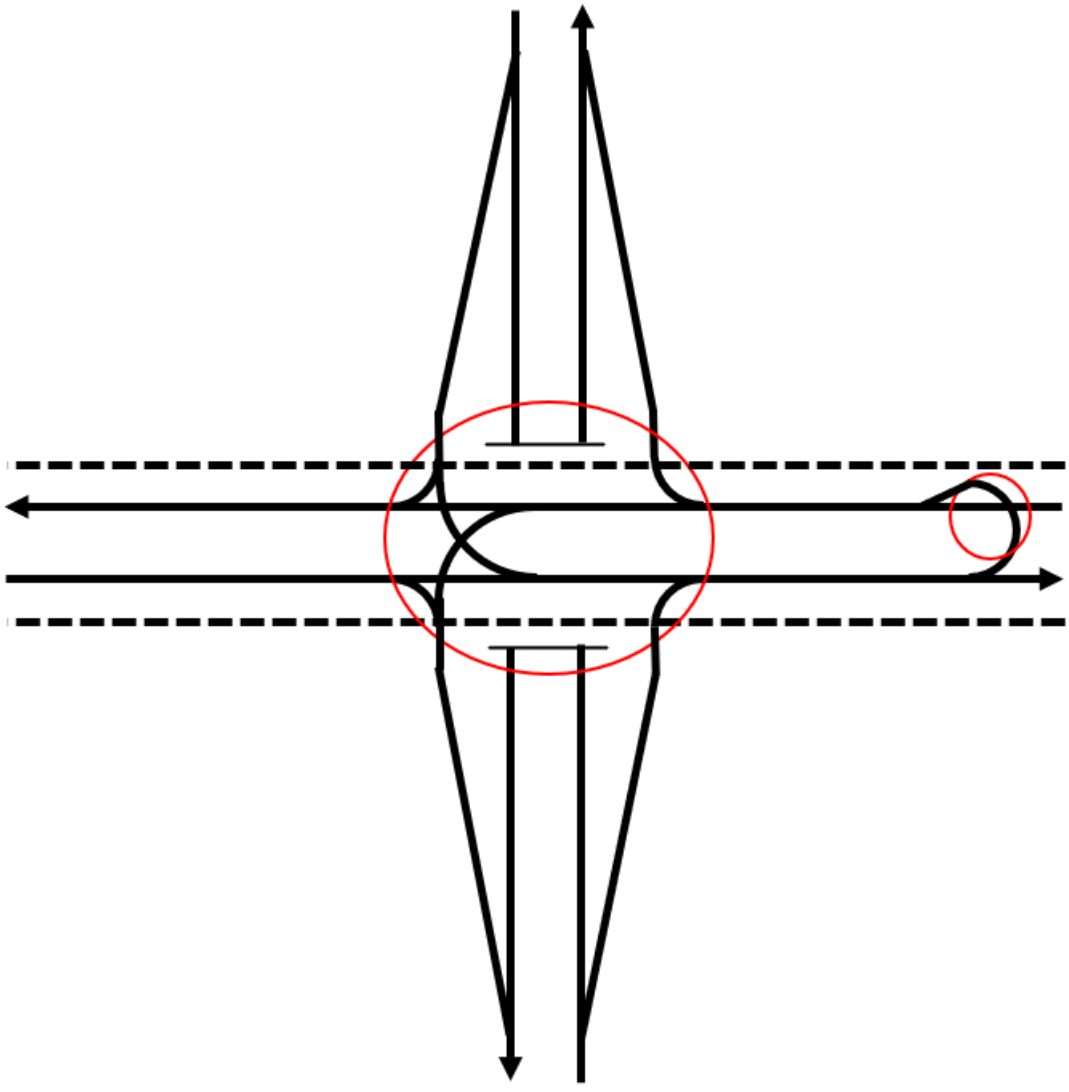
bjBJ, One Downstream U-Turn

Summary: Meets ideal cost criteria. The only major downsides are poor capacity and speed control. This could compete with a tight diamond where there is room for the u-turn crossover.

History: This is a new design.

Rank: 20 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
1	3	3	3	4	3	3	0	5	5	5	5	7	13	20	40



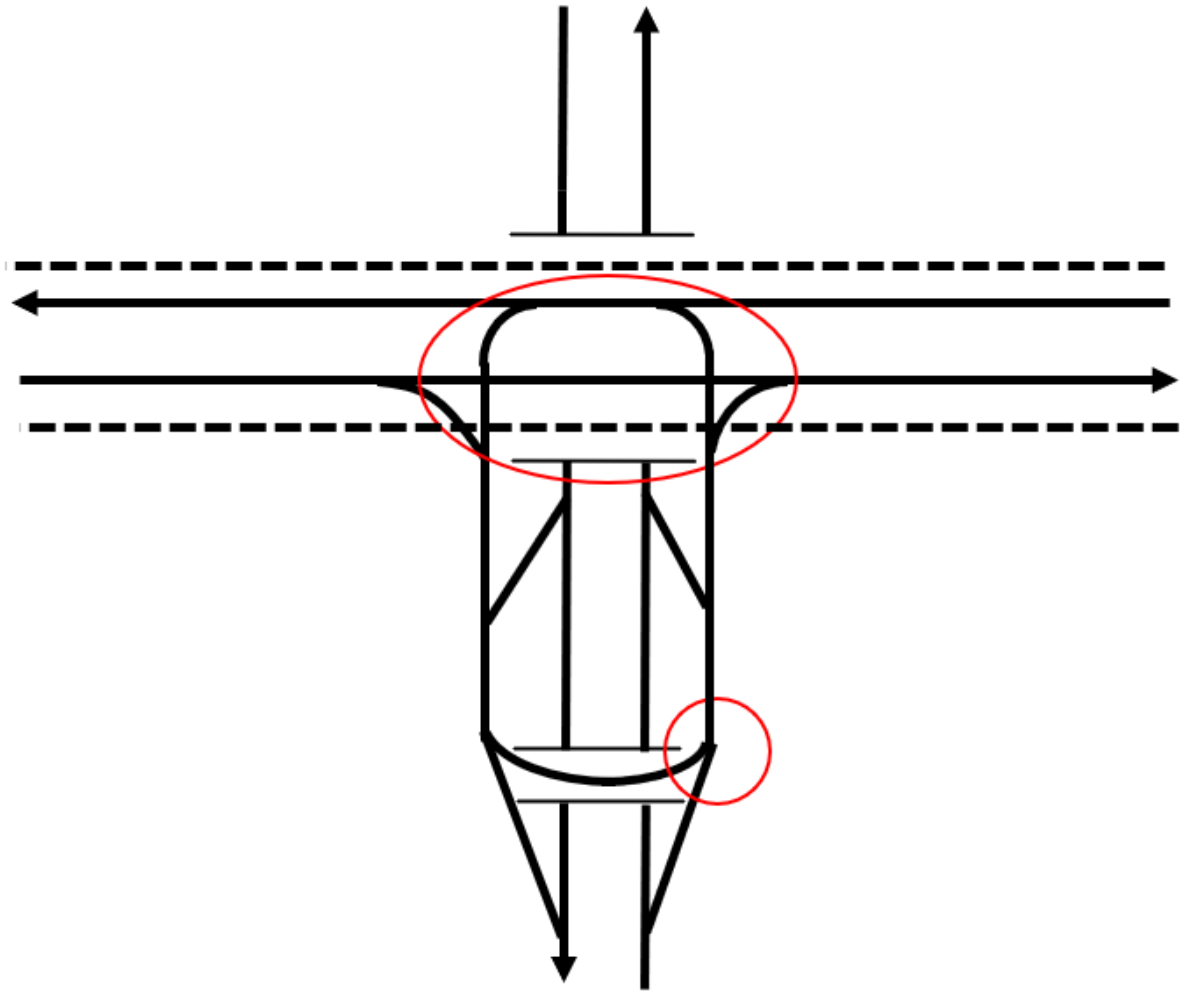
blBL, Tight V

Summary: A competitor to the parclo AB, where all of the ramps have to be on one side of the arterial. Earns several top scores and several low scores.

History: This is a new design.

Rank: 94 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
3	3	0	4	0	2	5	0	3	3	3	5	6	11	14	31



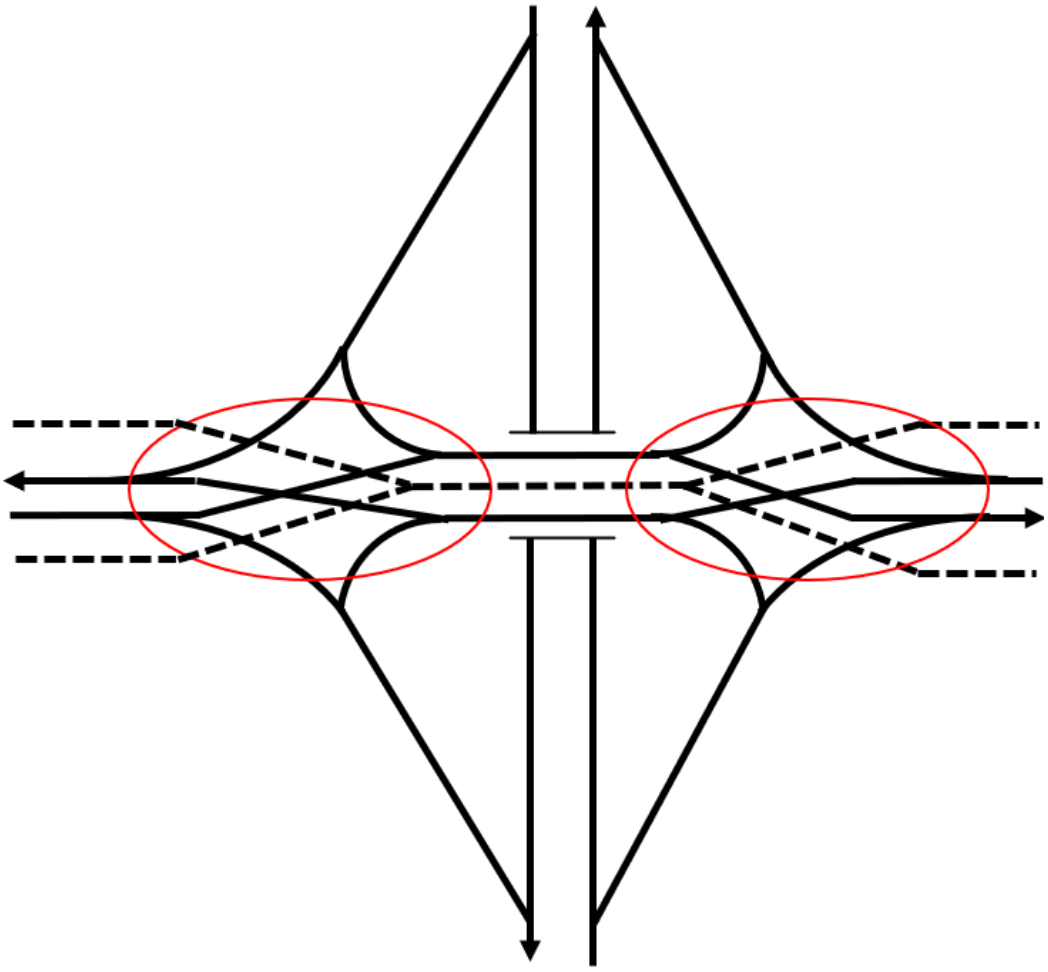
ccCC, Diverging Diamond (DDI)

Summary: Supplies poor efficiency, but has good safety and great cost scores. Has poor capacity and progression but requires minimal extra travel distance and has a small bridge.

History: First constructed in France in the 1960s and 1970s. The first DDI in the US opened in 2009. Since then, they have become a common interchange design in the US.

Rank: 35 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
0	1	5	3	2	3	4	4	5	4	4	3	6	16	16	38



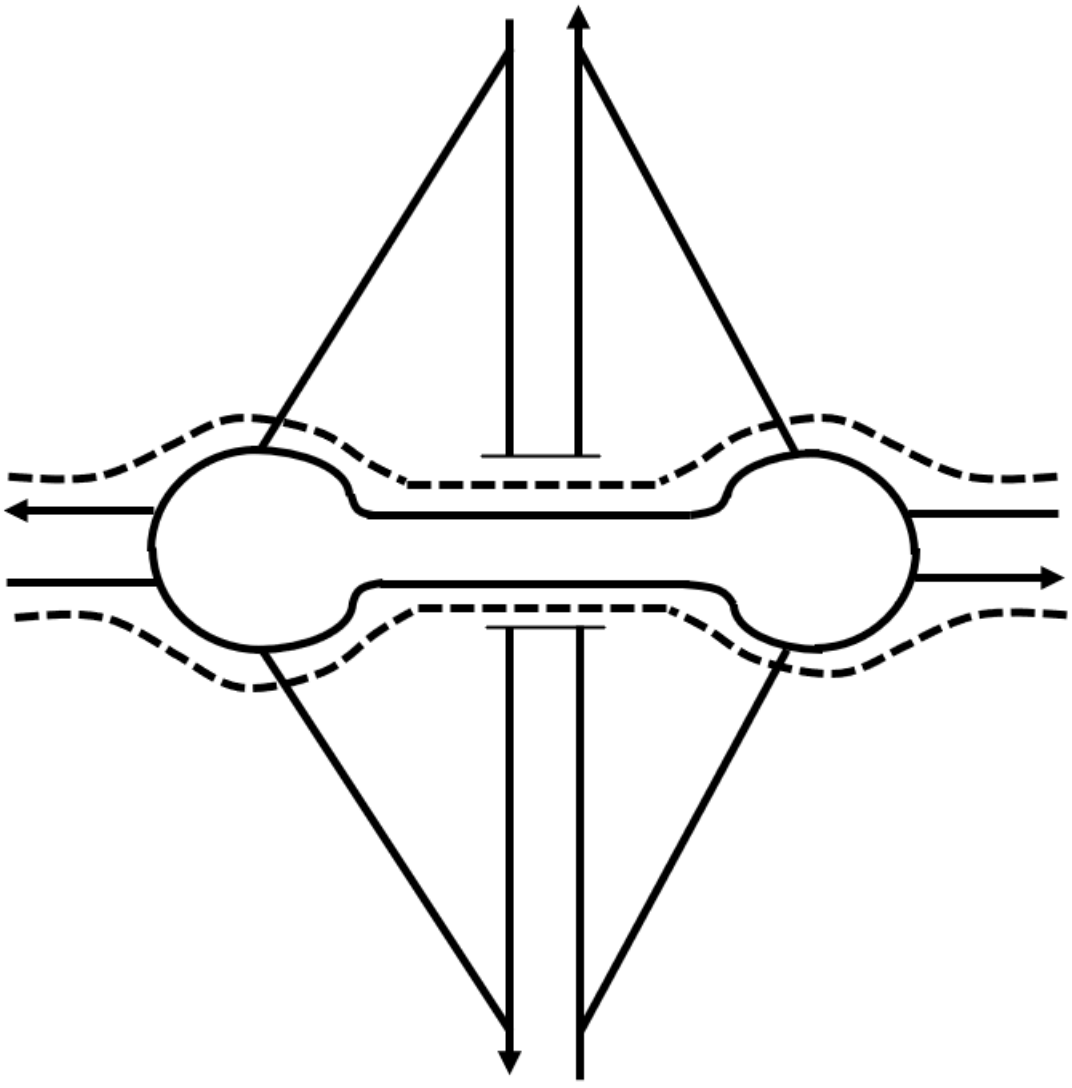
ccCC, Double Roundabout

Summary: Supplies average efficiency with great safety and cost scores. Lower capacity and progression potential are the only apparent weaknesses.

History: This is now a common design in the US, particularly in rural and low-demand locations.

Rank: 2 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
2	2	4	5	5	4	3	4	5	4	4	3	8	21	16	45



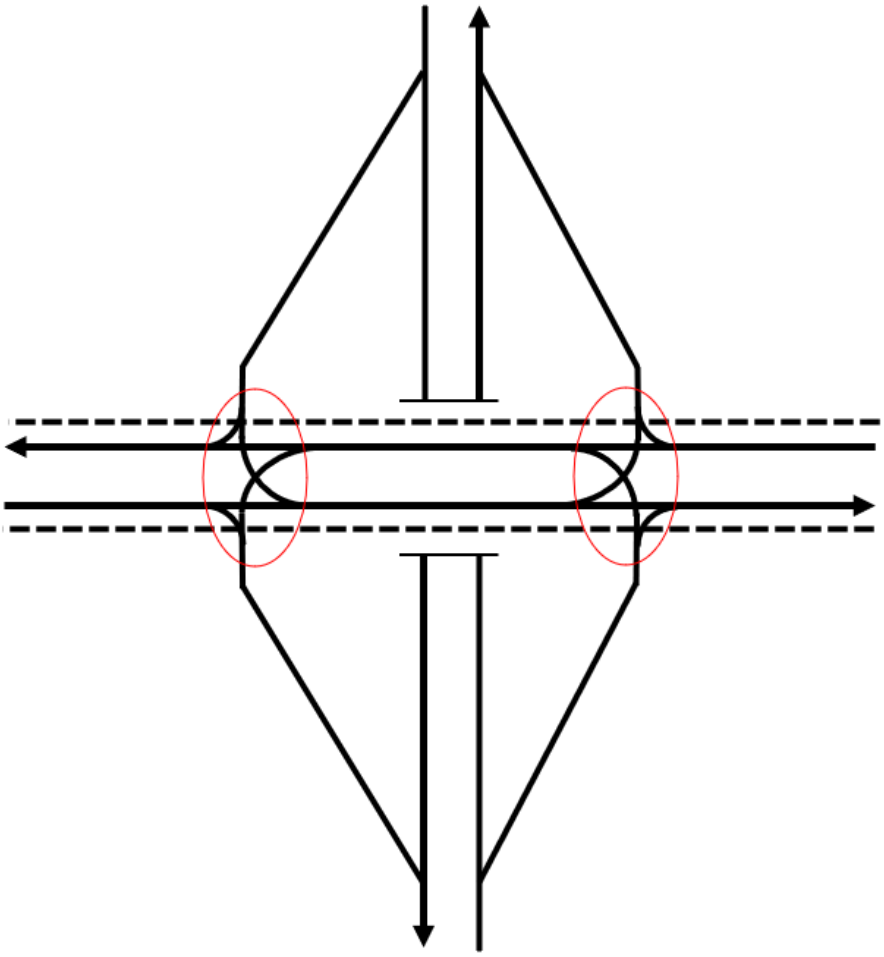
ccCC, Standard Diamond

Summary: Supplies good cost performance but has poor efficiency. More specifically, this design has poor capacity, progression, and speed control.

History: First constructed in the US in 1941, it has since become the most common interchange design. Extremely common design at rural interchanges.

Rank: 70 of 125.

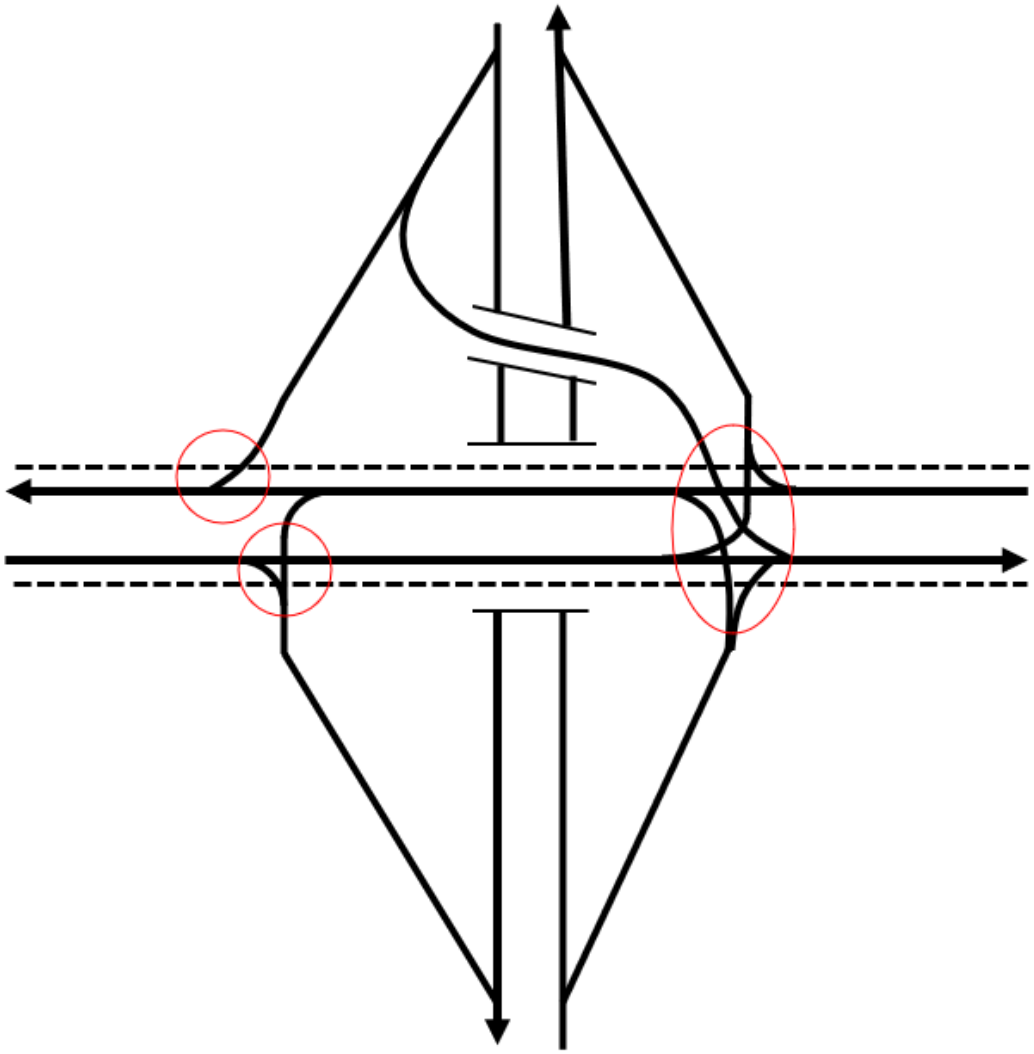
Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
1	0	4	1	5	4	4	0	4	4	4	3	5	14	15	34



ccCH, Standard Diamond One Displaced Left

Summary: Several better aspects and several weaker aspects. Overall quite average scores.
History: This is a new design.
Rank: 66 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
1	3	4	1	4	3	4	1	3	4	3	3	8	13	13	34



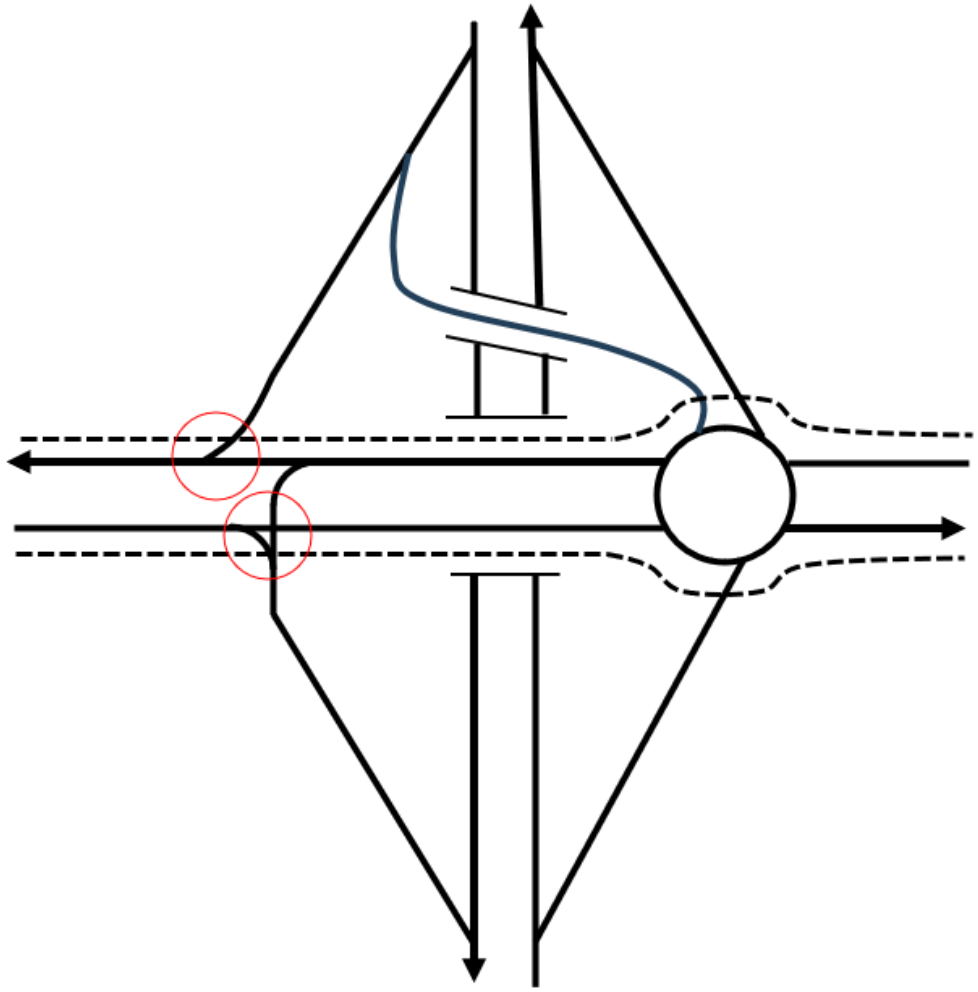
ccCH, Standard Diamond One Displaced Left With Roundabout

Summary: Good scores across the board should make this a competitor in a diamond footprint wherever the capacity will be adequate.

History: This is a new design.

Rank: 13 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
2	3	3	4	4	3	3	3	4	4	4	4	8	17	16	41



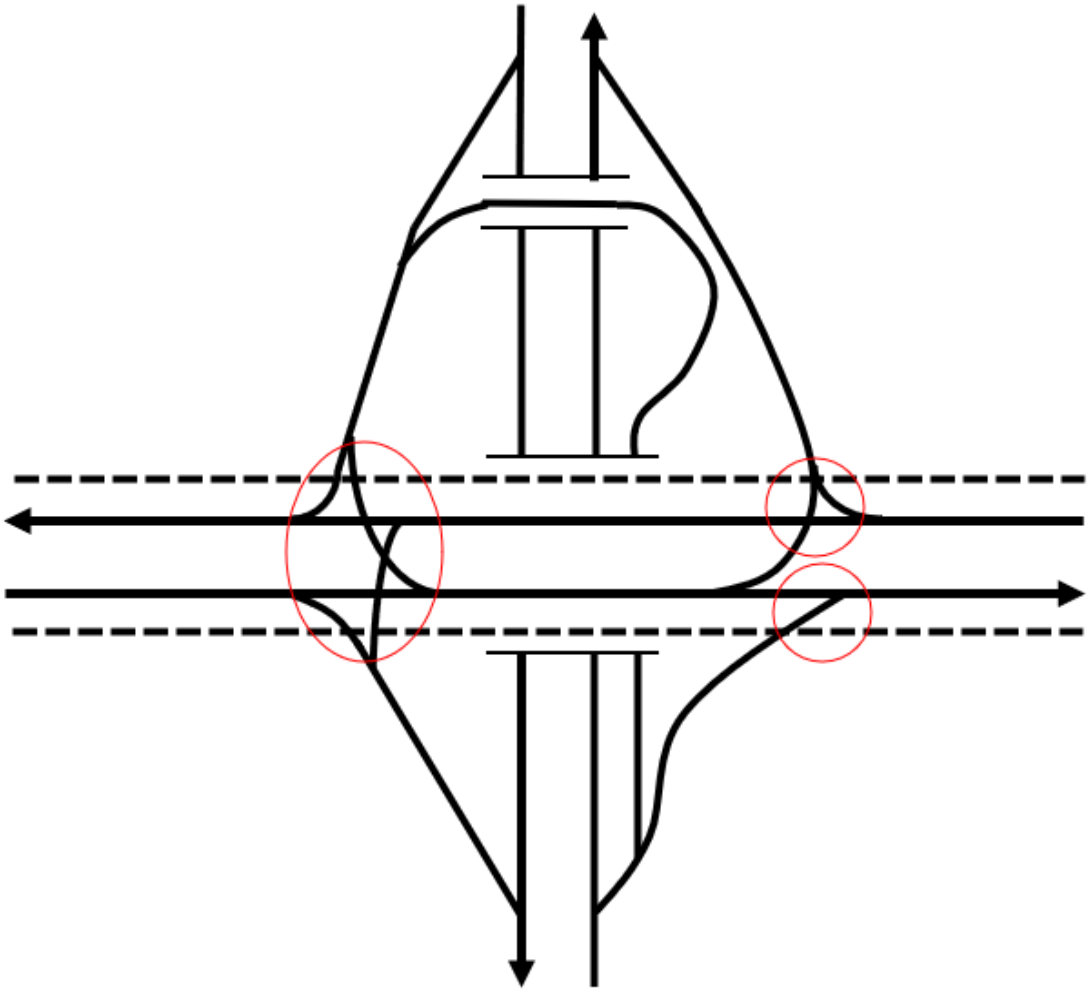
ccCL, Half Milwaukee B

Summary: Stronger in unusual maneuvers and pedestrian quality. Weaker in capacity and speed control. Overall not very competitive.

History: This is a new design.

Rank: 93 of 125.

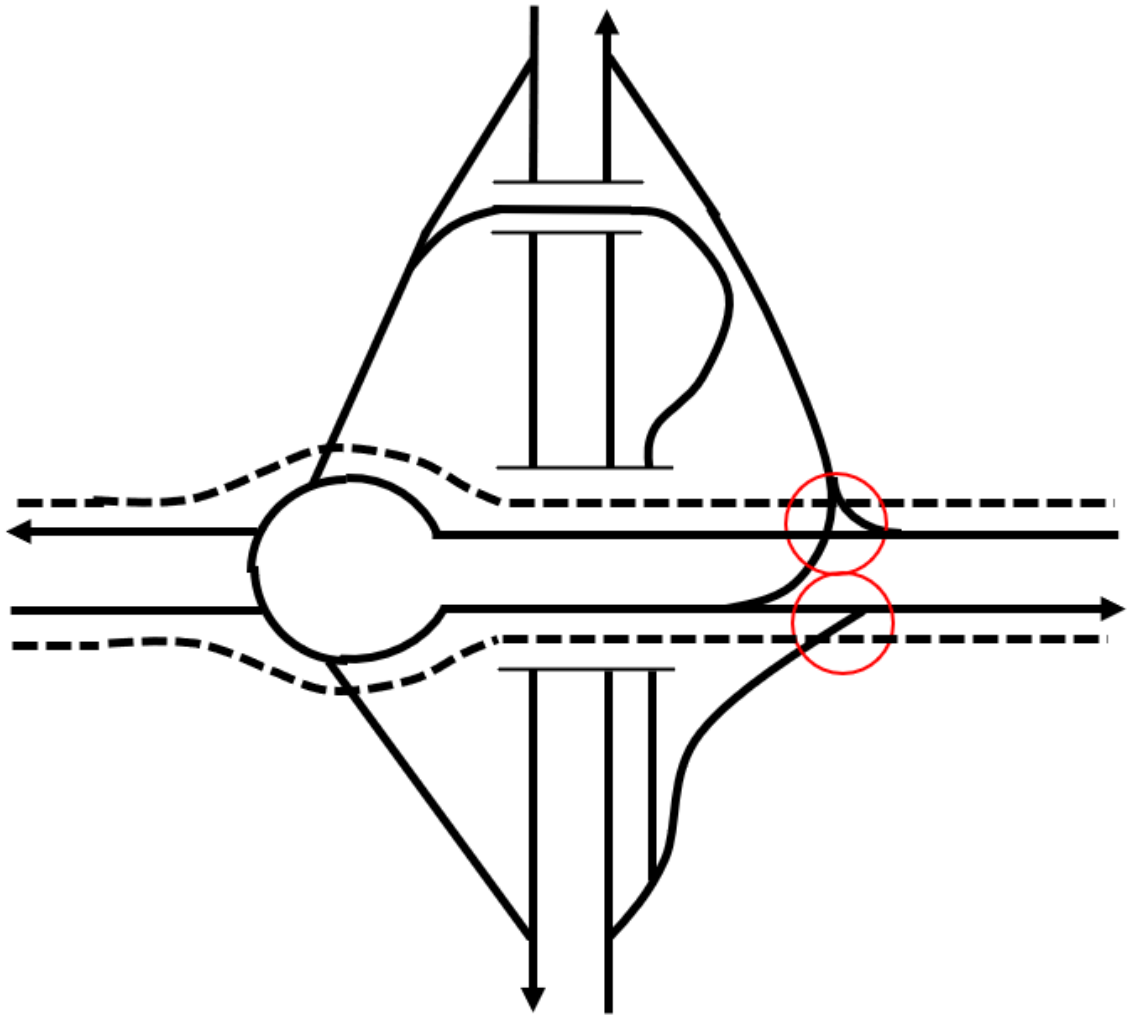
Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
1	3	3	2	4	3	4	1	2	3	2	3	7	14	10	31



ccCL, Half Milwaukee B With Roundabout

Summary: Supplies good safety performance. No particularly weak scores.
History: This is a new design.
Rank: 38 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
2	3	3	4	4	4	3	3	3	3	2	3	8	18	11	37



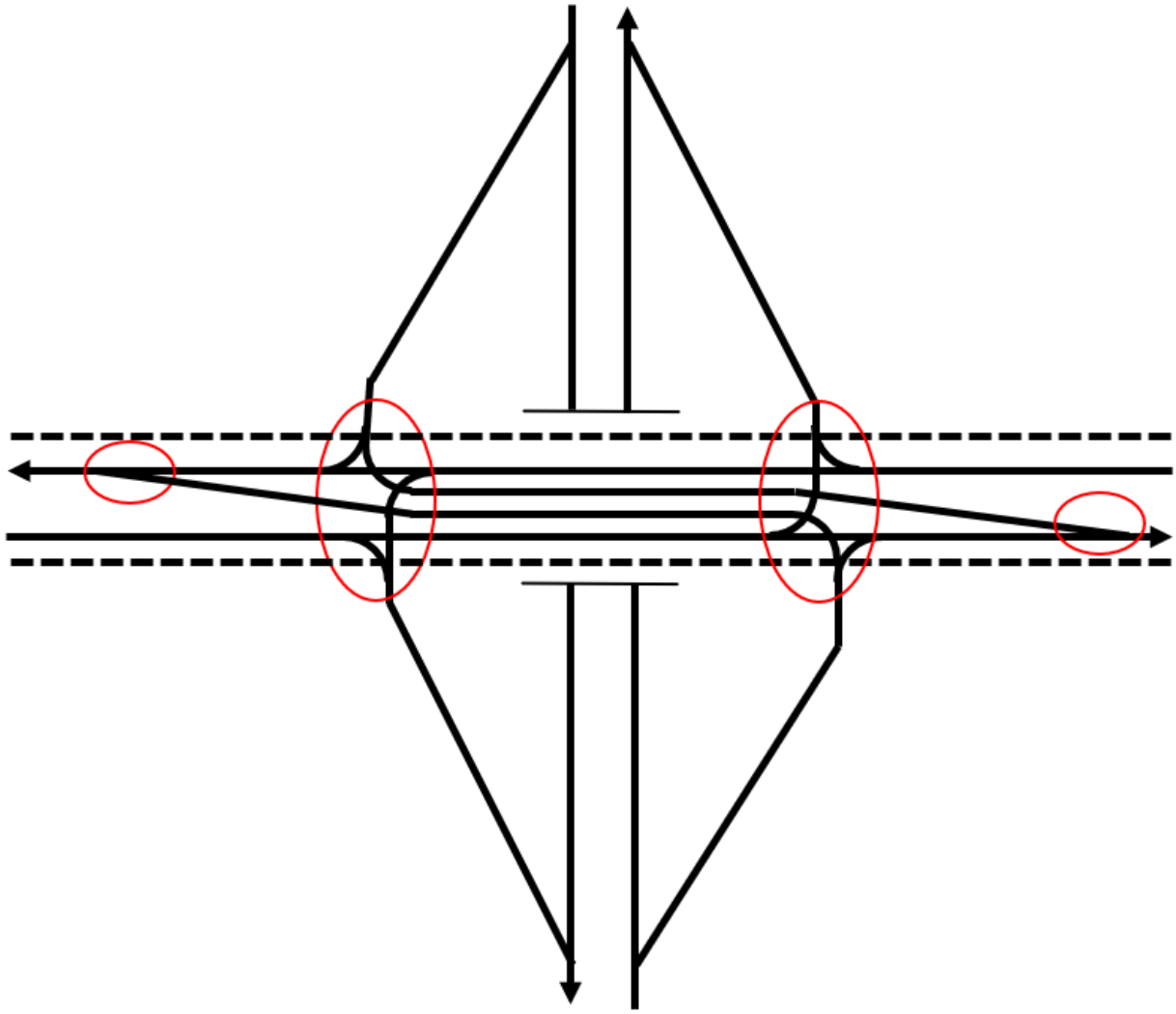
ccFF, Standard Diamond Standard Contraflow

Summary: Provides average efficiency, safety, and cost performance but has poor progression, has a large number of conflict points, and requires a large bridge.

History: This is a new design.

Rank: 57 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	1	4	0	4	4	4	3	1	4	4	2	9	15	11	35



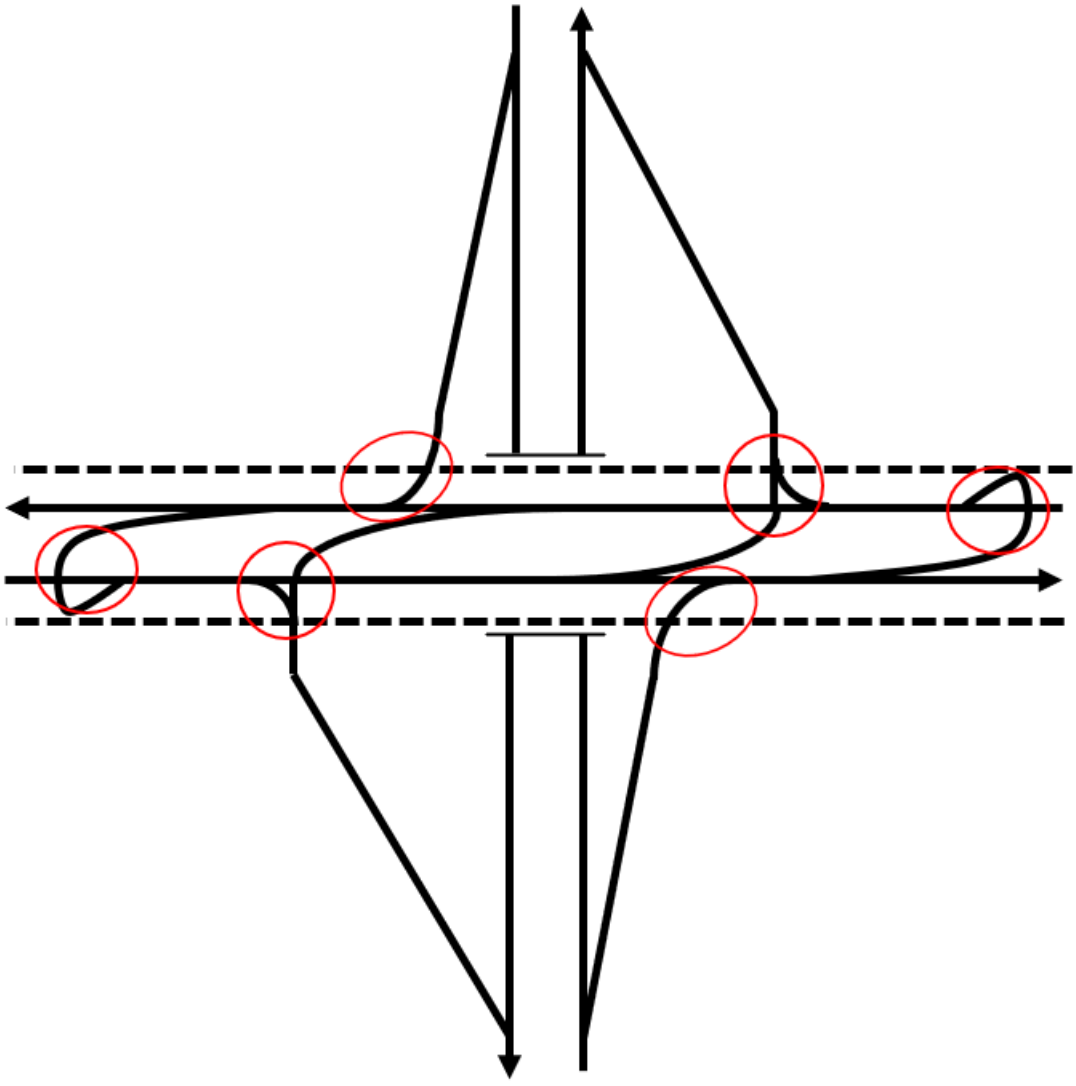
ccJJ, Superstreet

Summary: Supplies good safety and cost scores and has no major weaknesses. Could be a good retrofit for an unsafe standard diamond. The Synchronized (eeJJ) is a competitive design in the same niche.

History: Published by Hummer, 2014; the first one known to open was in Lexington, NC in 2024.

Rank: 8 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
2	5	2	3	4	4	4	3	4	4	4	3	9	18	15	42



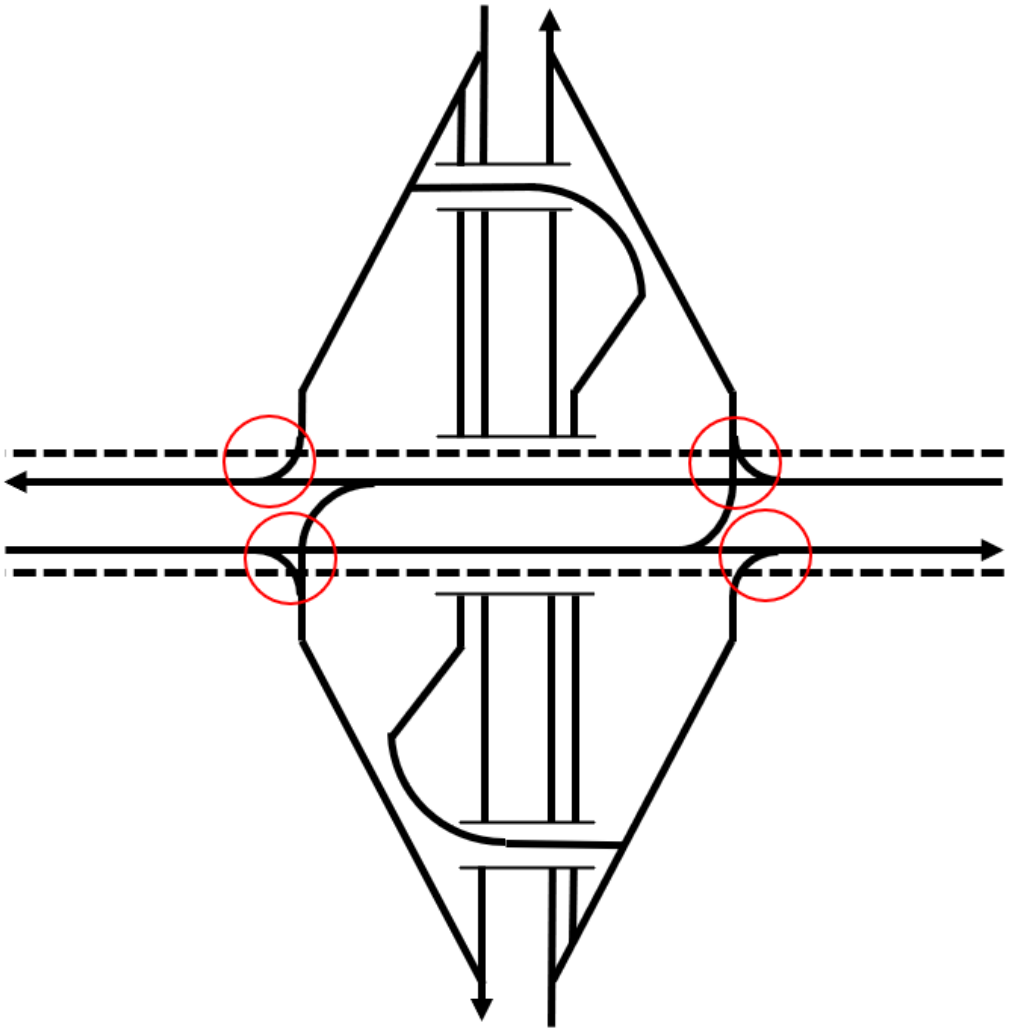
ccLL, Standard Diamond U-Turn Over Freeway with Slip Ramp

Summary: Provides good efficiency and safety performance but has poor cost scores. Requires a large bridge and a large right of way. In this niche the Milwaukee B interchange (ffLL) is also worth considering.

History: This is a new design.

Rank: 64 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	5	2	3	5	4	4	3	0	0	1	3	11	19	4	34



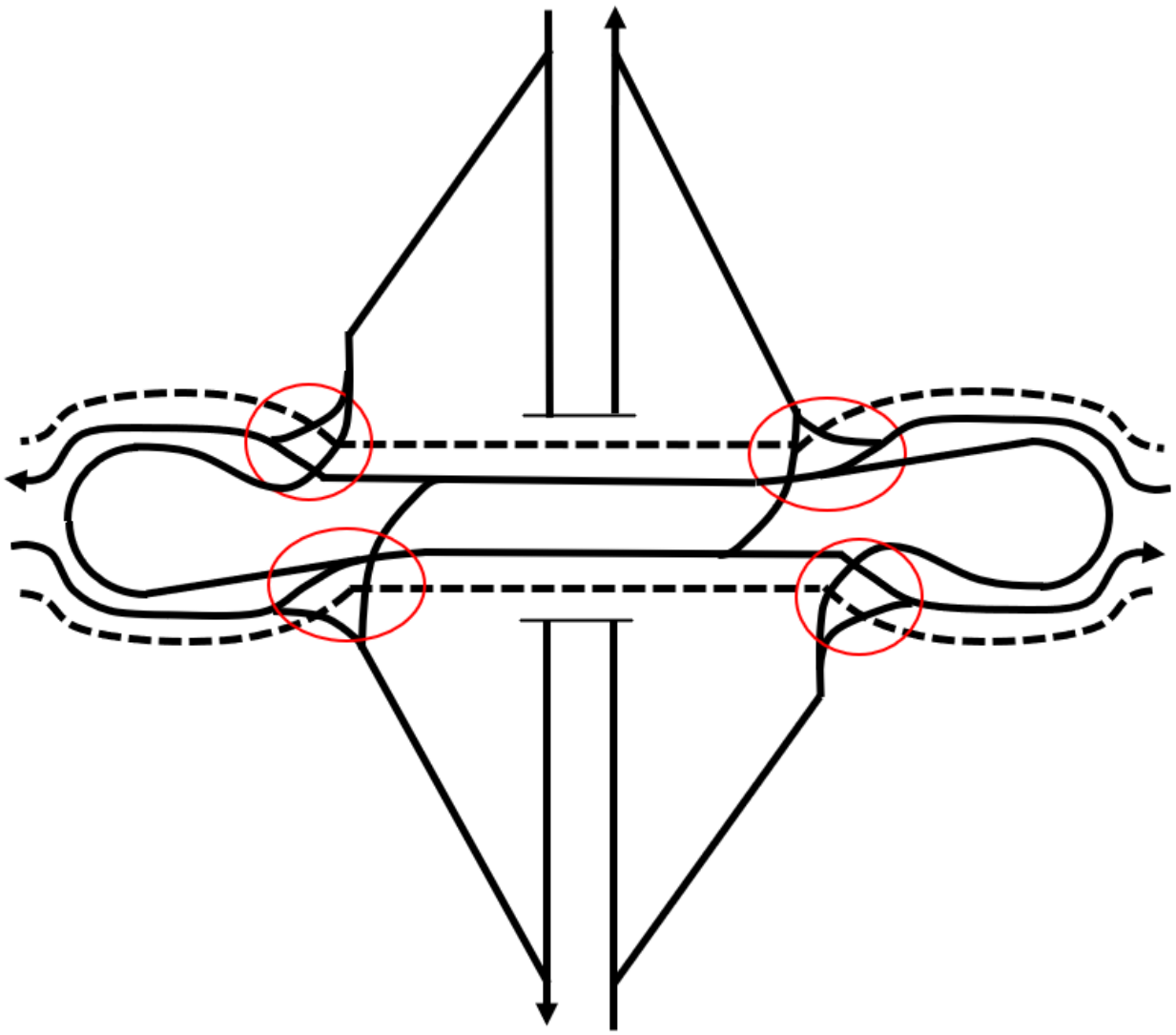
ccMM, Standard Diamond St. Aug.

Summary: Supplies good safety benefits but has poor capacity and requires a lengthy extent along the arterial. Other St. Aug. concepts have better overall scores.

History: This is a new design.

Rank: 40 of 125.

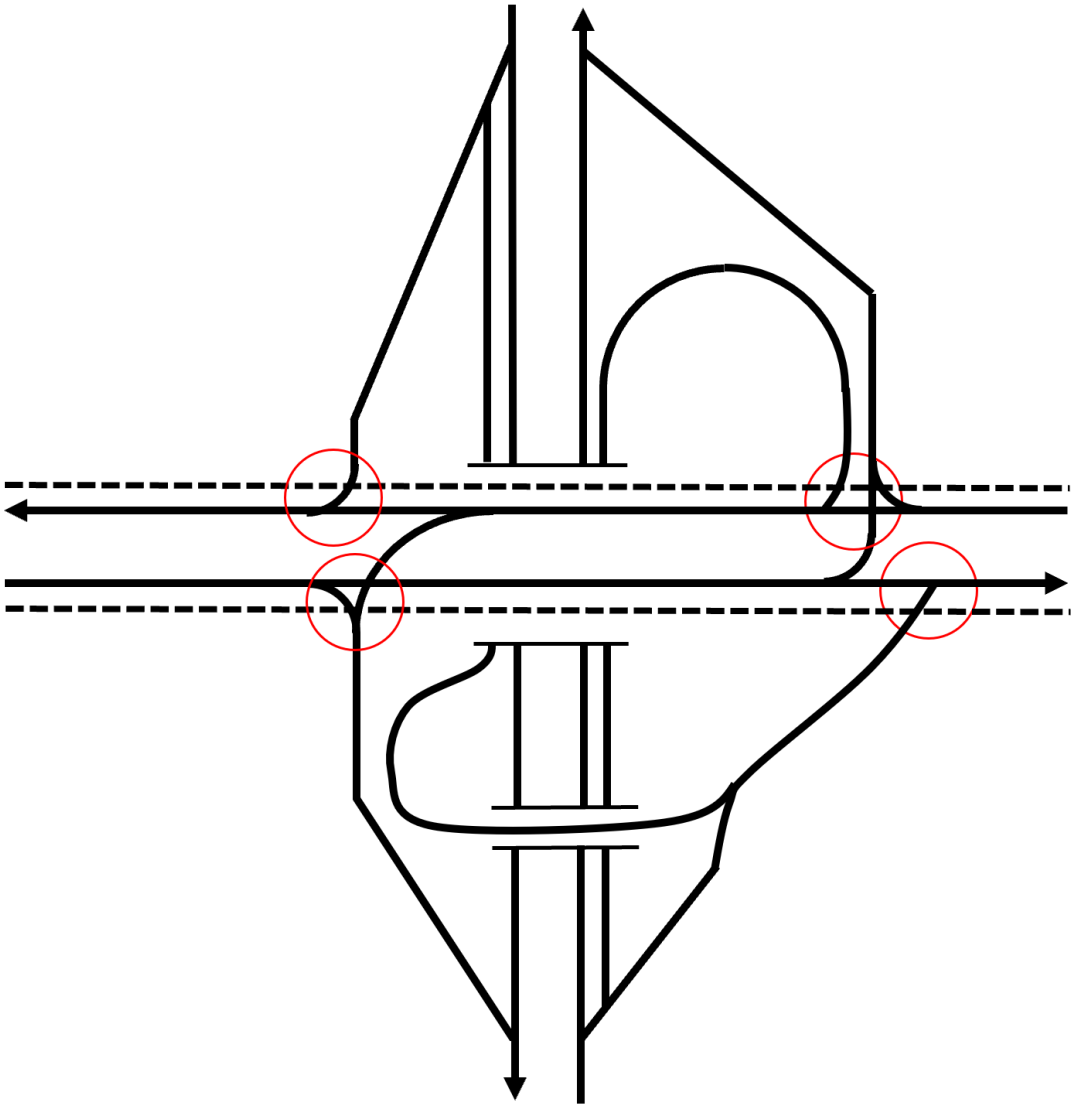
Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
1	5	2	2	3	4	4	5	4	3	4	0	8	18	11	37



cdIL, One Loop B One Milwaukee B

Summary: Has some good efficiency and safety aspects but would struggle with high costs.
History: This is a new design.
Rank: 73 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	5	1	3	5	4	4	3	1	1	1	1	10	19	4	33



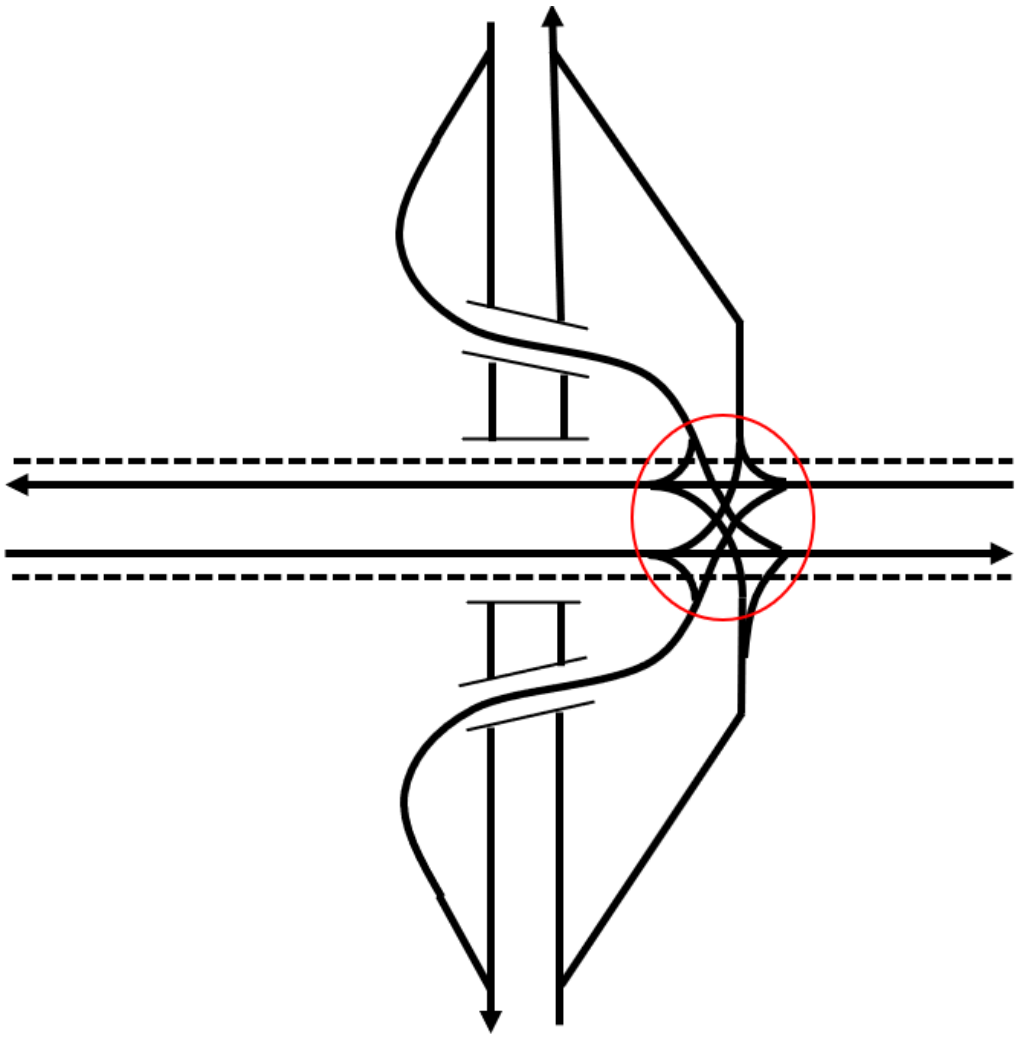
chCH, Offset SPUI

Summary: Excellent for unusual maneuvers and pedestrian quality, but poor for conflict points and speed control. Lower costs than a SPUI and could work well with right of way constraints on one side of the freeway.

History: At least one has been opened, at MN-36 and Rice Street near St. Paul, MN.

Rank: 50 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
3	3	4	0	5	2	5	0	4	4	2	4	10	12	14	36



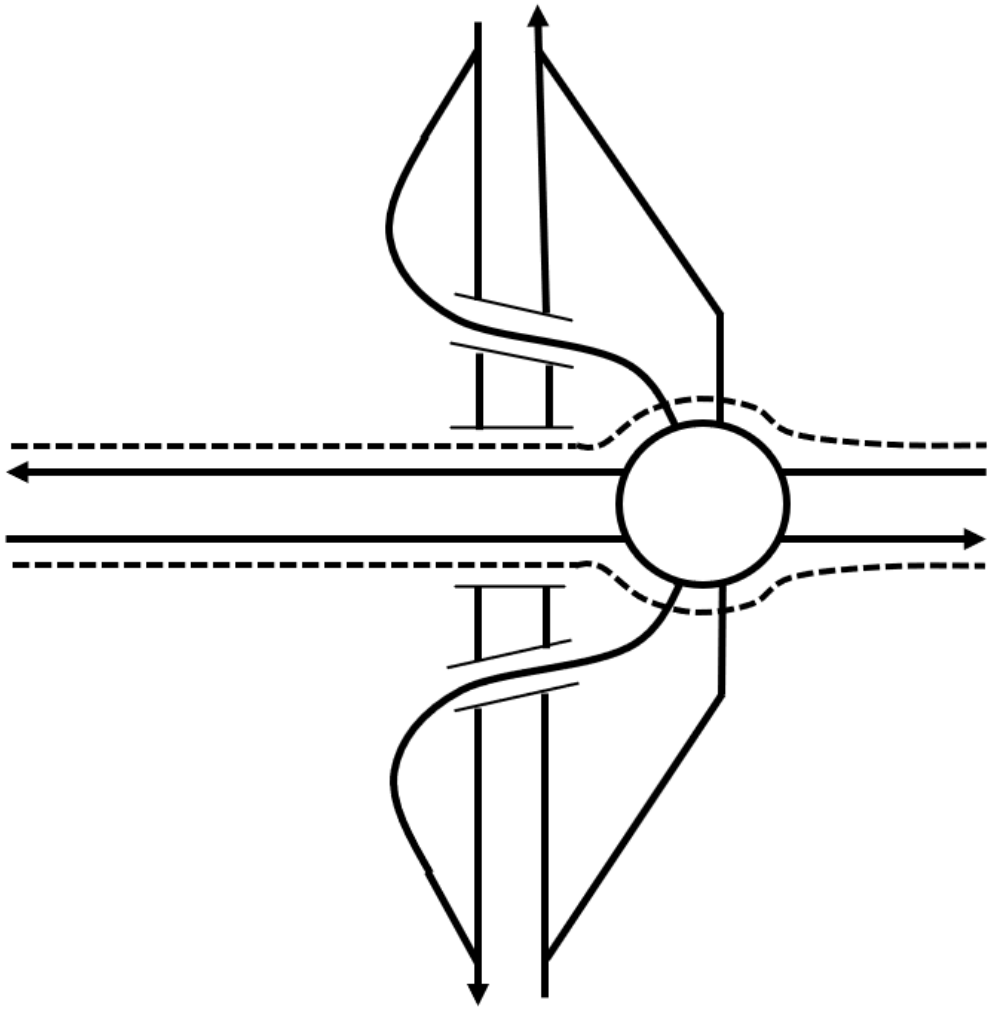
chCH, Offset SPUI with Roundabout

Summary: Where a single roundabout has sufficient capacity this design could be competitive. Lower costs than a SPU and could work well with right of way constraints on one side of the freeway.

History: At least one has been opened, at I-694 and Rice Street near St. Paul, MN.

Rank: 12 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
2	2	4	5	5	4	3	2	4	4	2	4	8	19	14	41



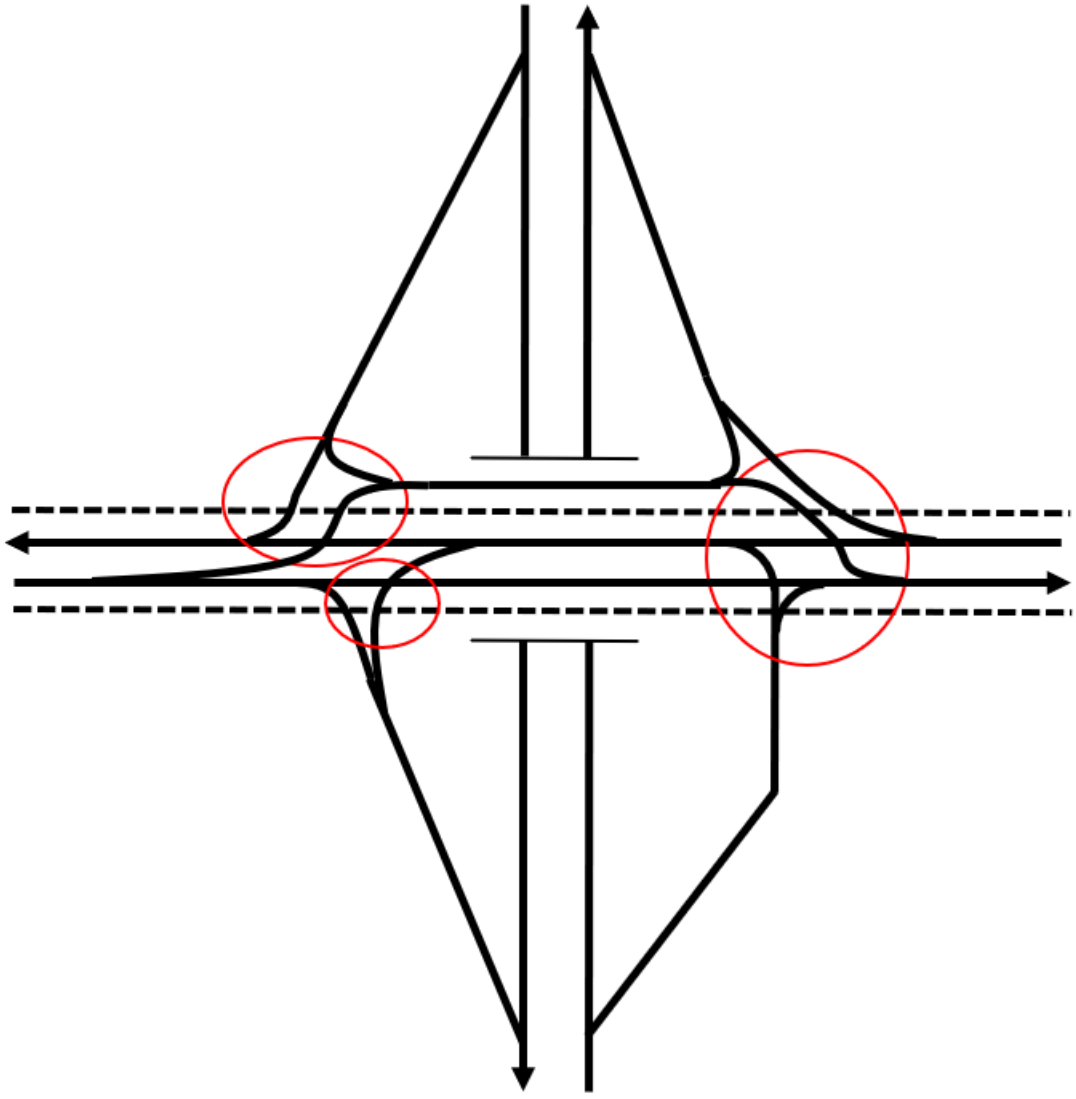
chCH, One-Sided DDI

Summary: Supplies excellent efficiency. Speed control is the weakest category. Could be a competitive retrofit for an over-capacity diamond.

History: We believe that the first to open was at I-35 and MO-152 north of Kansas City, MO. Published by Yu and Wang, 2022.

Rank: 32 of 125.

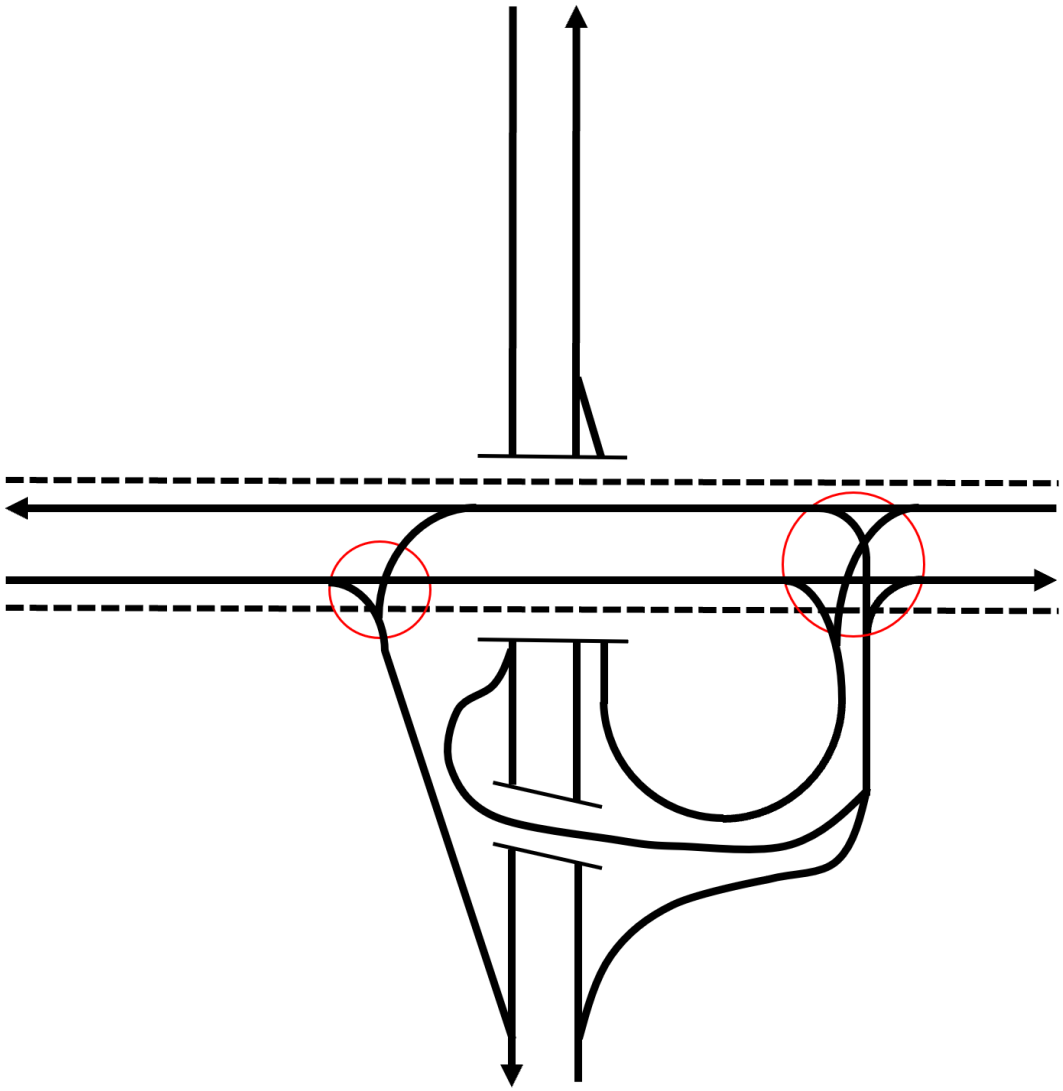
Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	4	4	2	4	3	4	1	2	4	4	2	12	14	12	38



ciDL, One Loop A One Milwaukee B

Summary: Weak in efficiency and speed control but scores well in several other categories.
History: This is a new design.
Rank: 76 of 125.

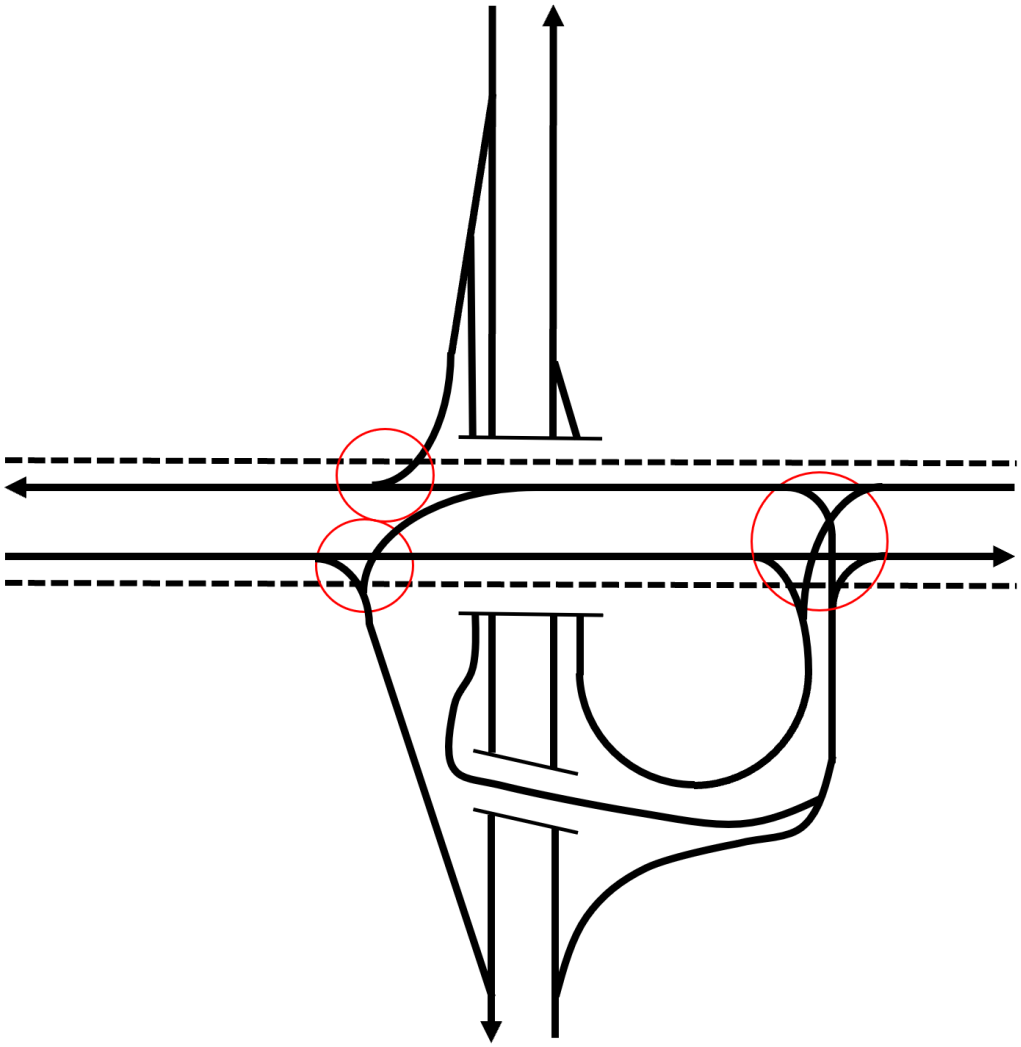
Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
3	3	0	3	3	3	5	0	3	3	4	3	6	14	13	33



ciDL, One Loop A One Milwaukee B with Right Ramp

Summary: Pretty average across most categories. Could be helpful in a parclo A footprint.
History: This is a new design.
Rank: 84 of 125.

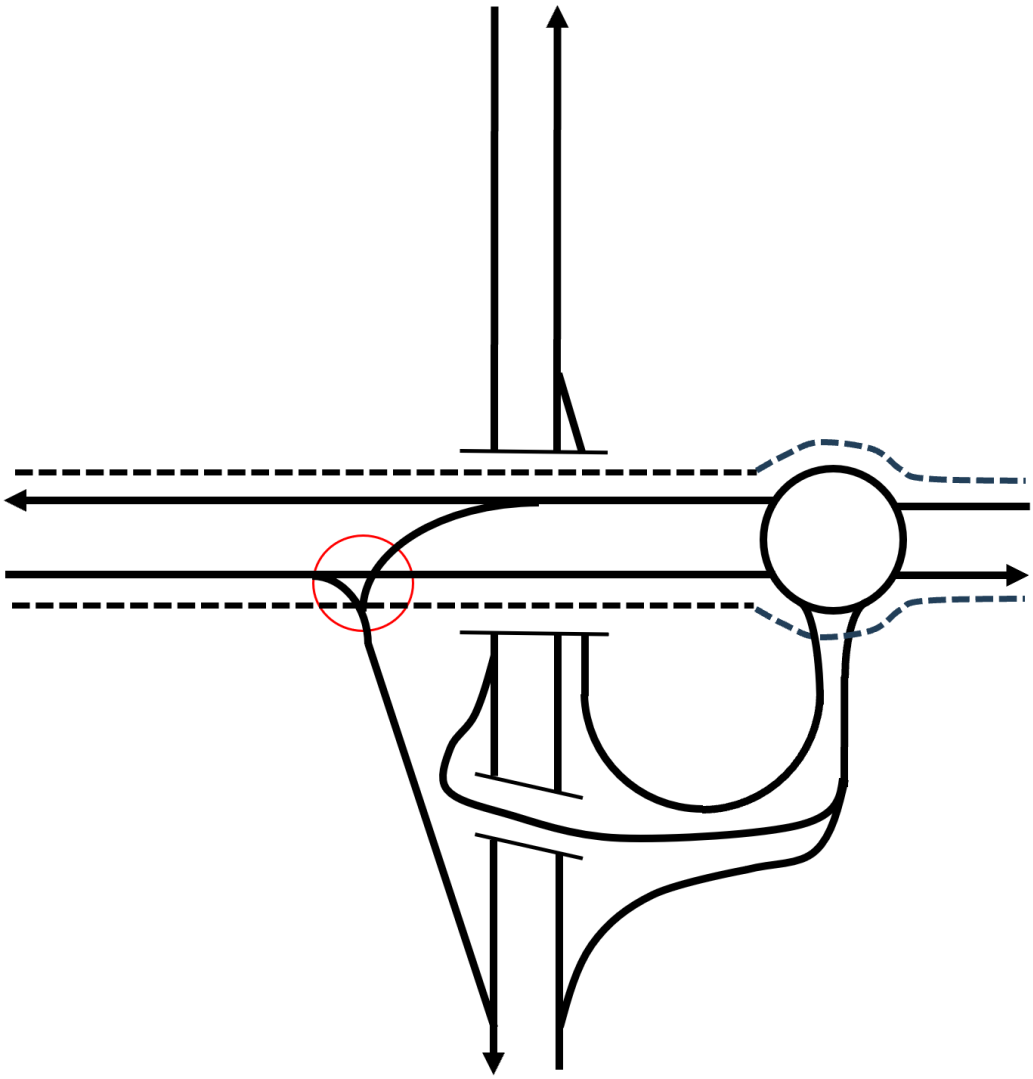
Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
3	3	1	2	3	3	4	1	3	3	3	3	7	13	12	32



ciDL, One Loop A One Milwaukee B with Roundabout

Summary: Generally decent on cost but weak in efficiency.
History: This is a new design.
Rank: 74 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
2	2	0	4	3	3	4	2	3	3	4	3	4	16	13	33



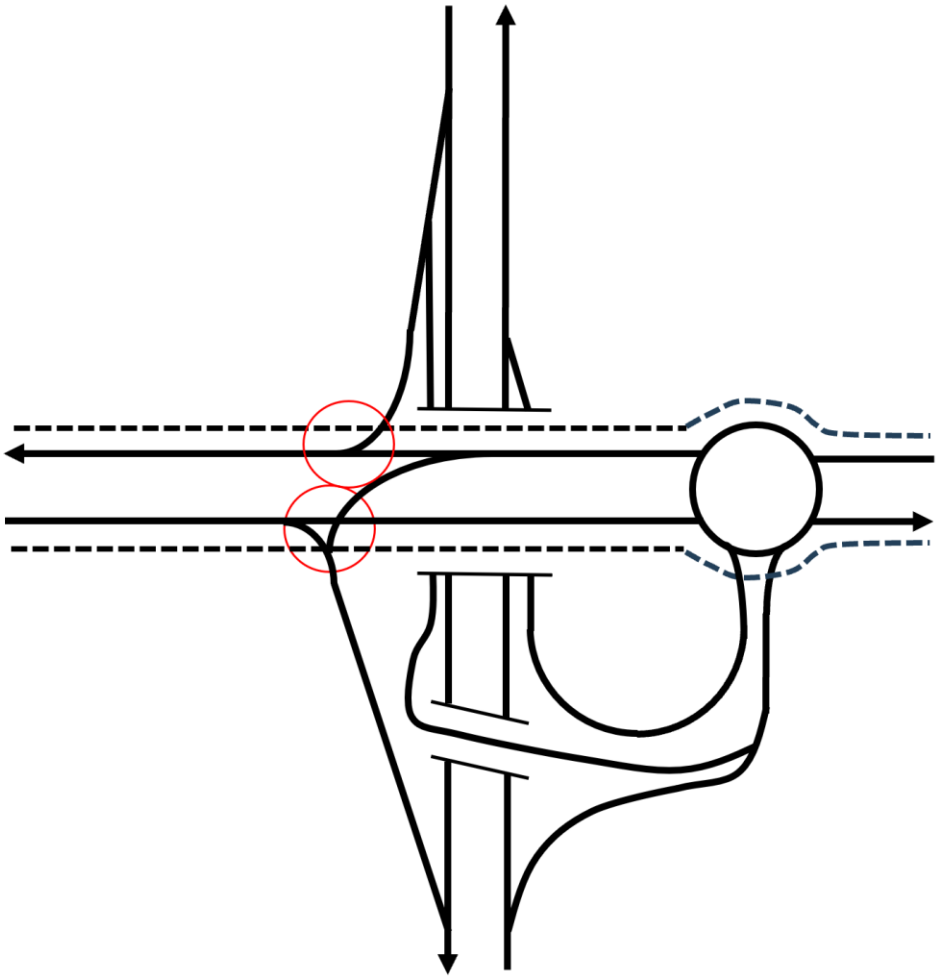
ciDL, One Loop A One Milwaukee B with Roundabout and Right Ramp

Summary: With only one score below a three this interchange has few weaknesses. Could be a competitive concept in a parclo A footprint.

History: This is a new design.

Rank: 47 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	3	1	4	3	3	3	3	3	3	3	3	8	16	12	36



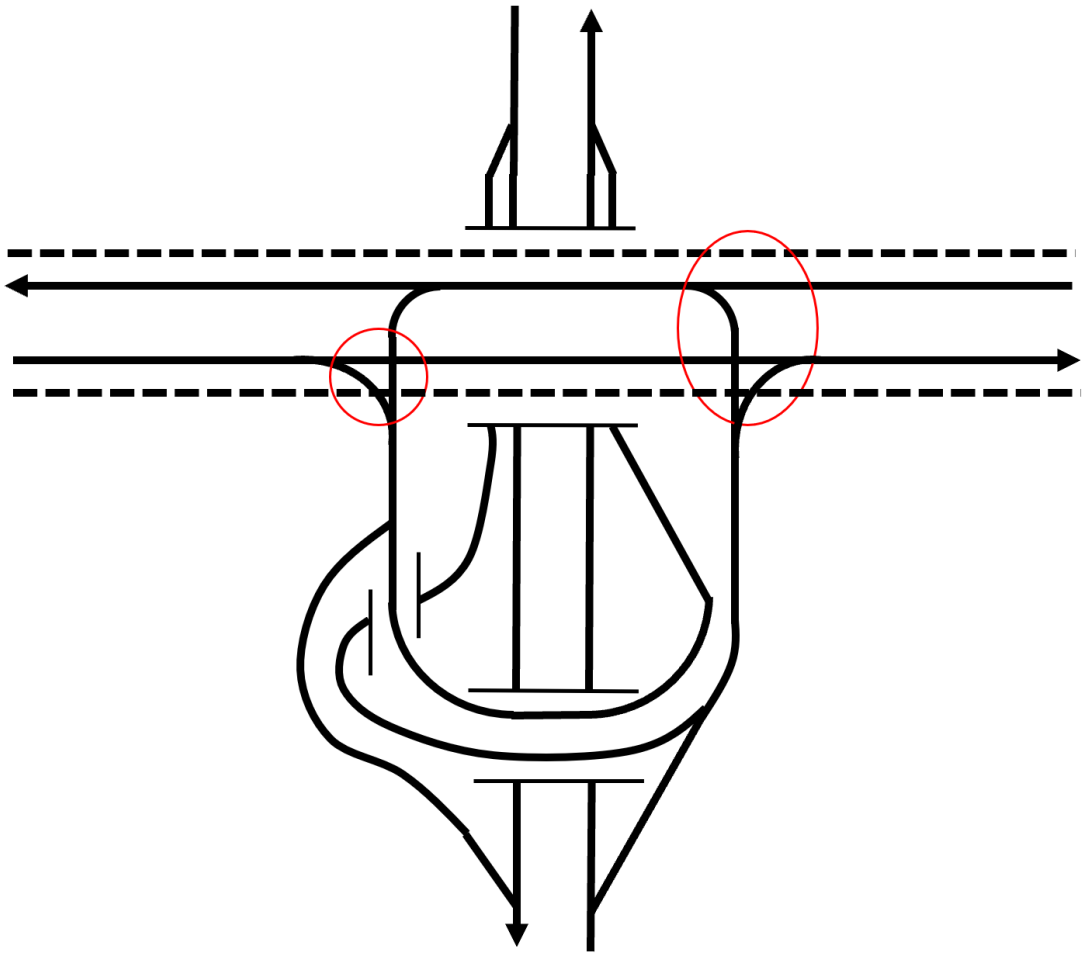
clCL, Elevated Double U

Summary: Has several positive attributes including progression, conflict points, and pedestrian quality, but performs poorly in other areas. There are probably better parclo AB competitors.

History: This is a new design.

Rank: 110 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
2	4	0	4	2	3	5	0	0	2	3	3	6	14	8	28



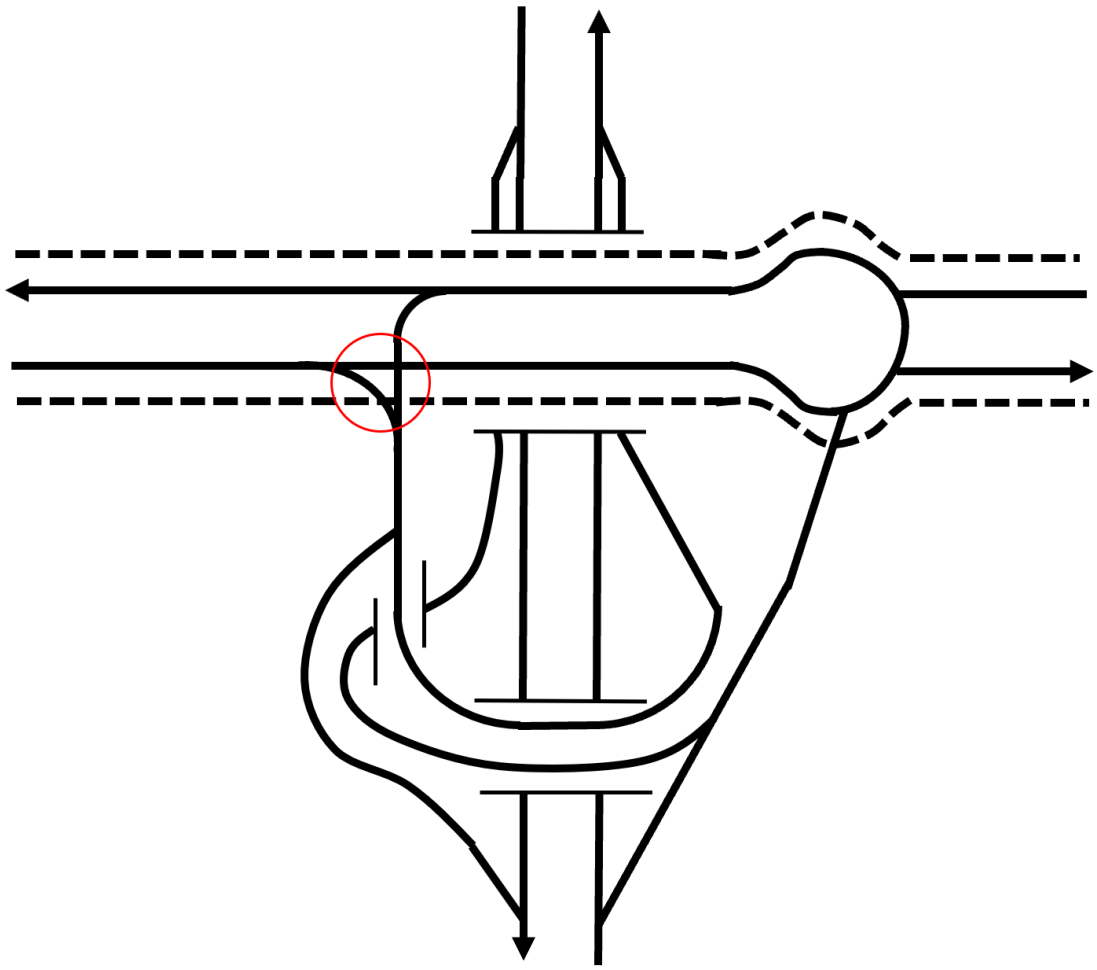
clCL, Elevated Double U with Roundabout

Summary: Performs quite well in the safety categories but poorly for distance traveled and bridge size. If the roundabout can handle the demands this concept is likely an upgrade over the version with two signals.

History: This is a new design.

Rank: 83 of 125.

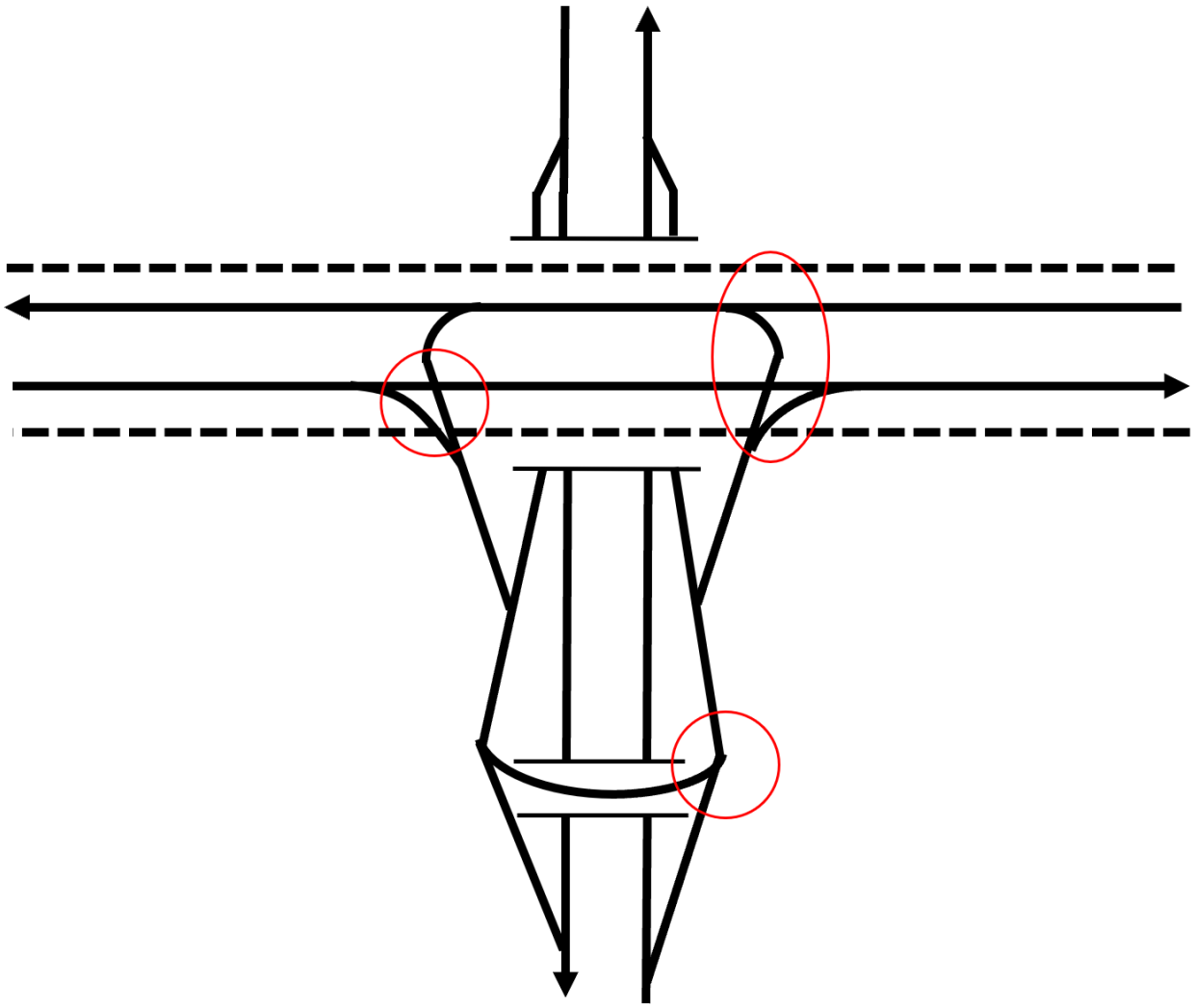
Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	2	0	5	2	4	5	2	0	2	3	3	6	18	8	32



clCL, V

Summary: Similar to the elevated double U (clCL) but with lower costs. Has several glaring weaknesses.
History: This is a new design.
Rank: 102 of 125.

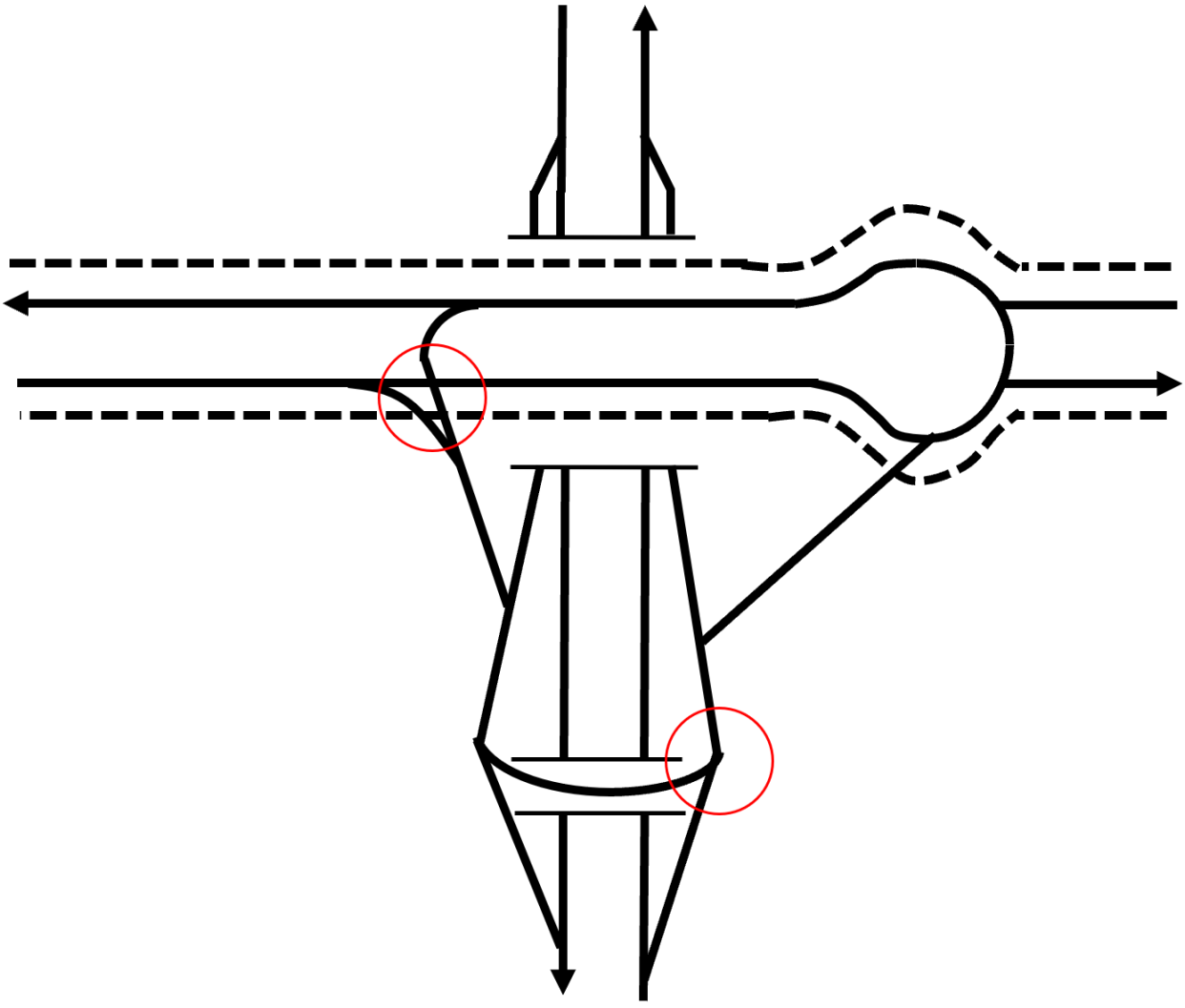
Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
2	4	0	4	0	3	5	0	3	3	3	3	6	12	12	30



clCL, V with Roundabout

Summary: If the roundabout can handle the demand this might be a worthy parclo AB competitor.
History: This is a new design.
Rank: 75 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	2	0	4	0	4	5	2	3	3	3	3	6	15	12	33



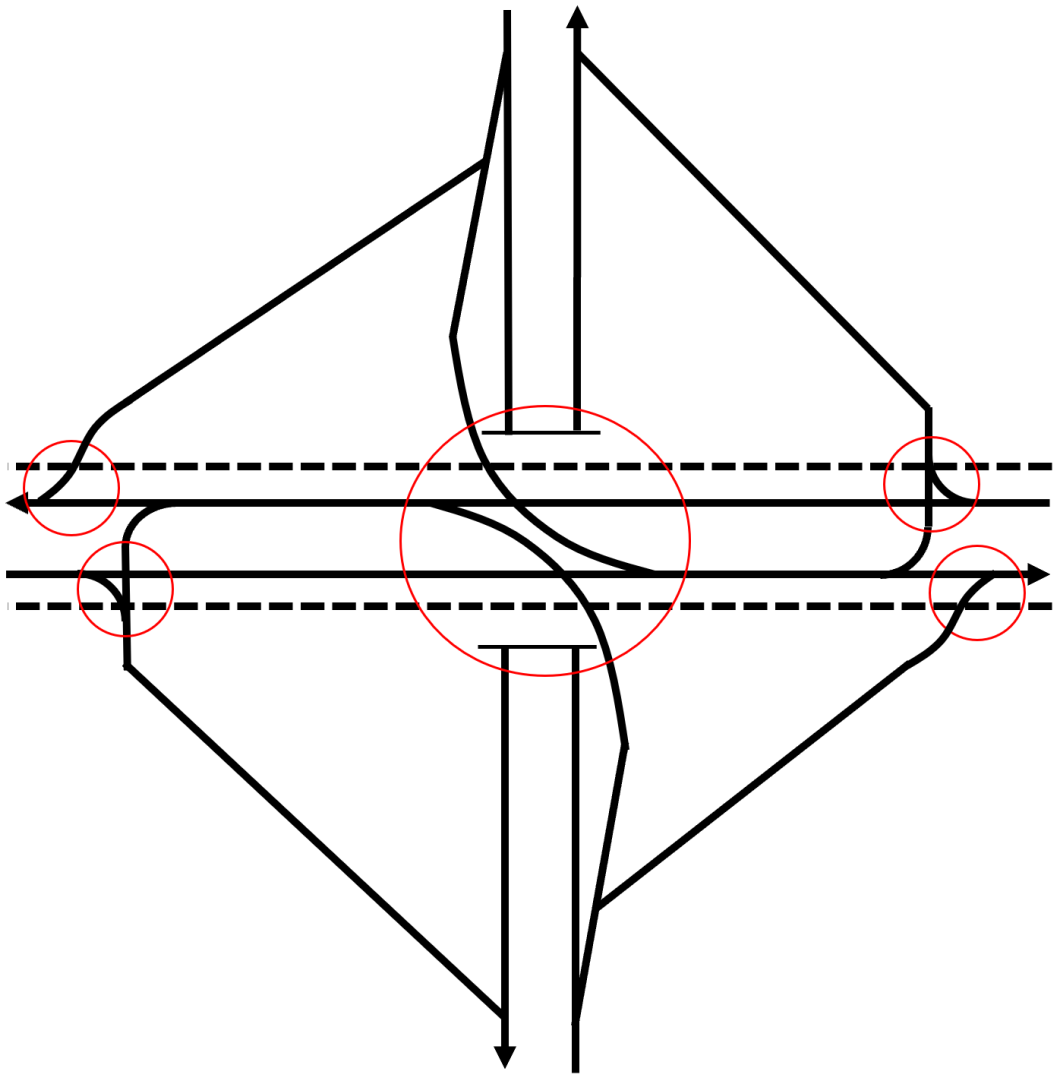
ddAA, Three Point

Summary: Supplies good efficiency but poor cost performance. Has high wrong way potential and requires a lengthy extent along the arterial.

History: One is open at I-55 and MO-141 in Arnold, Missouri.

Rank: 104 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	4	4	2	4	1	3	1	3	2	2	0	12	11	7	30



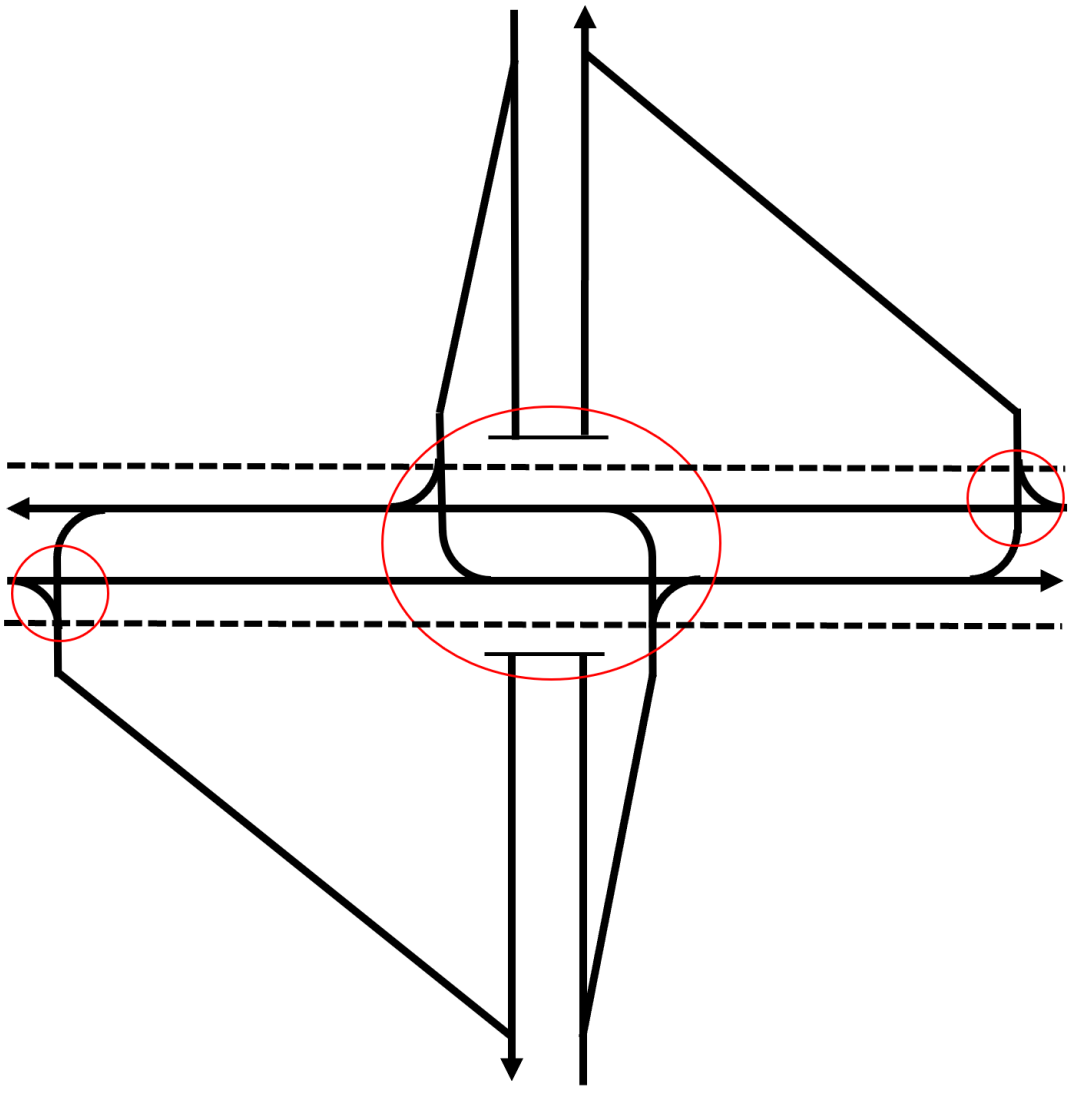
ddBB, Spread Diamond Tight Diamond

Summary: Supplies good safety and cost scores but has poor capacity. Requires a small bridge and has a low number of unusual maneuvers.

History: This is a new design.

Rank: 41 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
1	3	4	2	5	3	4	1	5	4	3	2	8	15	14	37



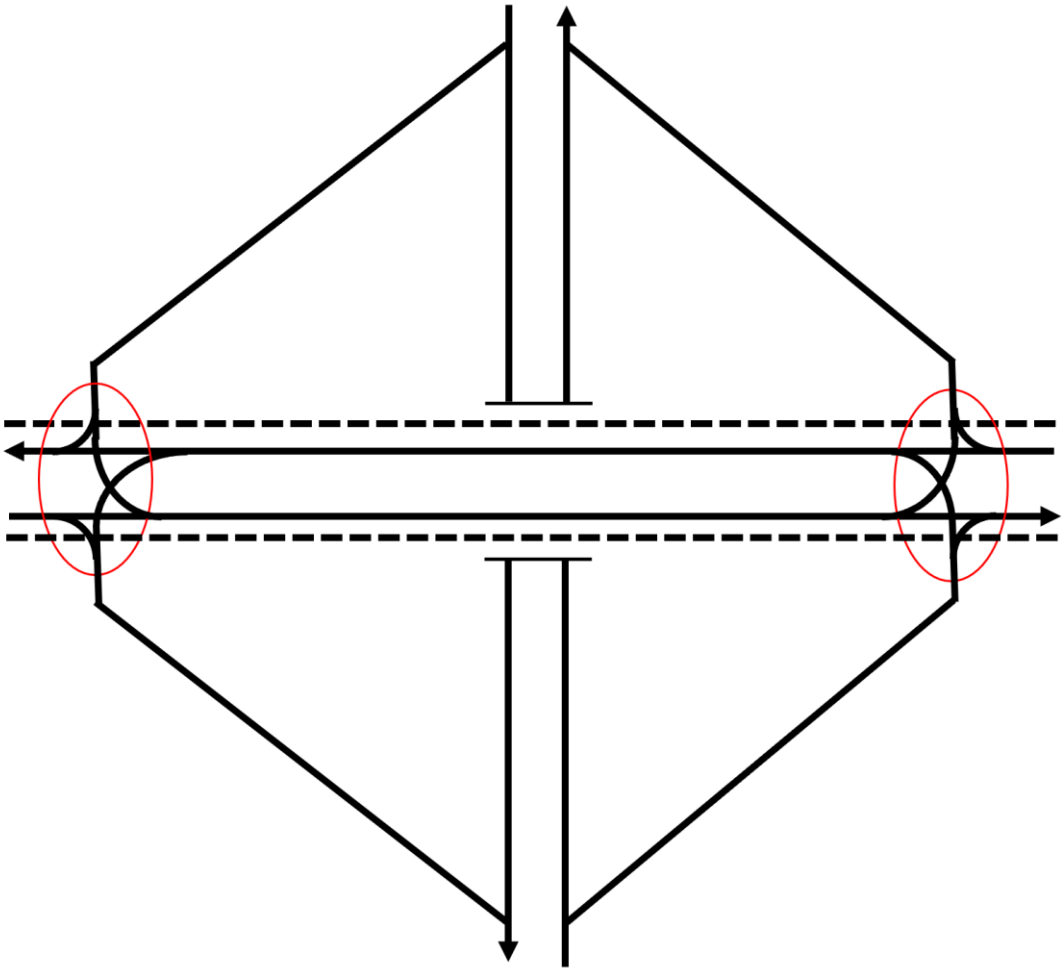
ddDD, Spread Diamond

Summary: Has several good safety scores and is excellent for bridge size but has poor efficiency. There are many better designs that fit in this large footprint.

History: This is a fairly common design, particularly in rural settings.

Rank: 118 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
1	0	2	1	5	4	4	0	5	2	3	0	3	14	10	27



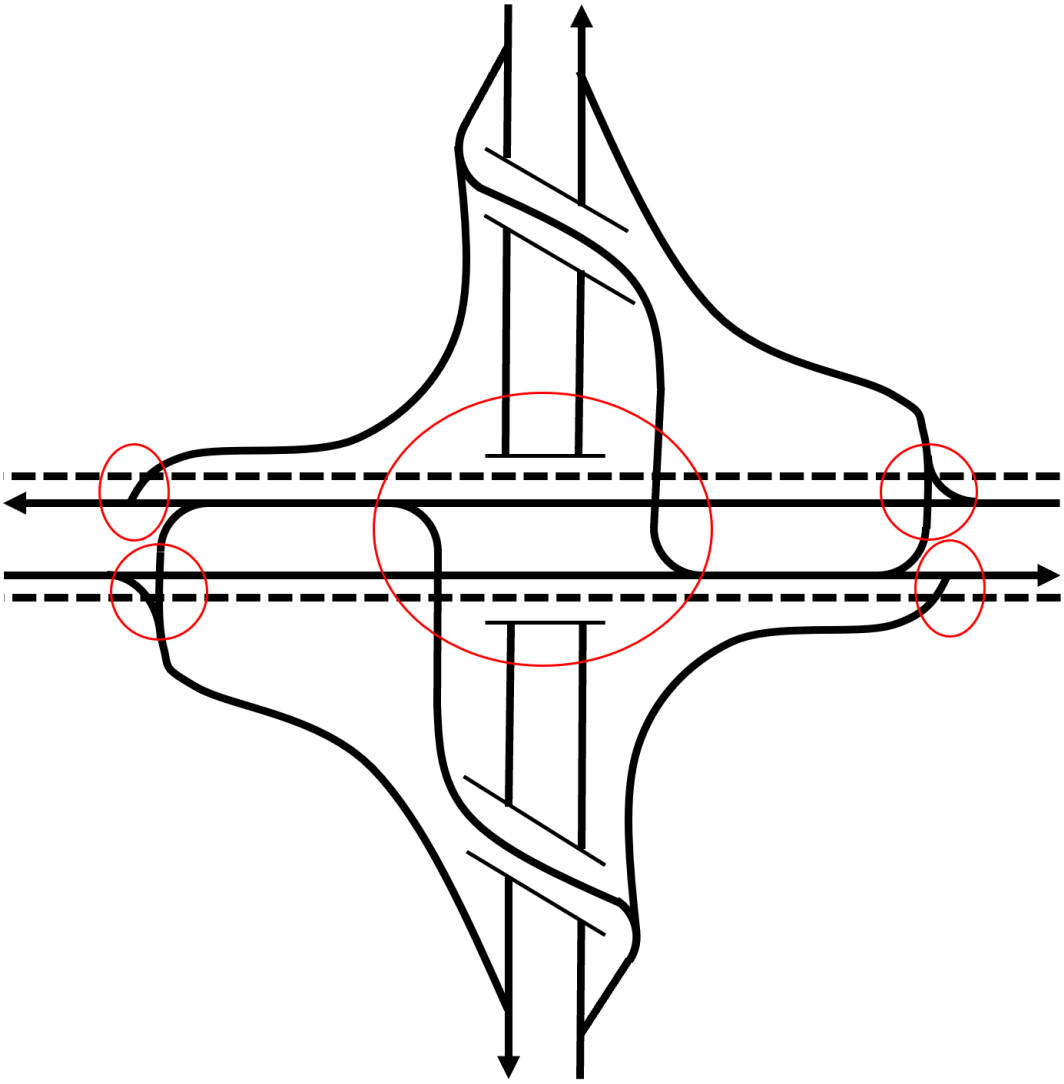
ddHH, Spread Diamond Displaced

Summary: Supplies good efficiency and safety with a small bridge and a low number of unusual maneuvers.

History: This is a new design.

Rank: 44 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	4	4	2	5	2	3	3	4	2	2	2	12	15	10	37



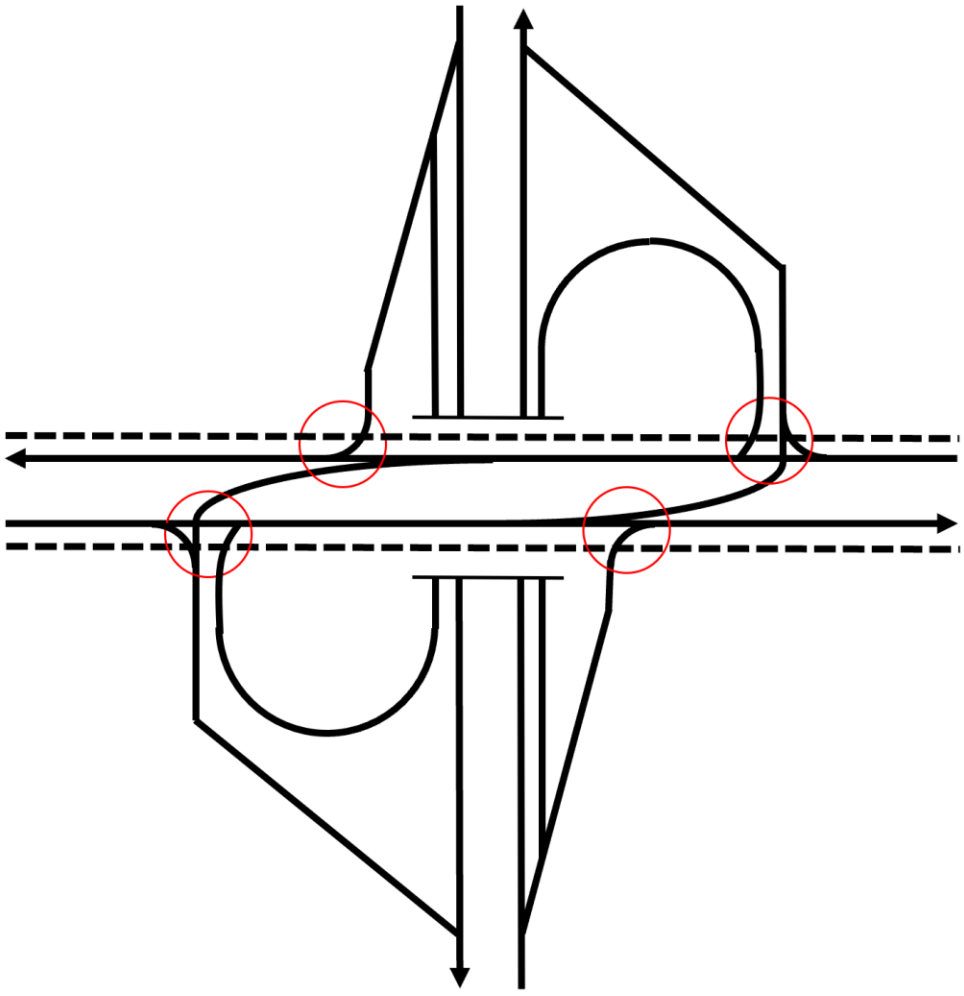
ddII, Parclo B

Summary: Supplies good efficiency and safety. Has great progression, a low number of unusual maneuvers, and a small bridge size but longer travel distances.

History: This is a common design often used in high demand suburban areas.

Rank: 18 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	5	1	3	5	4	4	3	5	2	2	2	10	19	11	40



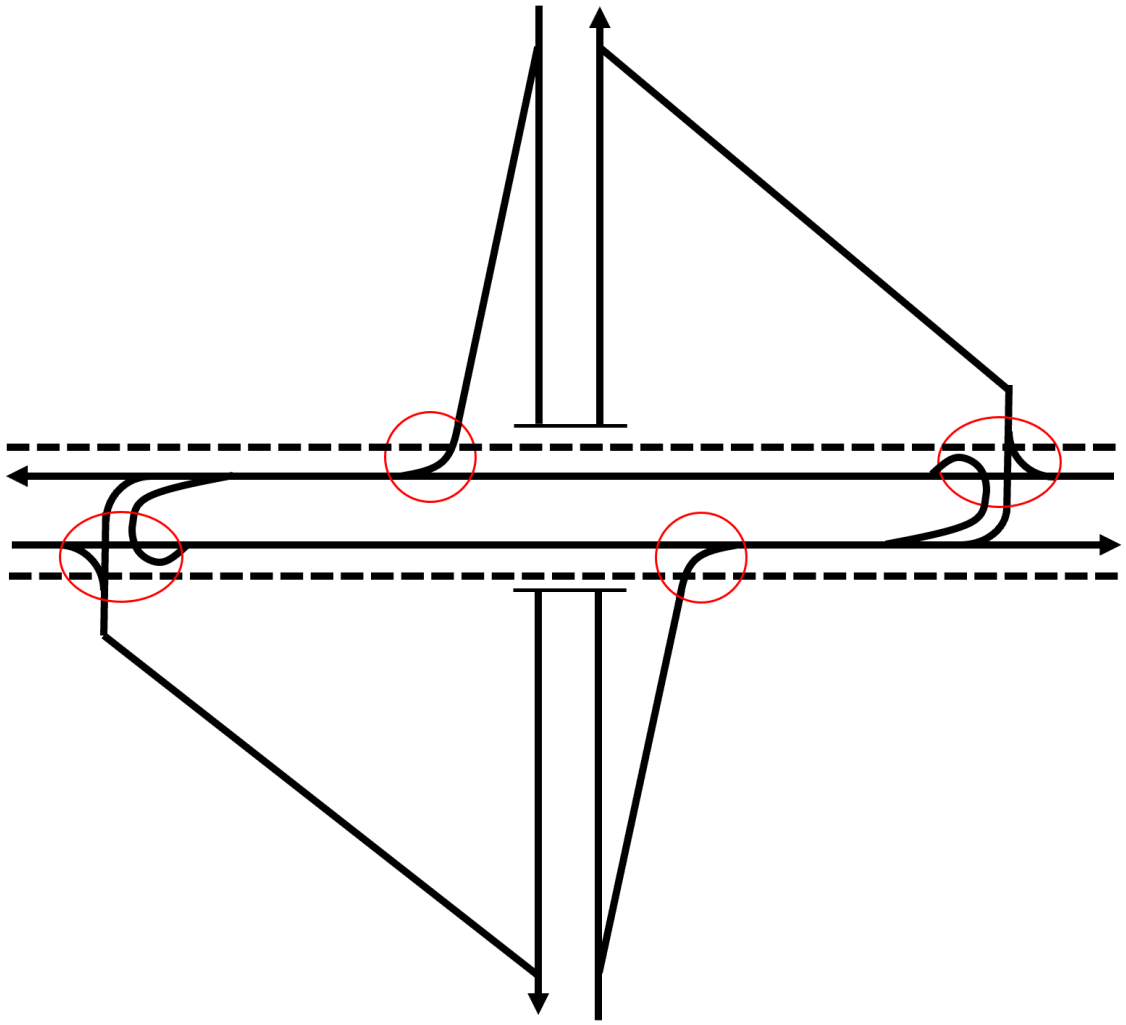
ddJJ, Spread Diamond U-Turn on Arterial

Summary: Supplies good safety and cost scores. Requires extensive travel distances and lengthy extents along the arterial. Has the advantages of a concept with u-turn crossovers without extra right of way for the crossovers.

History: This is a new design.

Rank: 24 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
2	5	1	3	4	4	4	3	5	4	3	1	8	18	13	39



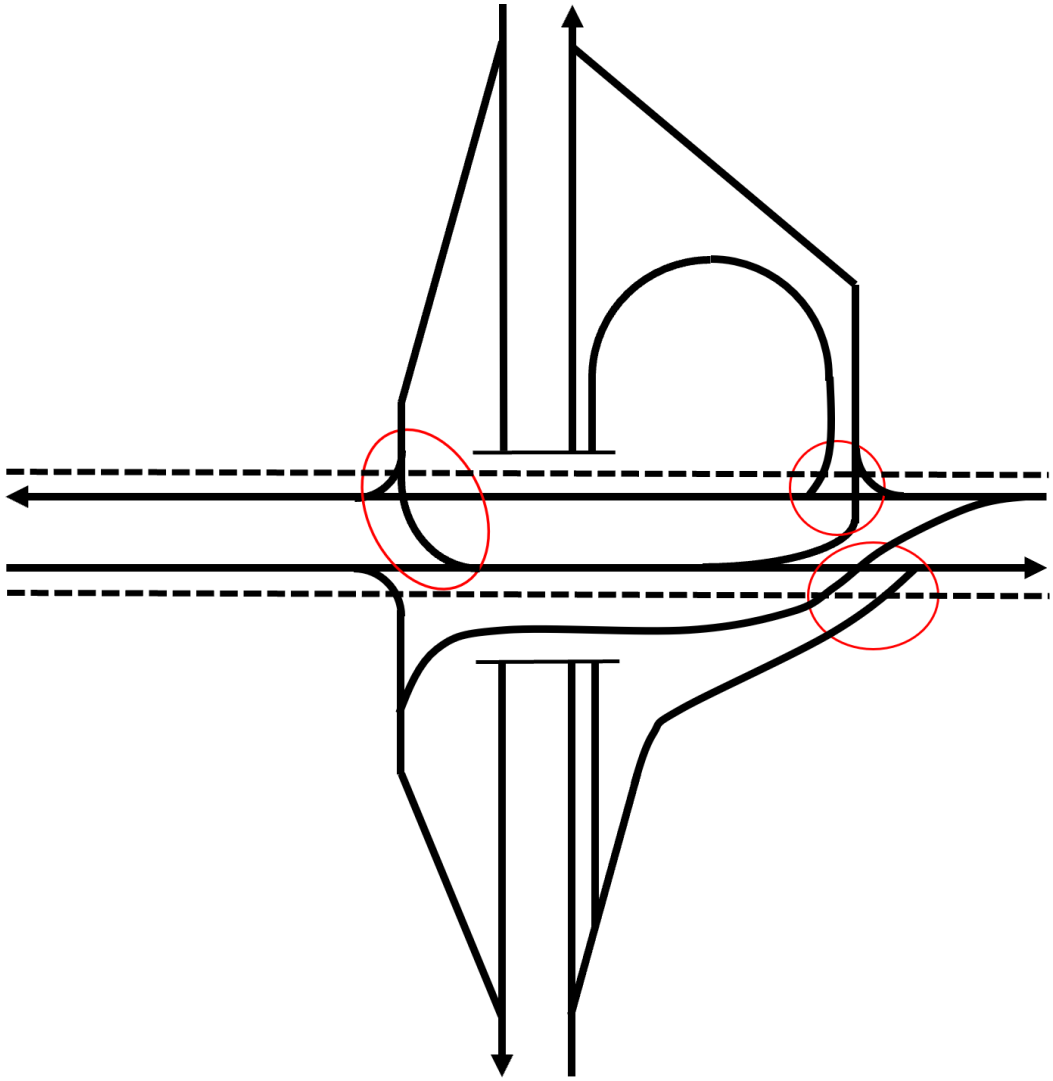
dhBI, One Loop B Displaced Left

Summary: Above average for efficiency and excellent for unusual maneuvers. Not good for speed control. Could compete with tight right of way on one side of the freeway.

History: This is a new design.

Rank: 49 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	4	2	3	5	2	3	1	4	3	3	2	10	14	12	36



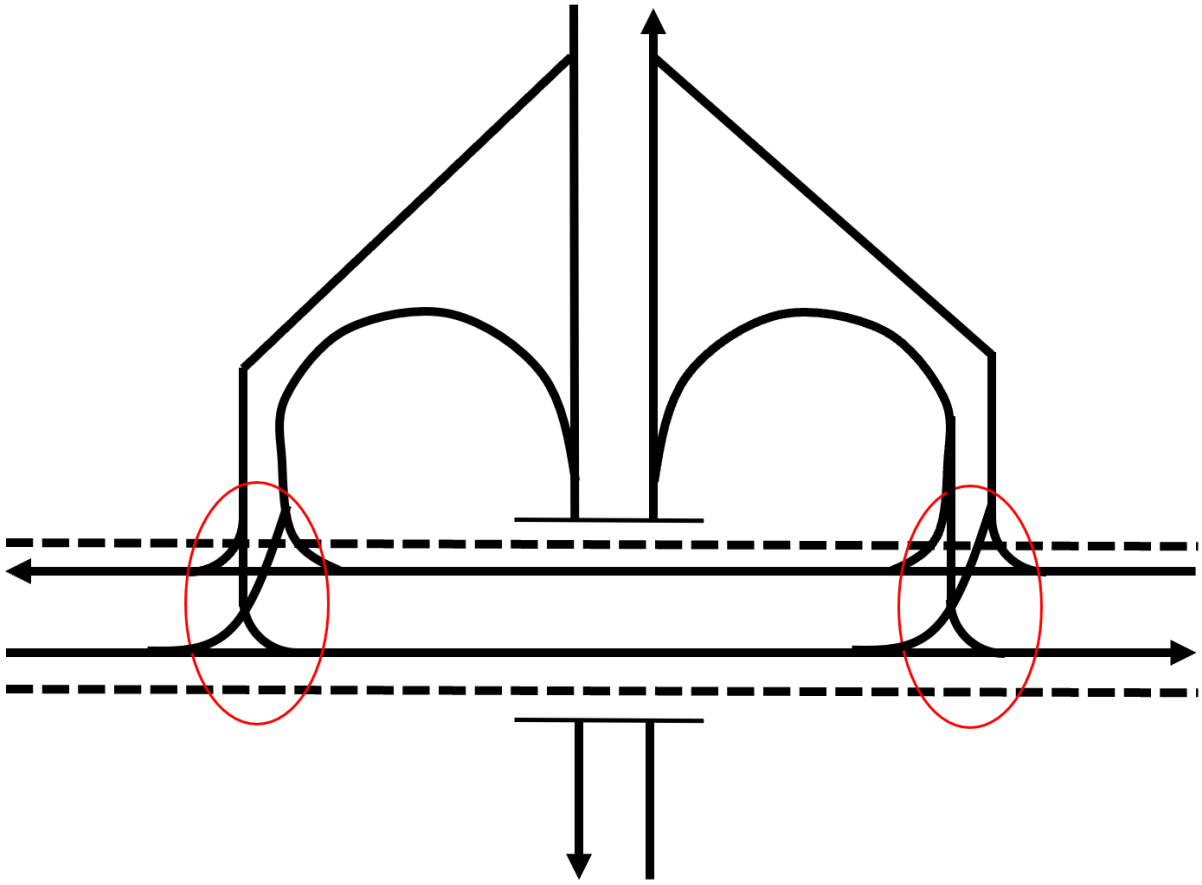
diDI, Parclo AB

Summary: Supplies good cost scores but has very poor efficiency. Also has a high number of conflict points and poor speed control. Project teams should consider alternatives.

History: This is a common design often used where right of way is constrained on one side of the arterial.

Rank: 114 of 125.

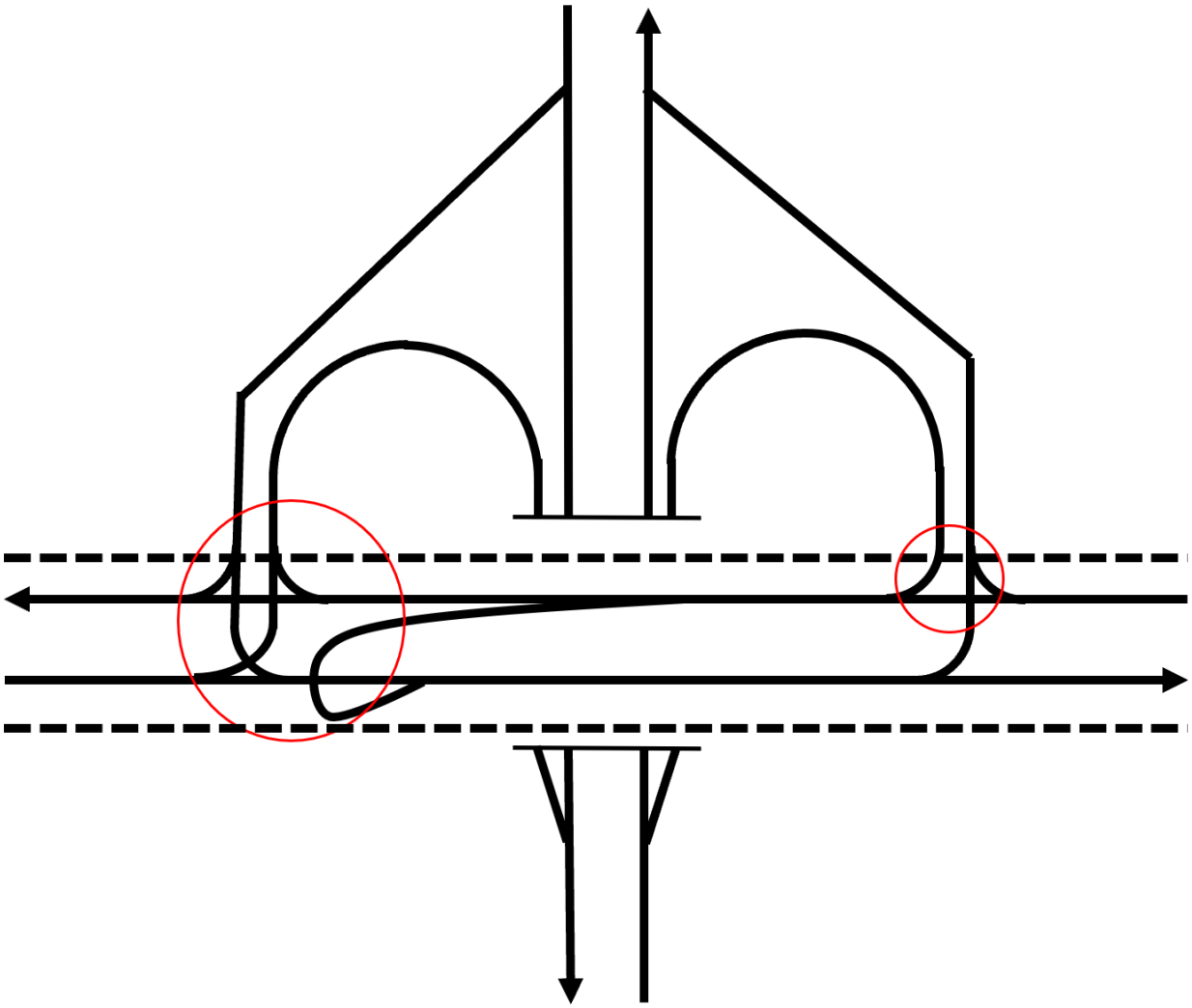
Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
1	1	0	1	3	3	5	0	4	2	5	3	2	12	14	28



diDI, Parclo AB Internal U-Turn

Summary: The u-turn would likely help the efficiency of a parclo AB at a relatively small cost.
History: This is a new design.
Rank: 113 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
1	3	0	2	3	2	5	0	3	2	5	2	4	12	12	28



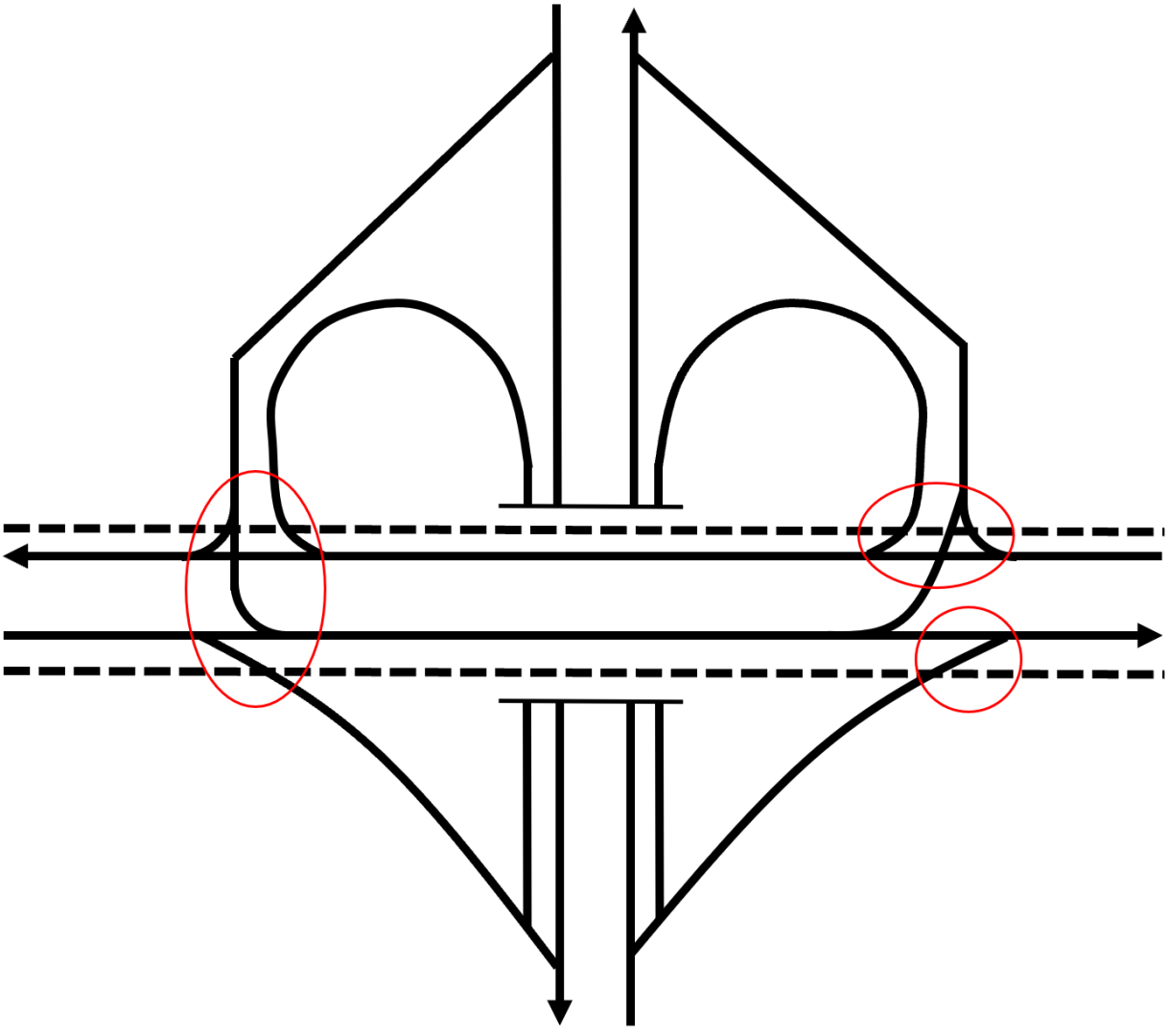
diDI, Parclo AB with Two Right Turn Ramps

Summary: Supplies much better efficiency than a parclo AB but requires a large right of way and a lengthy extent along the arterial.

History: This is a new design.

Rank: 101 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	4	1	3	4	3	3	1	4	1	2	0	9	14	7	30



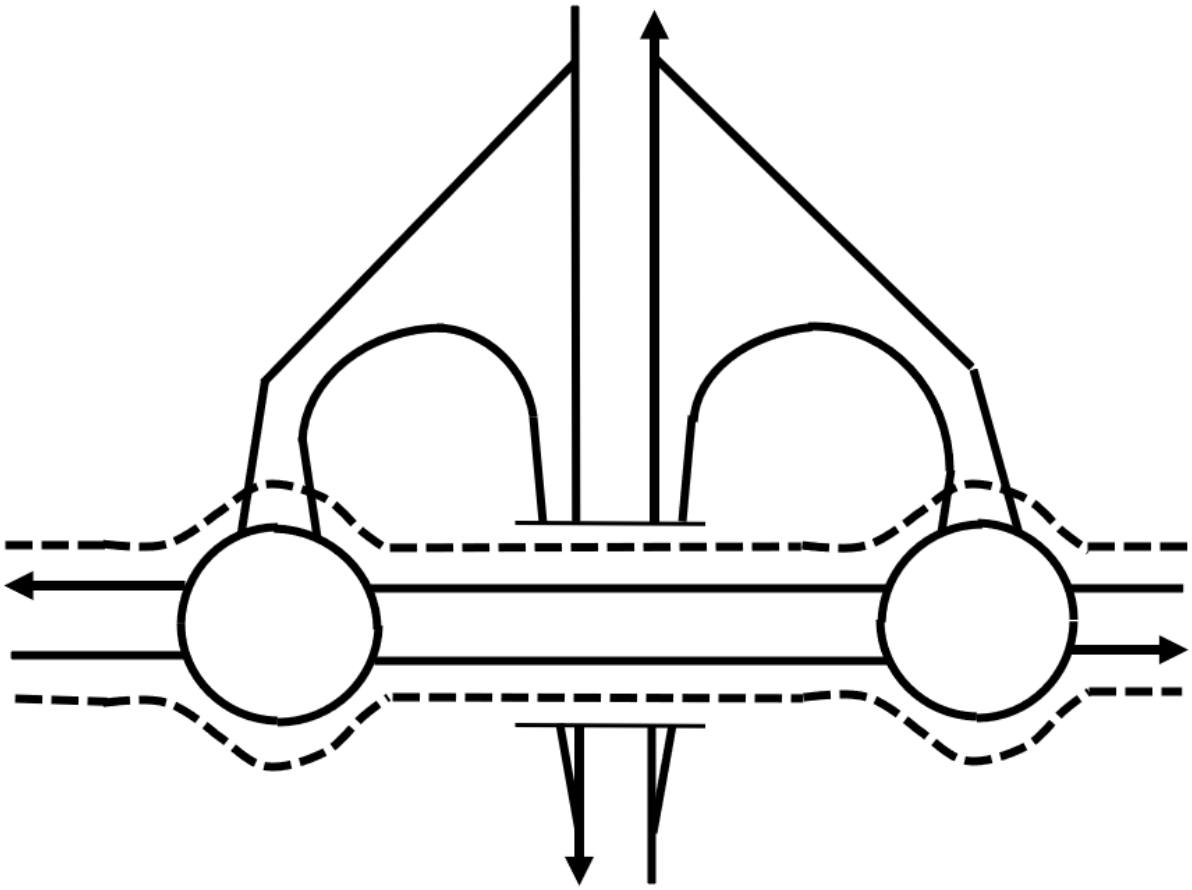
diDI, Parclo AB with Two Roundabouts

Summary: Compared to the parclo AB this design is not much improved for efficiency but is much improved in safety.

History: This is currently a rare design but becoming more popular.

Rank: 33 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
2	2	0	4	3	5	3	4	5	2	5	3	4	19	15	38



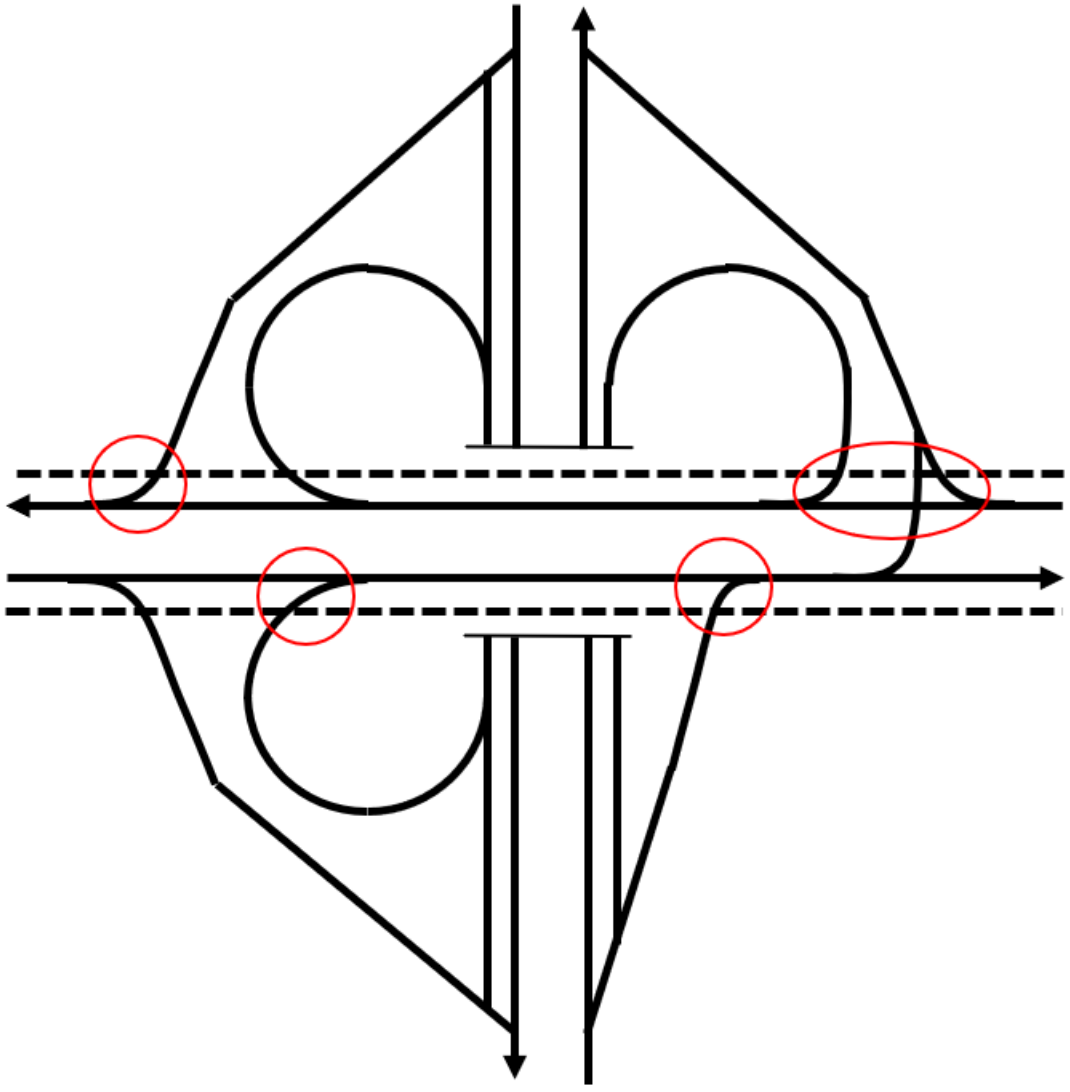
diII, Three Loop Missing A

Summary: Supplies average efficiency and safety scores and below-average cost scores. Requires lengthy travel distances, a large right of way, and a lengthy extent along the arterial.

History: This is a rare design typically created by removing a cloverleaf loop ramp.

Rank: 88 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	5	0	3	3	3	2	3	5	1	2	1	9	14	9	32



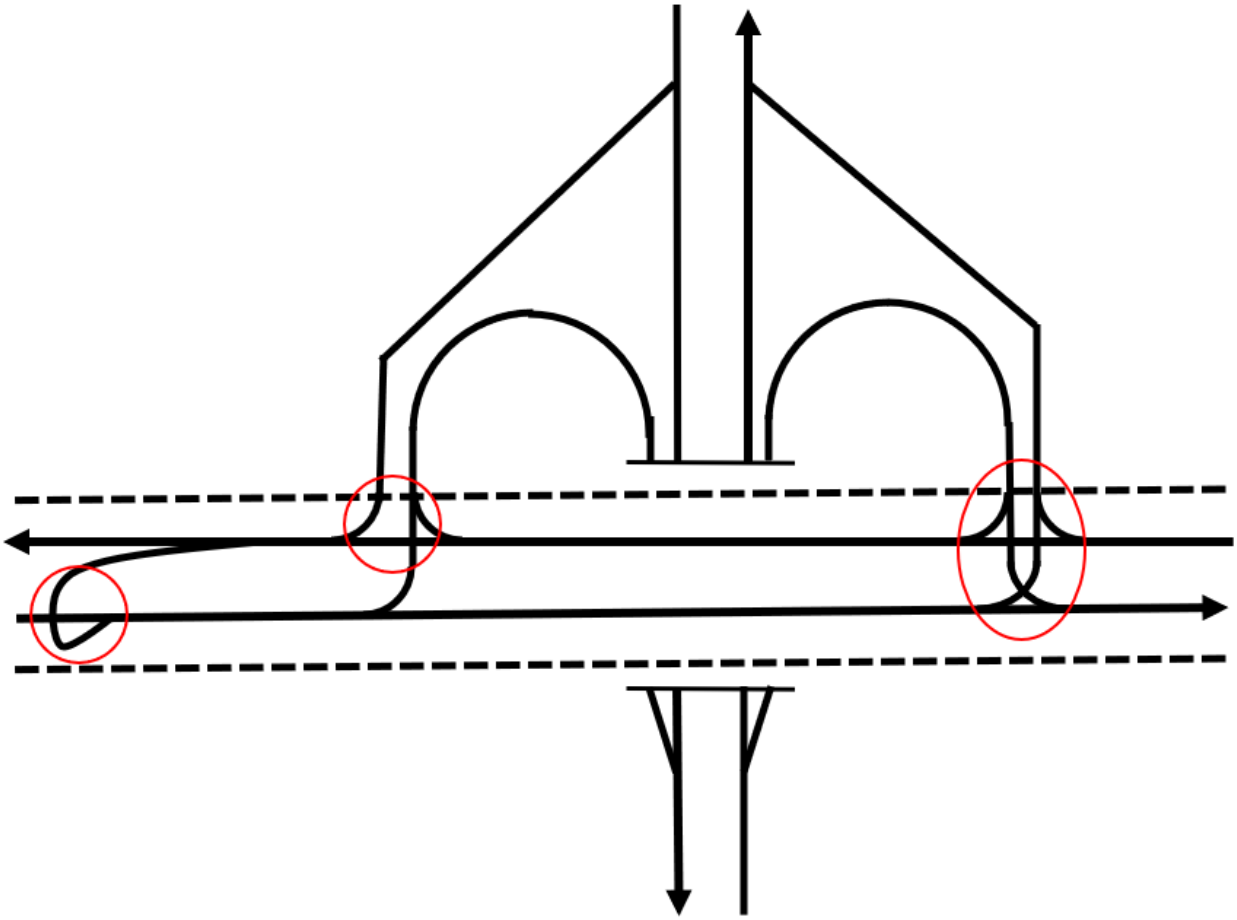
diIJ, Parclo AB with External U-Turn

Summary: Supplies good cost scores but has poor capacity and lengthy travel distances.
This concept improves progression compared to a parclo AB with the same size bridge.

History: This is a new design.

Rank: 103 of 125.

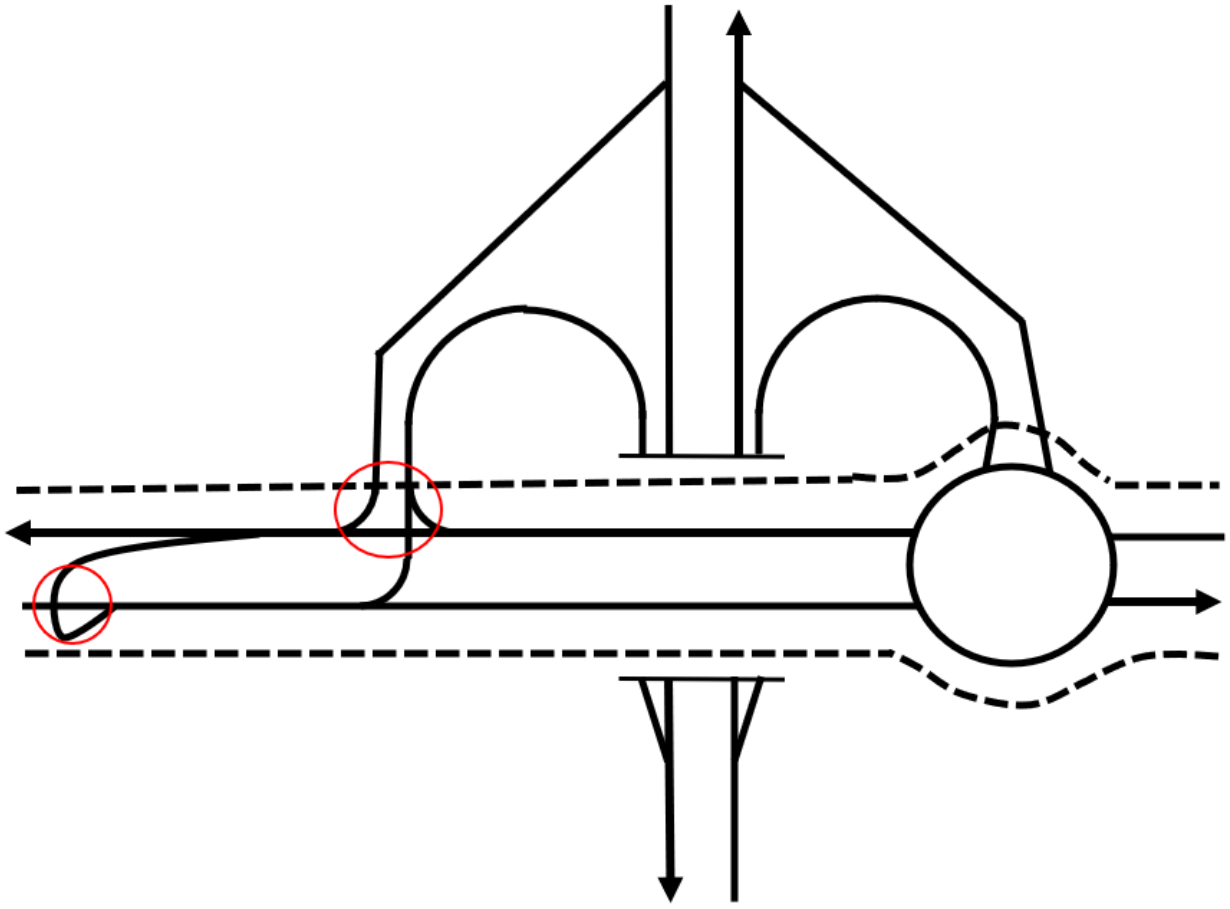
Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
1	3	0	2	3	2	5	1	4	2	5	2	4	13	13	30



diIJ, Parclo AB with External U-Turn and Roundabout

Summary: Supplies good cost scores but has poor capacity with lengthy travel distances.
History: This is a new design.
Rank: 60 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
2	3	0	4	2	3	4	3	5	2	5	2	5	16	14	35



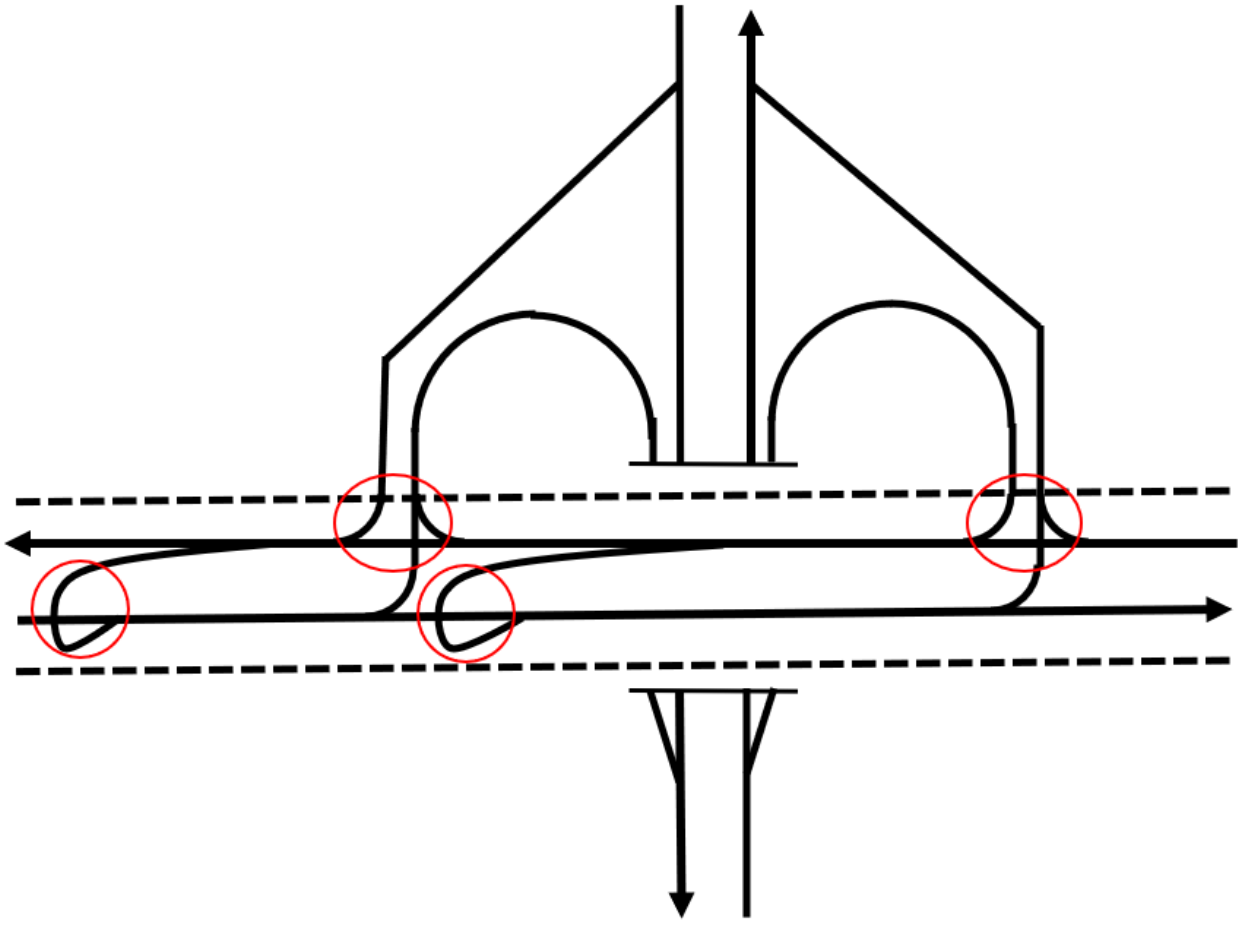
diIJ, Parclo AB with Two U-Turns

Summary: Supplies good safety and cost scores but requires long travel distances. This could be a good competitor to a parclo AB.

History: This is a new design.

Rank: 53 of 125.

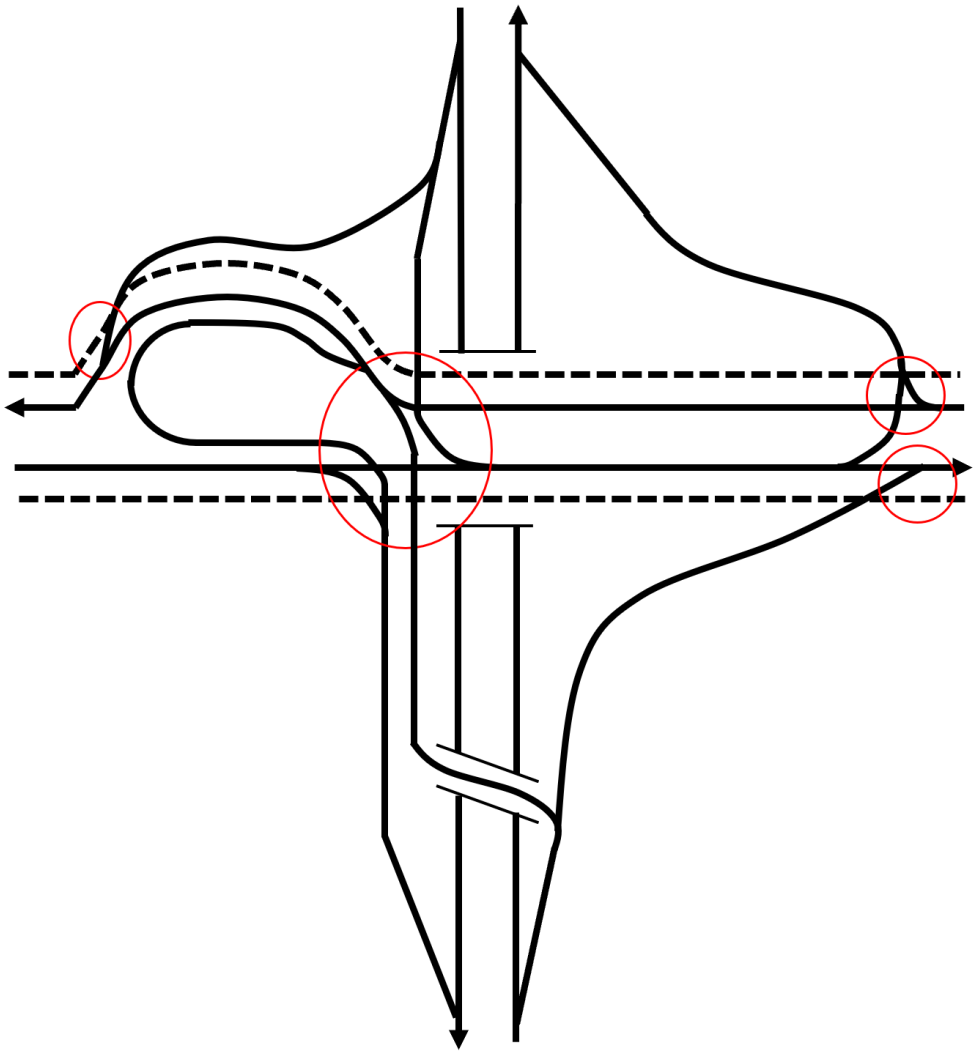
Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
2	5	0	3	3	3	5	3	3	2	5	2	7	17	12	36



dmBH, One St. Aug. One Displaced

Summary: Supplies good efficiency with a small bridge but has a lengthy extent along the arterial.
History: This is a new design.
Rank: 51 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	4	3	2	4	2	3	3	5	3	2	1	11	14	11	36



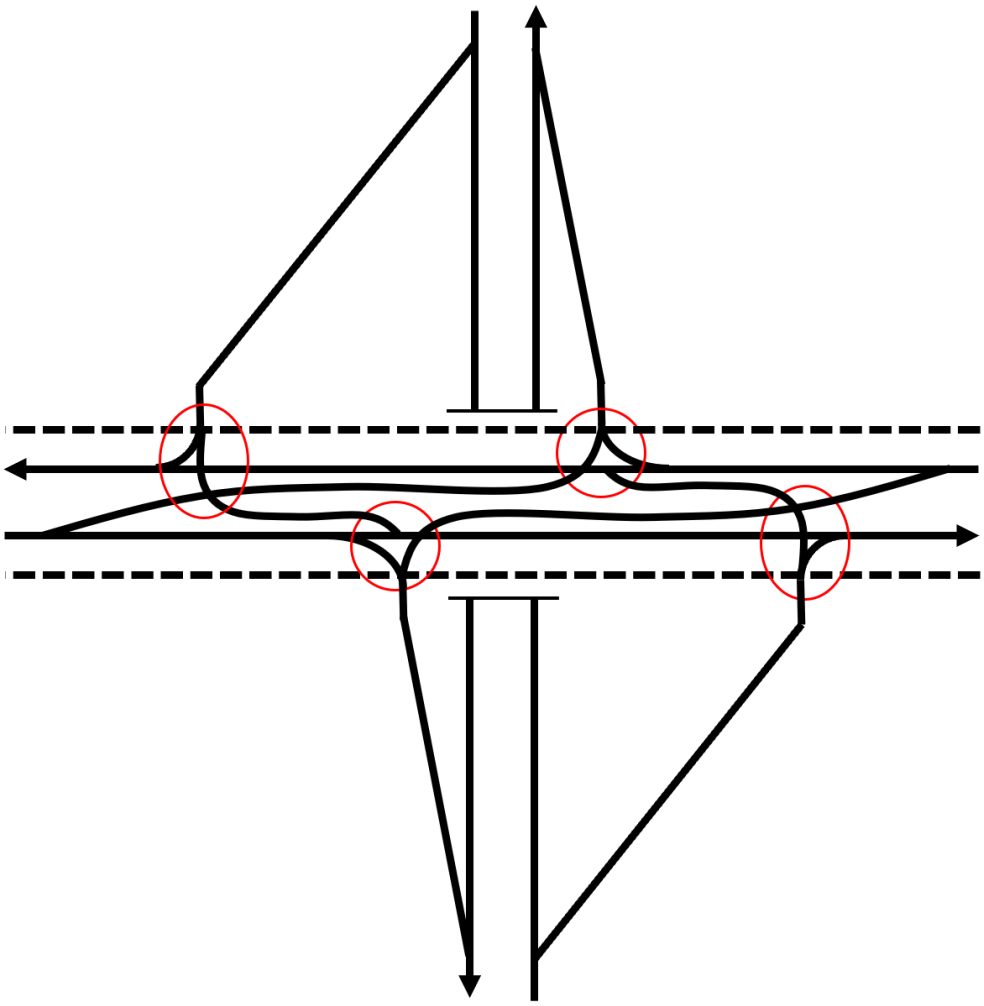
eeDD, Offset Diamond

Summary: Supplies good efficiency with great progression but has a large number of conflict points. Could be a parclo A retrofit.

History: First published by Molan and Hummer, 2020.

Rank: 52 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
3	5	4	1	3	2	4	3	3	3	3	2	12	13	11	36



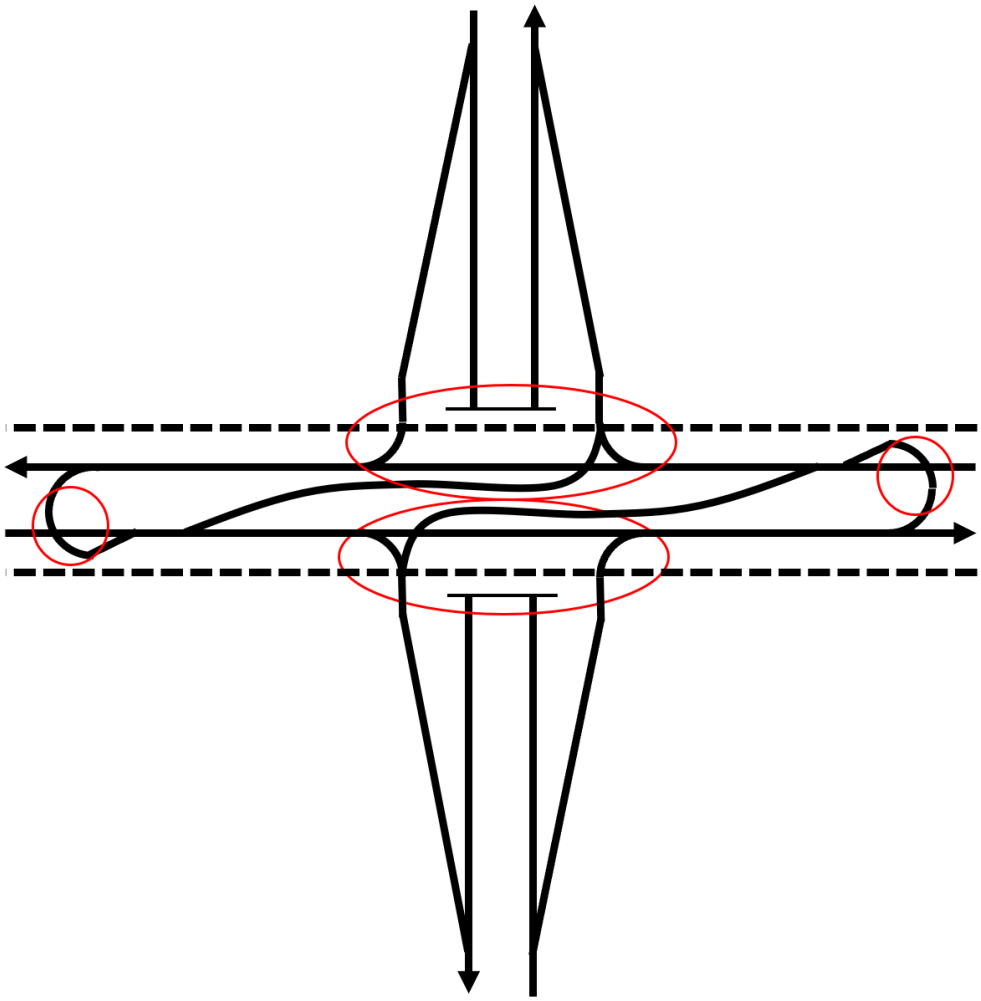
eeJJ, Synchronized

Summary: Supplies great cost scores with good efficiency and safety performance. This design has no major weaknesses based on our analysis. If project teams can find the space for the u-turn crossovers this design should be competitive.

History: First published by Molan and Hummer, 2018.

Rank: 1 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	5	3	3	3	4	4	3	3	5	5	4	12	17	17	46



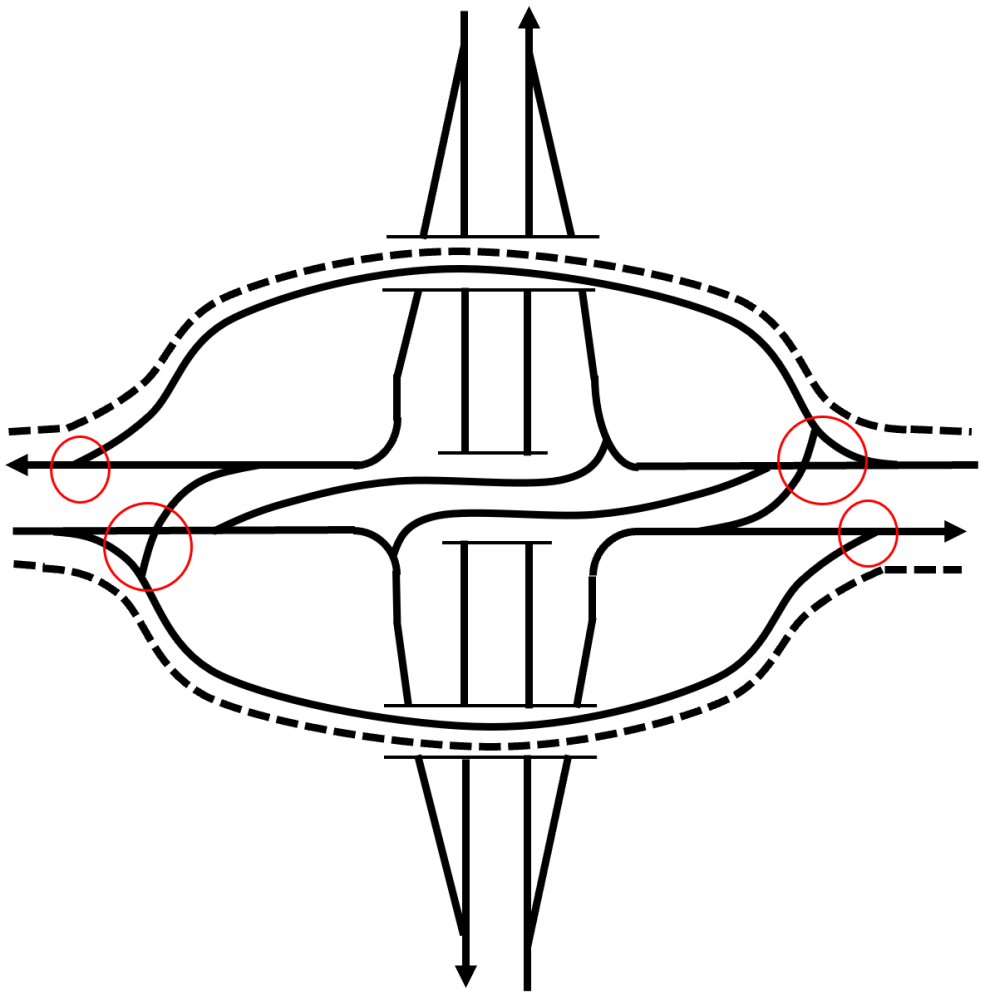
eeJJ, Synchronized with Two One-Way Bypasses

Summary: Supplies good safety and cost scores with a slightly smaller main bridge than the original synchronized design but requires extensive travel distances and much more right of way.

History: This is a new design.

Rank: 7 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	5	0	3	4	3	4	5	4	2	5	3	9	19	14	42



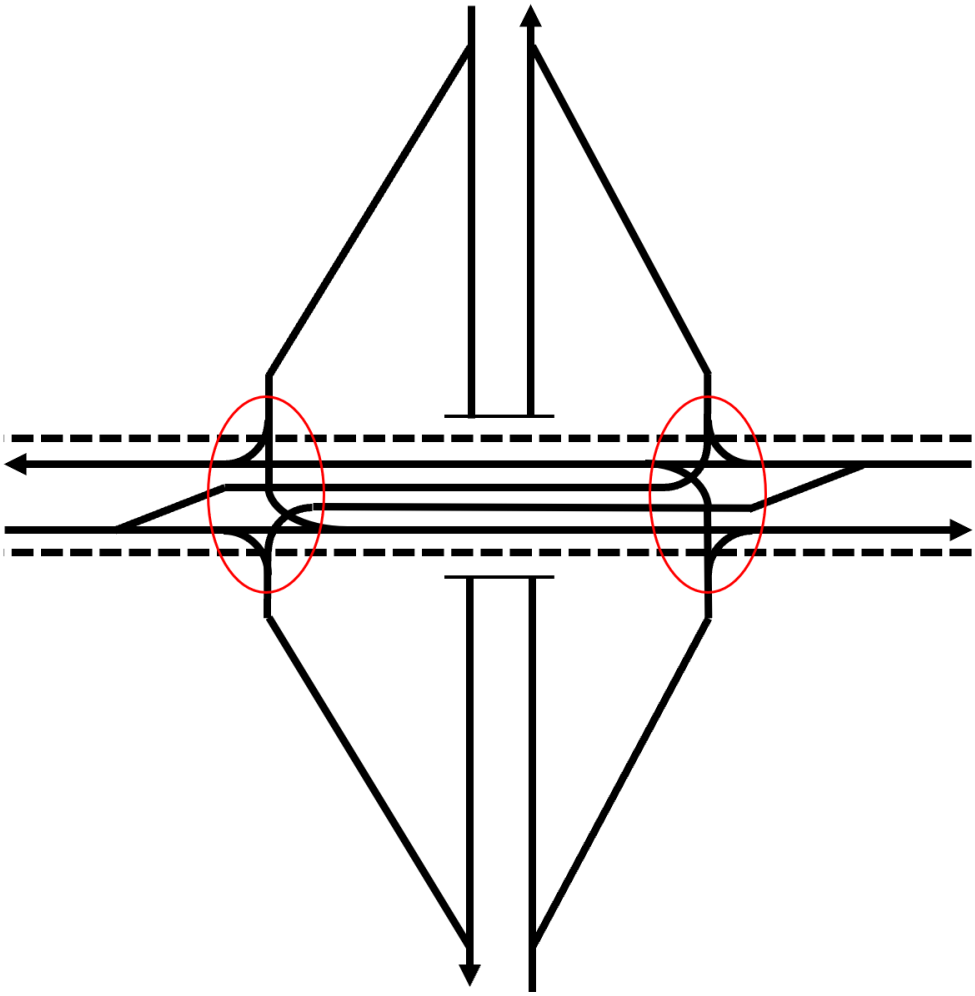
ffCC, Contraflow

Summary: Supplies good cost scores but has poor progression and a large number of conflict points. Has higher capacity than a diamond but earns fewer safety points.

History: A contraflow interchange exists at FL-869 and Lyons Road in Coconut Creek, Florida.

Rank: 105 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
3	0	4	0	3	2	4	0	3	4	4	3	7	9	14	30



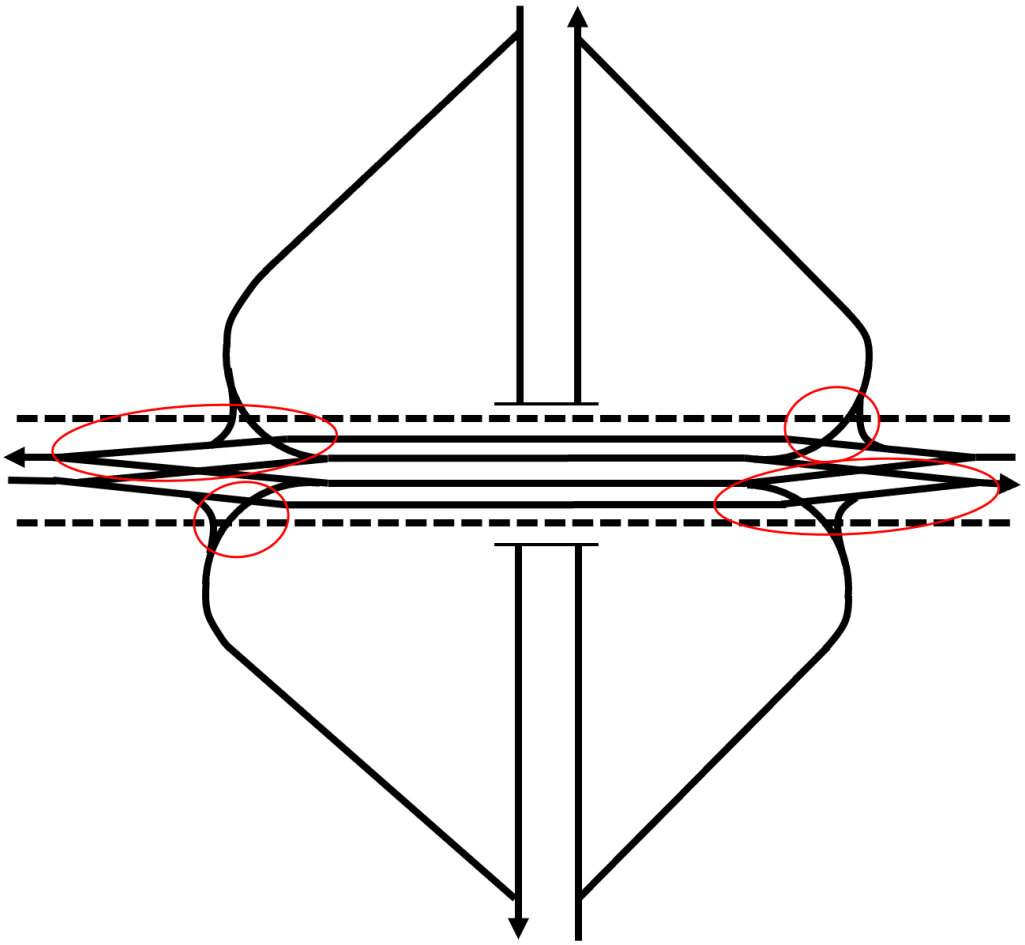
ffFF, Super DDI

Summary: Supplies good efficiency and cost scores but has a large number of conflict points and high wrong way potential.

History: First published by Molan, et. al., 2019.

Rank: 19 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
5	5	4	0	4	1	4	3	3	4	4	3	14	12	14	40



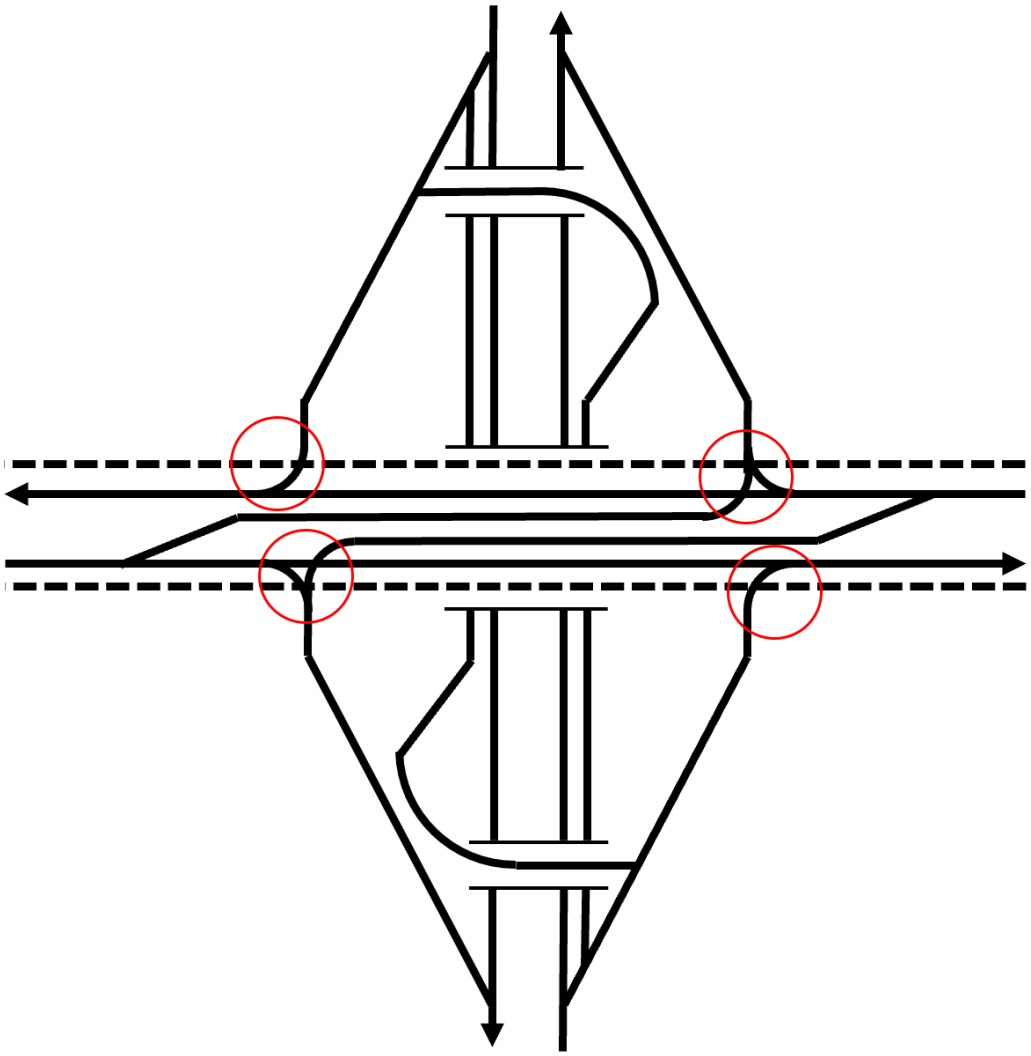
ffLL, Milwaukee B

Summary: Supplies good efficiency and safety but has poor cost performance. Requires a large bridge, a large right of way, and a lengthy extent along the freeway.

History: This design was first published by Molan and Hummer, 2018.

Rank: 63 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
5	5	2	3	4	4	4	3	0	0	1	3	12	18	4	34



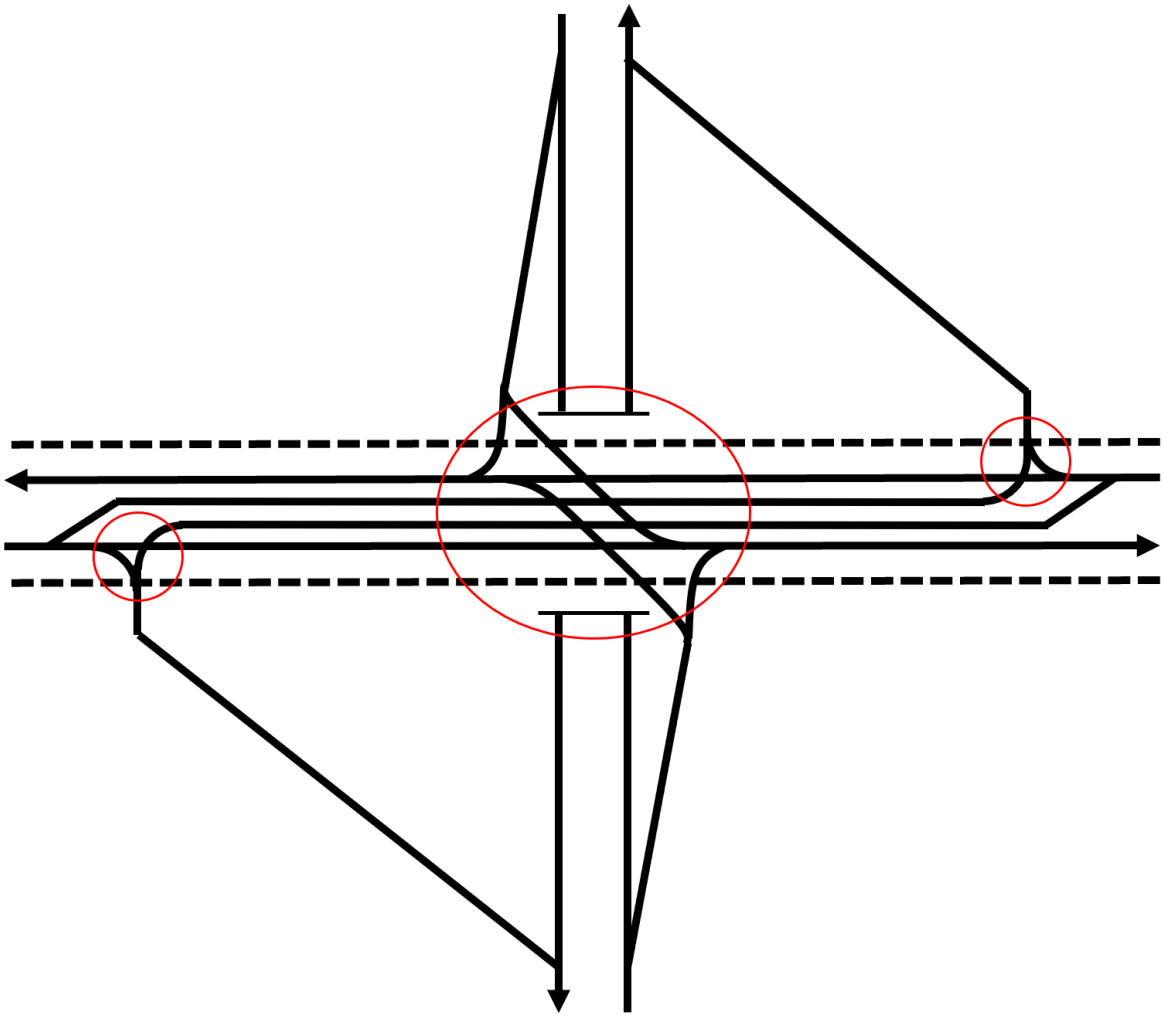
ggAA, Spread Contraflow Single Point

Summary: Supplies good efficiency in a smaller right of way. Requires a large bridge and results in a large number of conflict points.

History: This is a new design.

Rank: 99 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
5	3	3	0	3	1	4	1	1	4	3	2	11	9	10	30



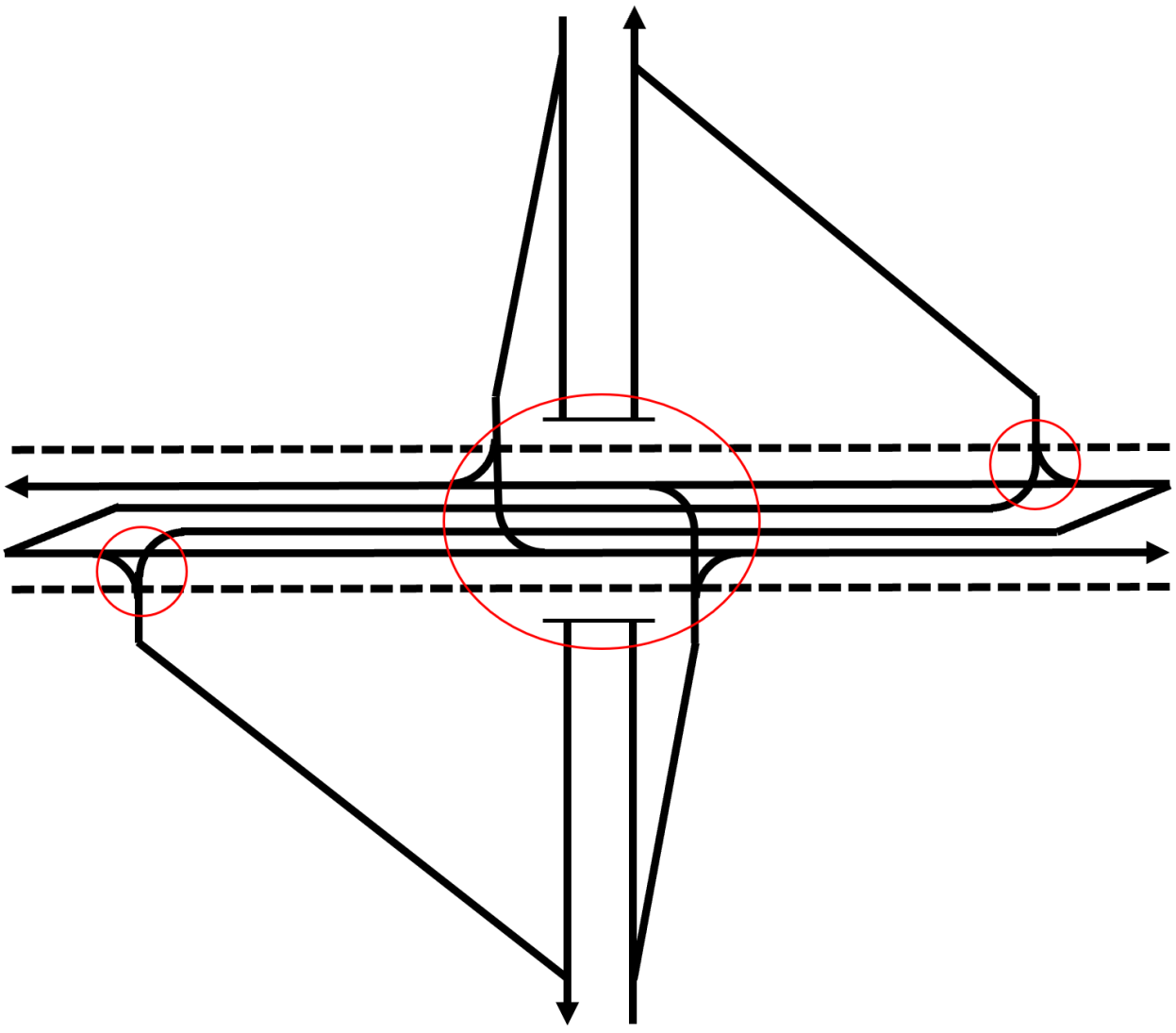
ggBB, Spread Contraflow Tight Diamond

Summary: Supplies average efficiency and cost performance, with a smaller right of way. Has a high number of conflict points.

History: This is a new design.

Rank: 91 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
3	3	4	0	3	2	4	1	3	4	3	2	10	10	12	32



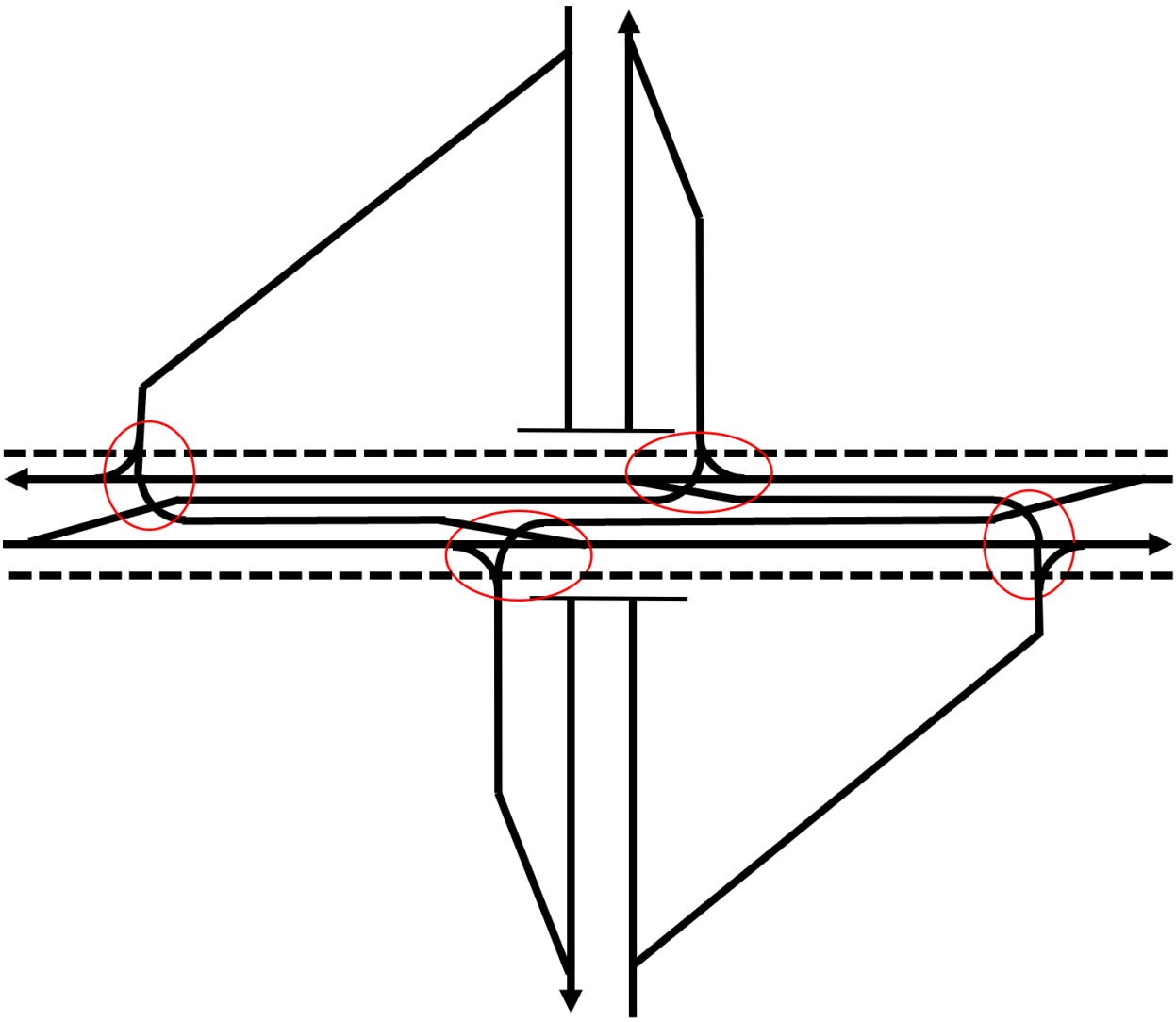
ggGG, Spread Contraflow

Summary: Supplies good efficiency with average safety and cost scores. This design is great for progression but has a large number of conflict points.

History: This is a new design.

Rank: 62 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
3	5	4	0	3	2	4	3	3	3	3	2	12	12	11	35



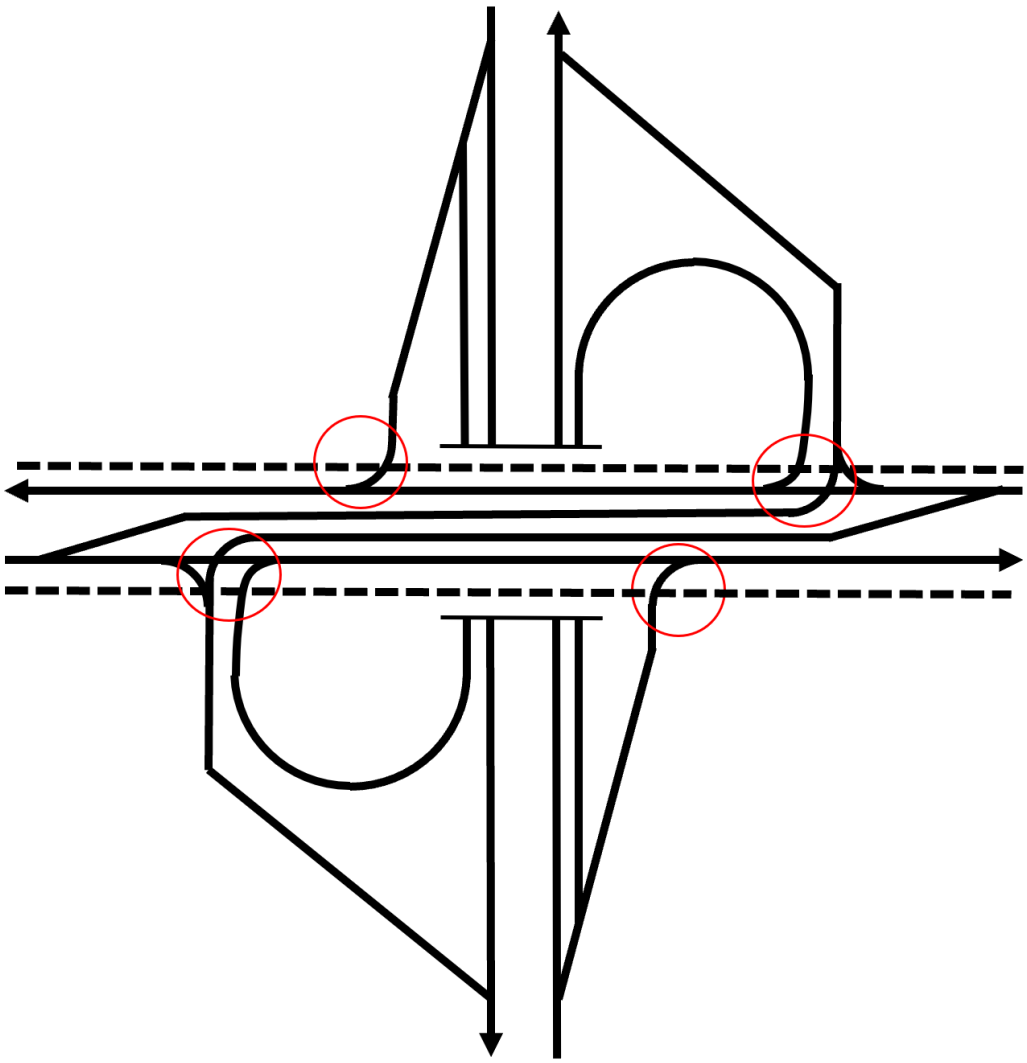
ggII, Folded

Summary: Supplies good efficiency and safety but has poor cost performance. This design has great capacity and progression. Could be a cloverleaf retrofit.

History: First published by Riniker, 2009. Under construction at I-26 and US-64 in Hendersonville, NC.

Rank: 46 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
5	5	1	3	4	4	3	3	2	2	2	2	11	17	8	36



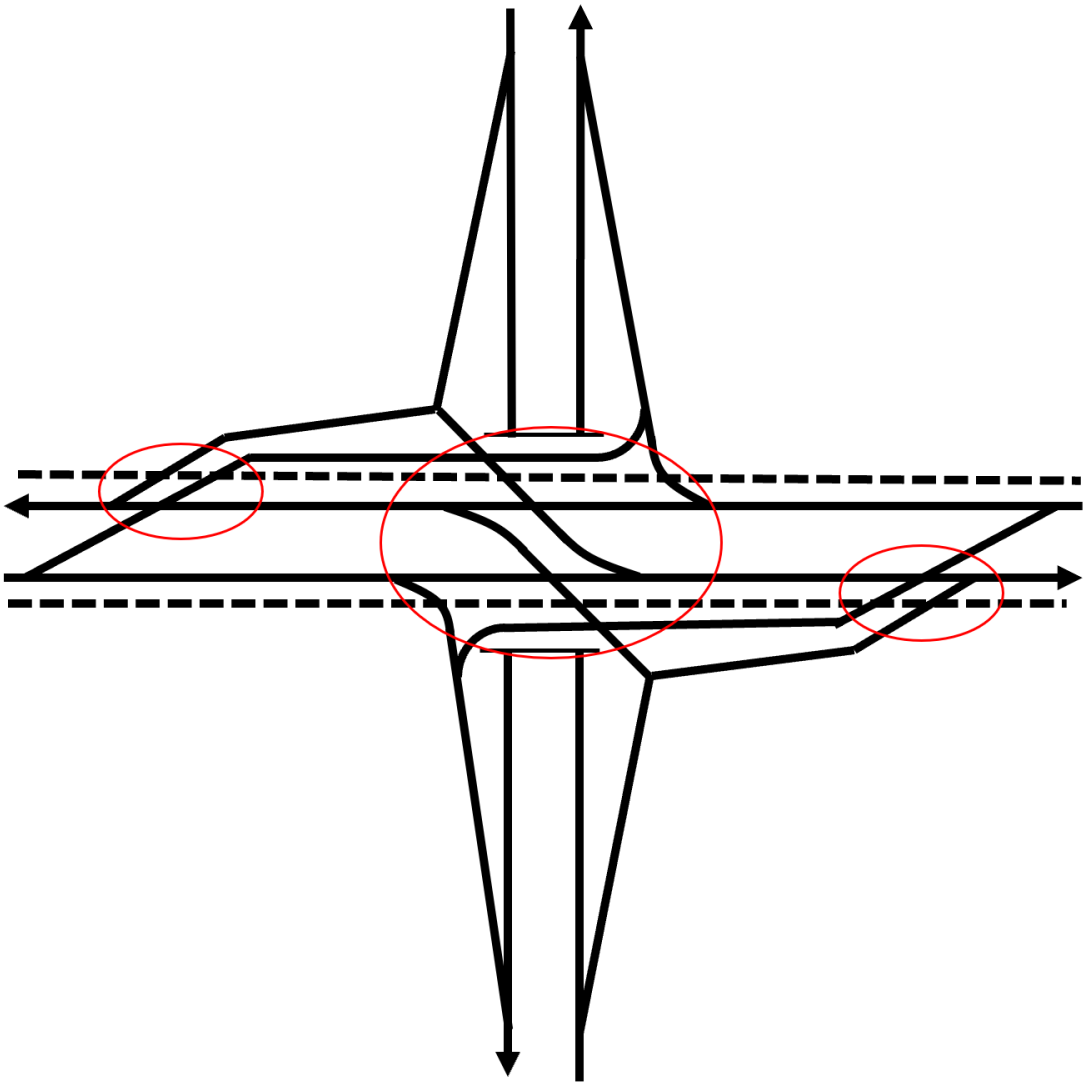
hhAA, Displaced Single Point

Summary: Supplies great efficiency, poor safety, and good cost scores. Has a high number of conflict points, high wrong way potential, poor pedestrian quality, and requires a large bridge.

History: This is a new design.

Rank: 79 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
5	4	5	1	3	0	1	1	1	5	5	2	14	6	13	33



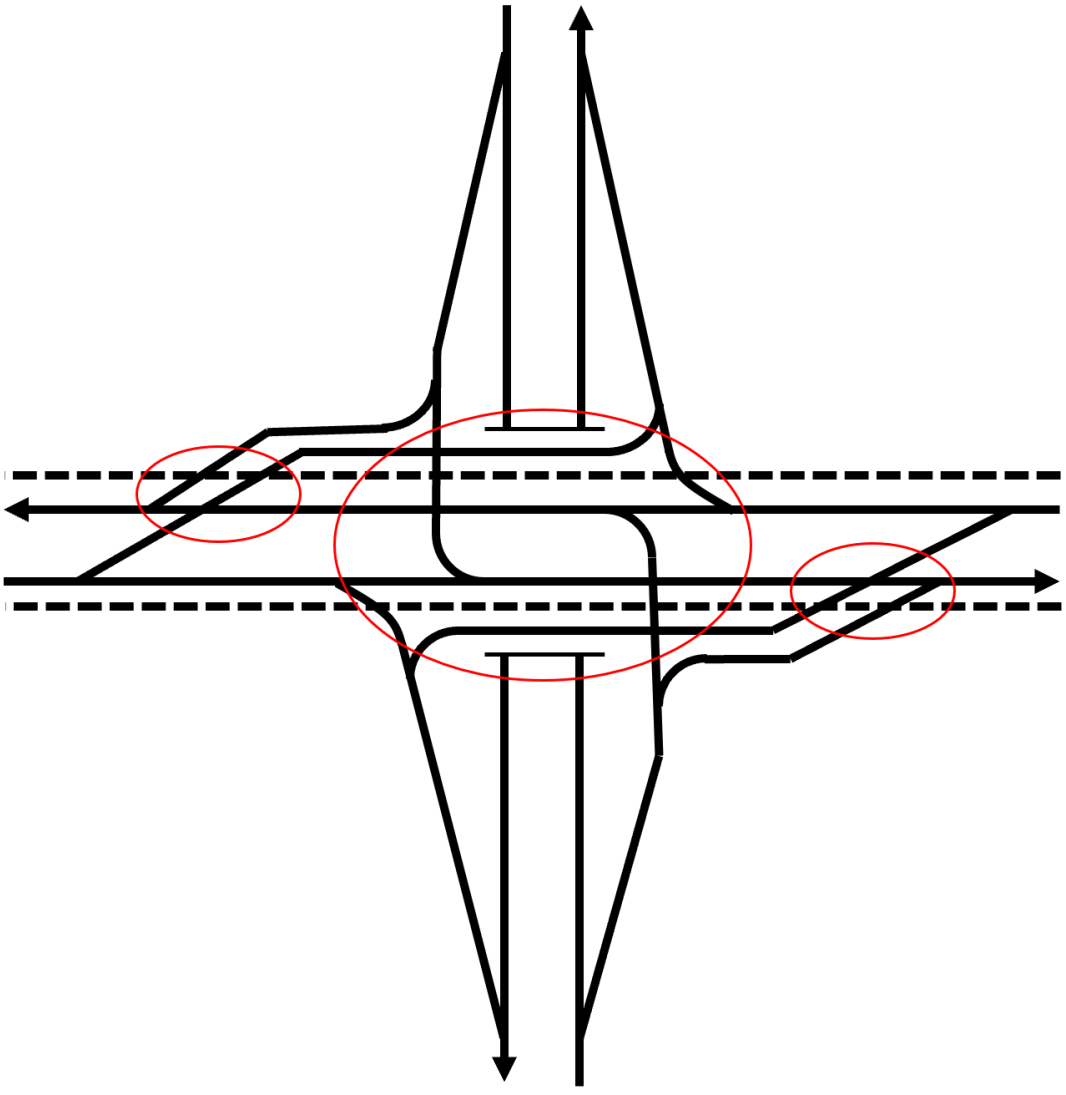
hhBB, Displaced Tight Diamond

Summary: Supplies good efficiency and cost but has poor safety performance. Has a high number of conflict points, high wrong way potential, and poor speed control.

History: This is a new design.

Rank: 71 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
3	3	5	1	3	1	2	1	3	5	5	2	11	8	15	34



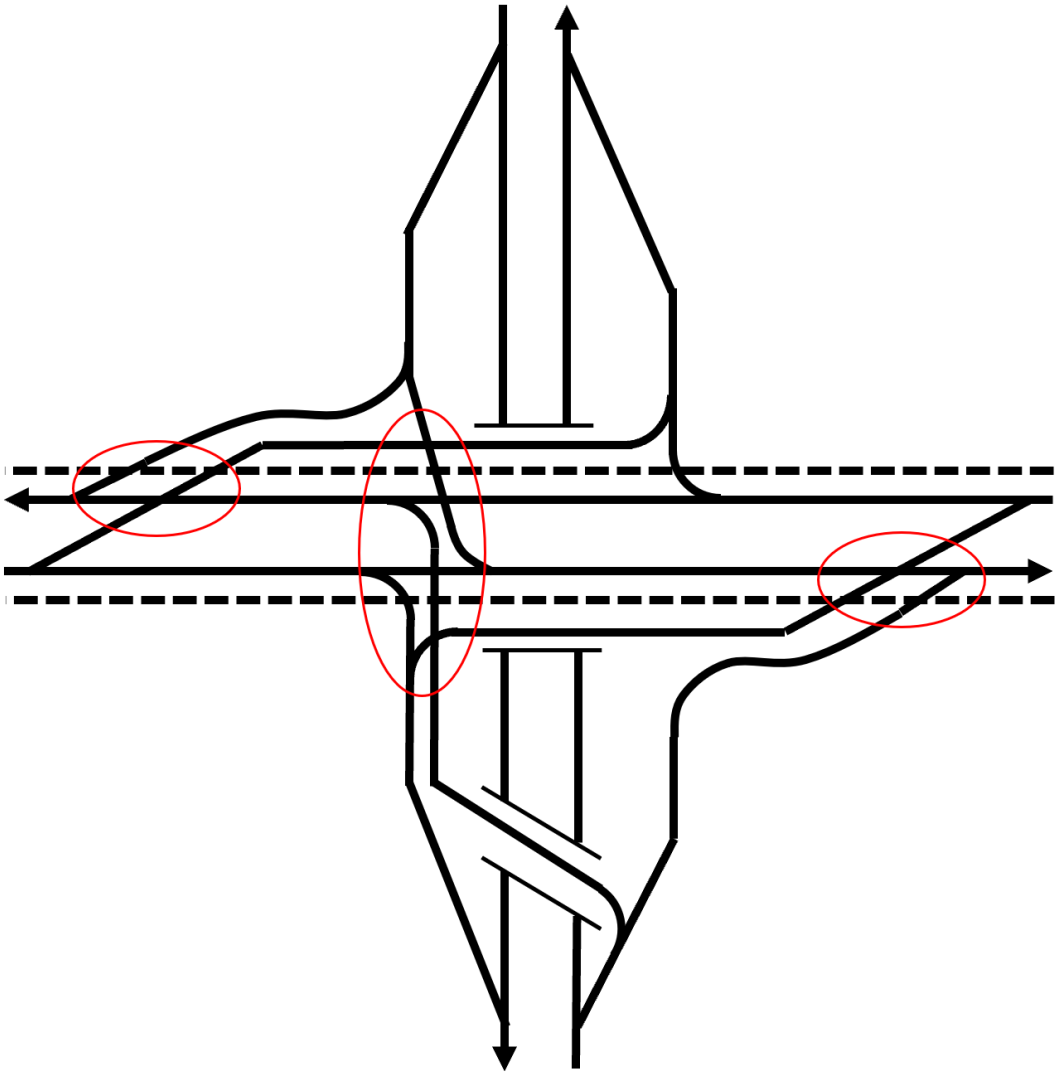
hhBH, Three-Quarters Displaced

Summary: Supplies great efficiency but has a large number of conflict points and a lengthy extent along the arterial.

History: This is a new design.

Rank: 61 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	4	5	1	3	2	3	1	4	4	3	1	13	10	12	35



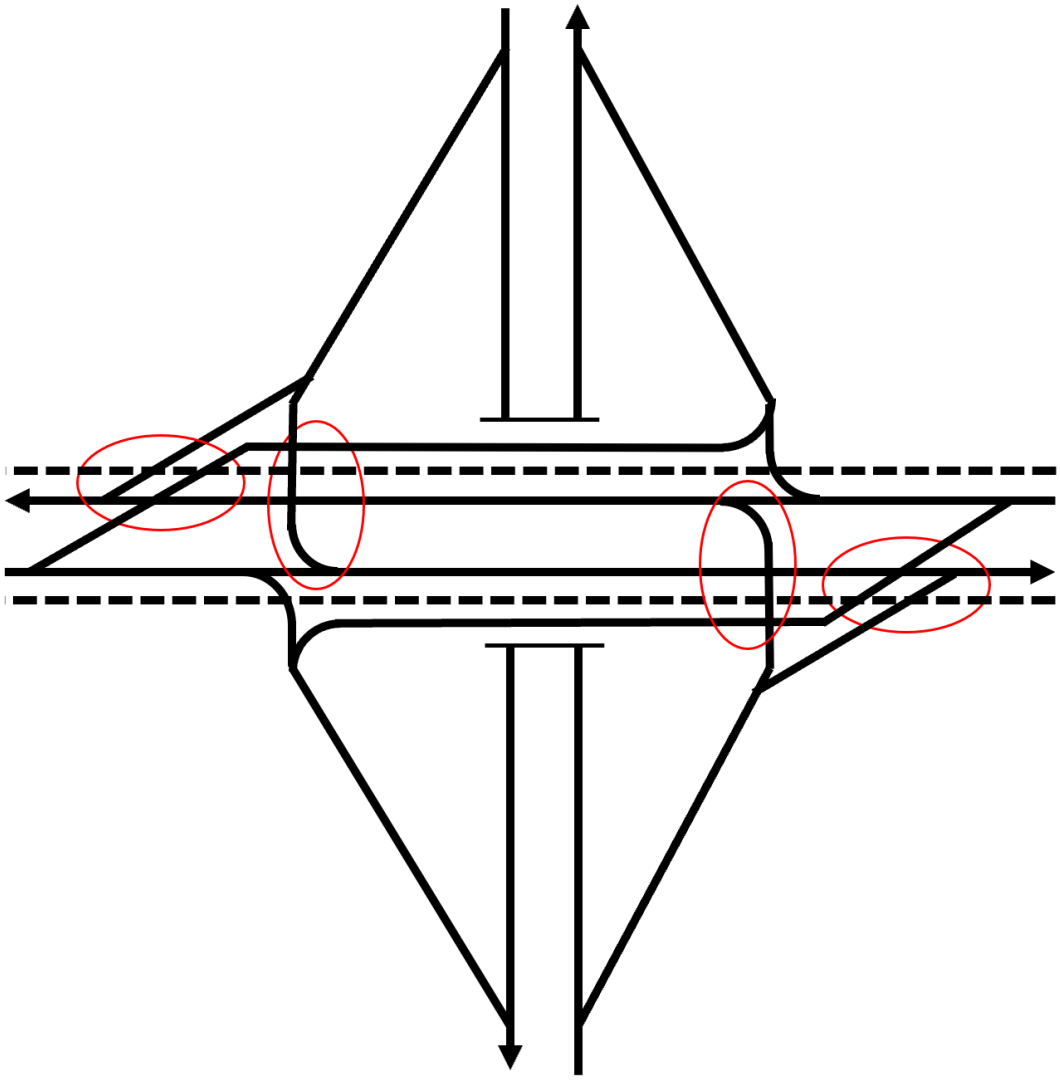
hhCC, Displaced Left

Summary: Supplies poor safety performance with poor progression and a lengthy extent along the arterial. Has good capacity, short travel distances, and short extents along the freeway.

History: Published by Hughes, W. et. al., 2010. Several have been built on I-35 in Texas.

Rank: 122 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	1	4	1	3	1	1	1	3	3	4	0	9	7	10	26



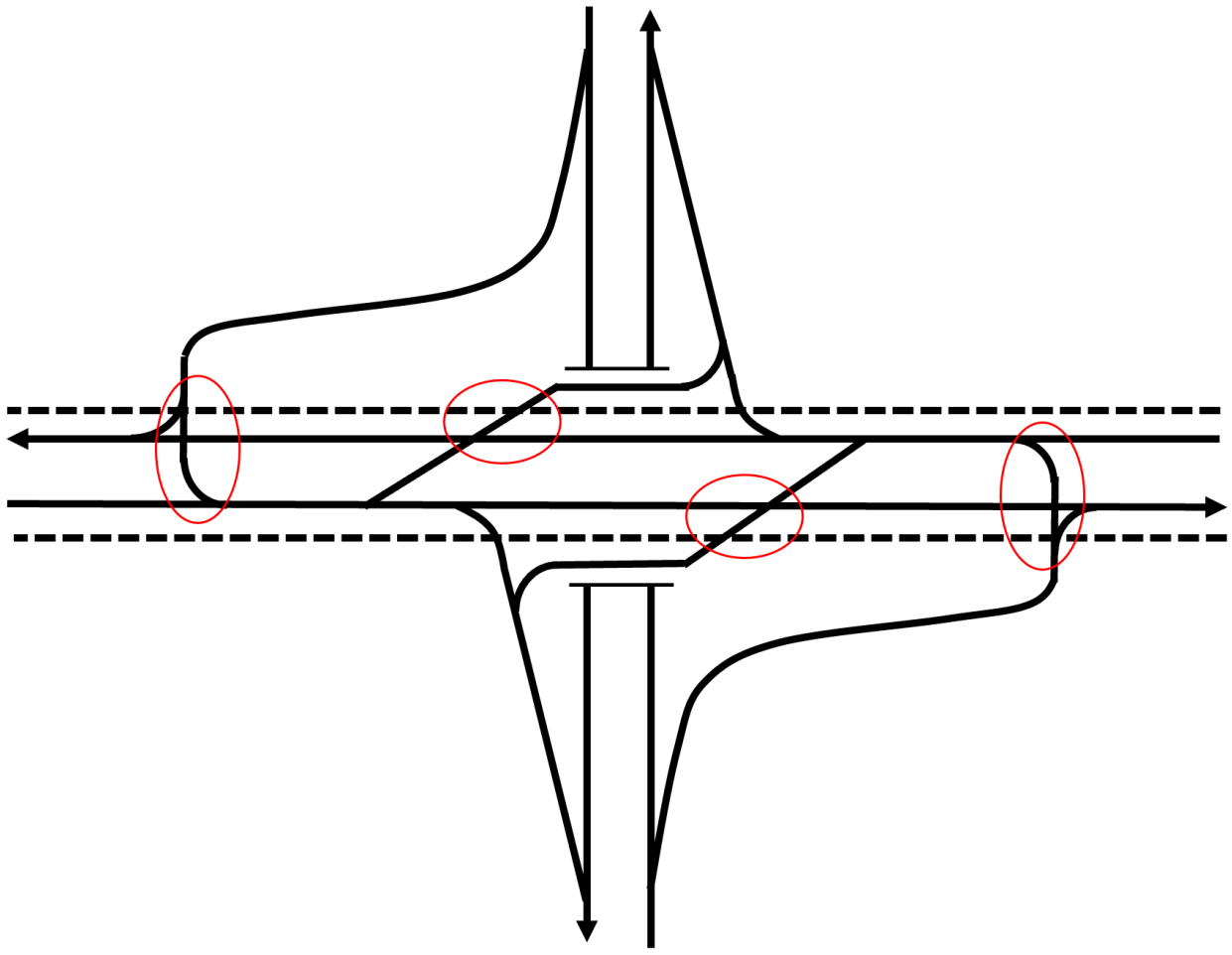
hhDD, Displaced Spread Diamond

Summary: Supplies average efficiency, safety, and cost scores. Has good capacity, short travel distances, and a small number of unusual maneuvers, but has poor progression.

History: This is a new design.

Rank: 81 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	1	4	2	4	2	3	1	4	3	3	2	9	12	12	33



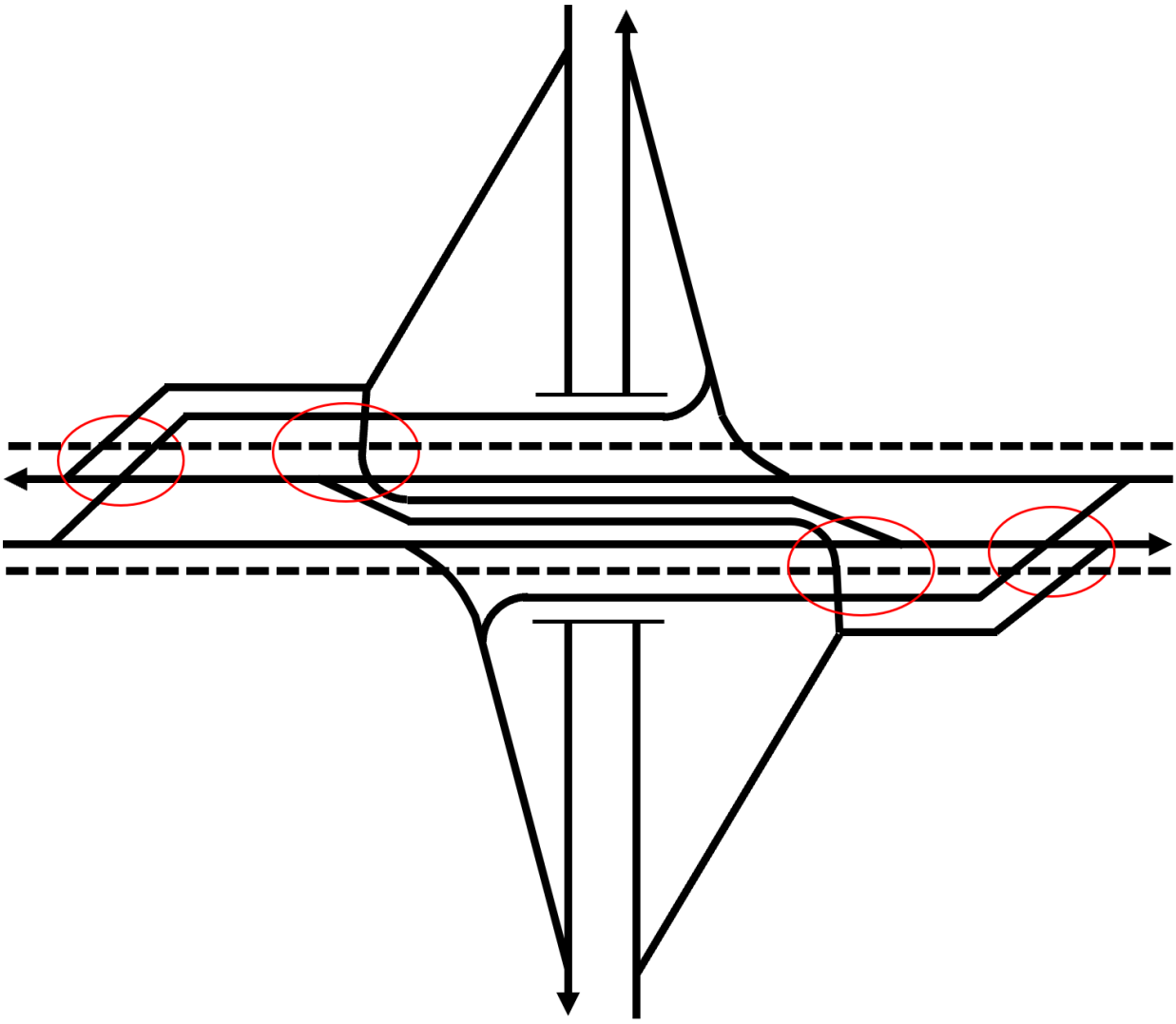
hhFF, Displaced Standard Contraflow

Summary: Supplies great efficiency in a smaller right of way. Has poor safety and cost performance. Requires a large bridge and results in a large number of conflict points.

History: This is a new design.

Rank: 87 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	5	4	1	3	2	2	3	0	4	4	0	13	11	8	32



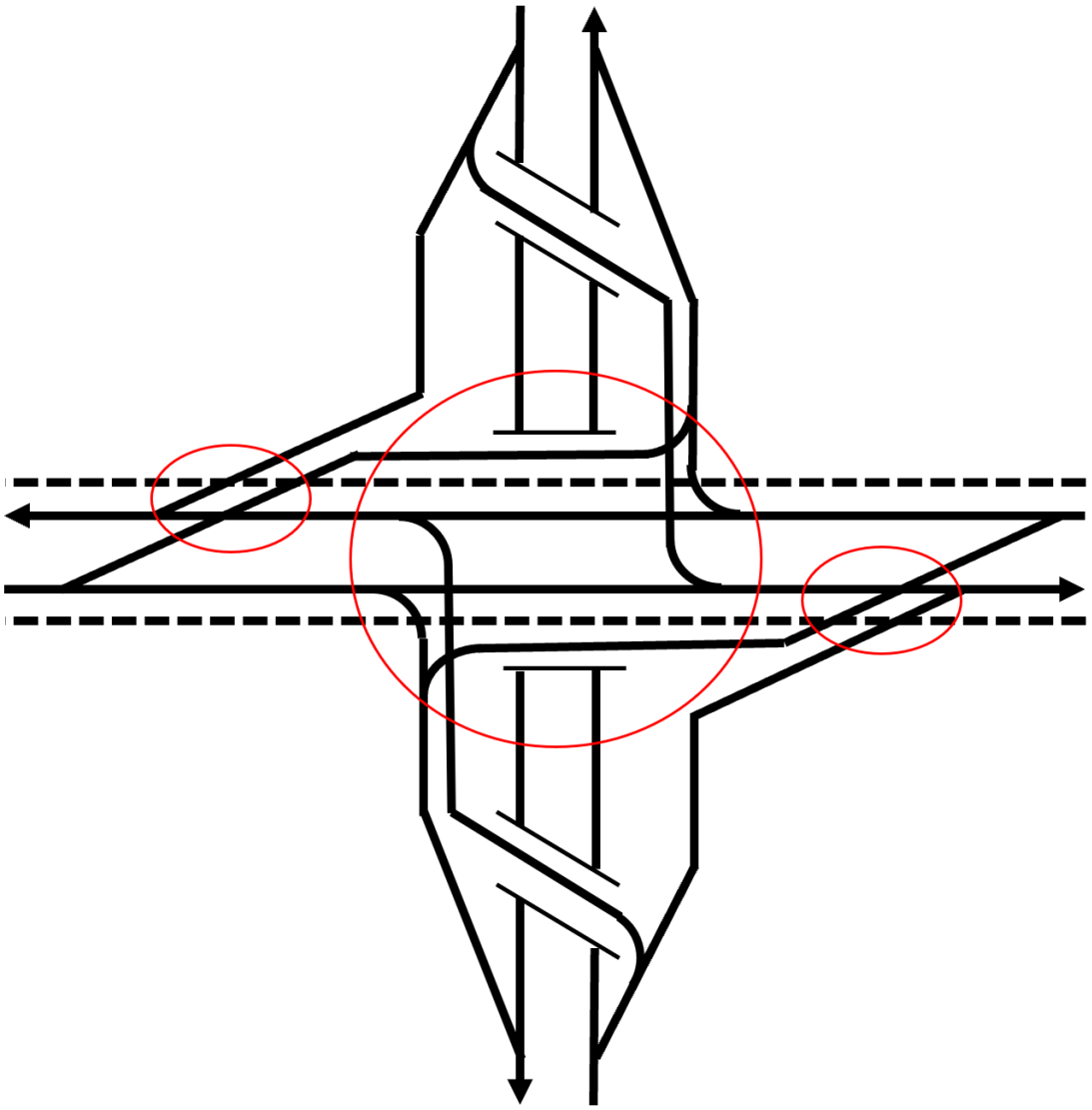
hhHH, Displaced Displaced

Summary: Supplies great efficiency but has poor safety and cost performance. Has a high number of conflict points and high wrong way potential.

History: This is a new design.

Rank: 109 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	4	5	1	3	0	2	1	2	3	2	2	13	7	9	29



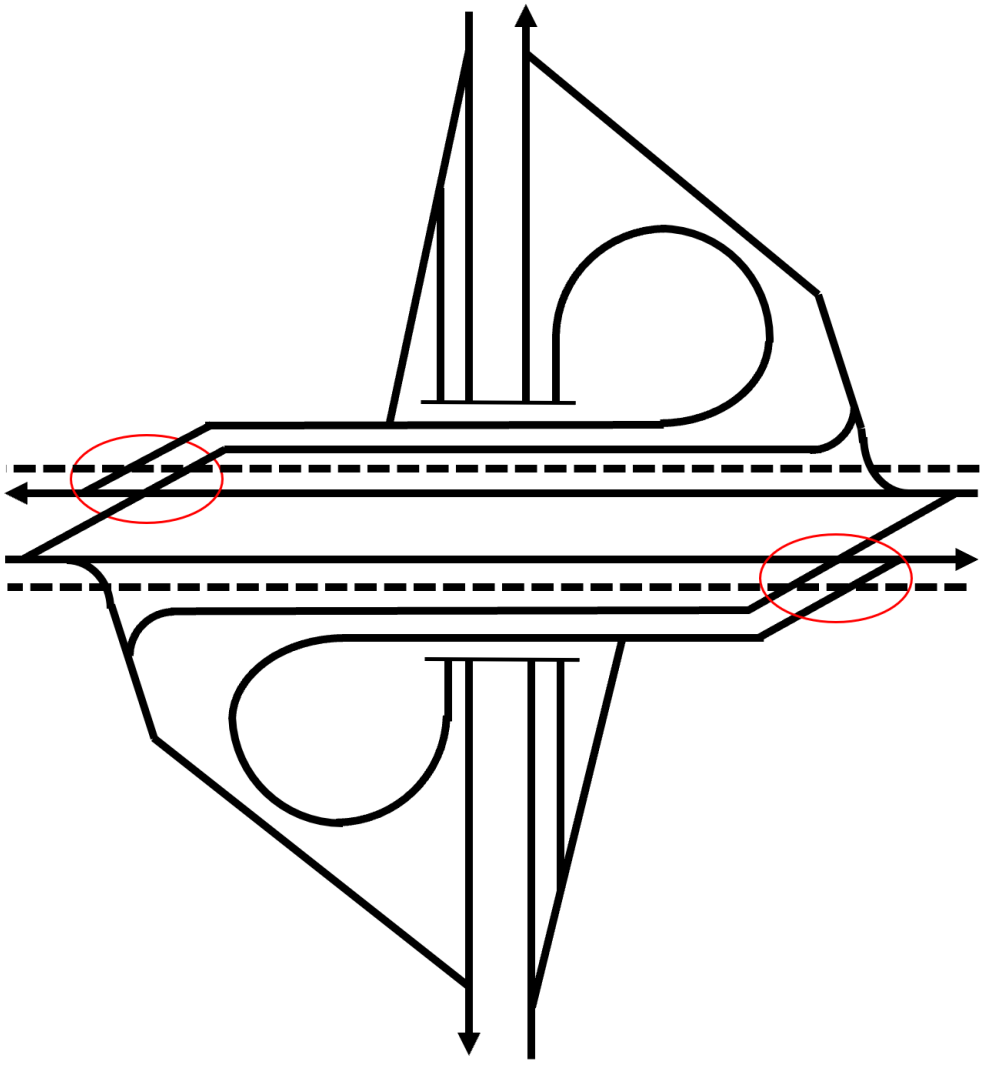
hhII, Continuous Flow

Summary: Supplies good efficiency with a low number of unusual maneuvers and low wrong way potential. Has poor pedestrian performance and a lengthy extent along the arterial.

History: This design may have been patented at one point, but we believe that the possible patent has expired.

Rank: 98 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
5	5	1	3	4	4	1	1	2	2	2	0	11	13	6	30



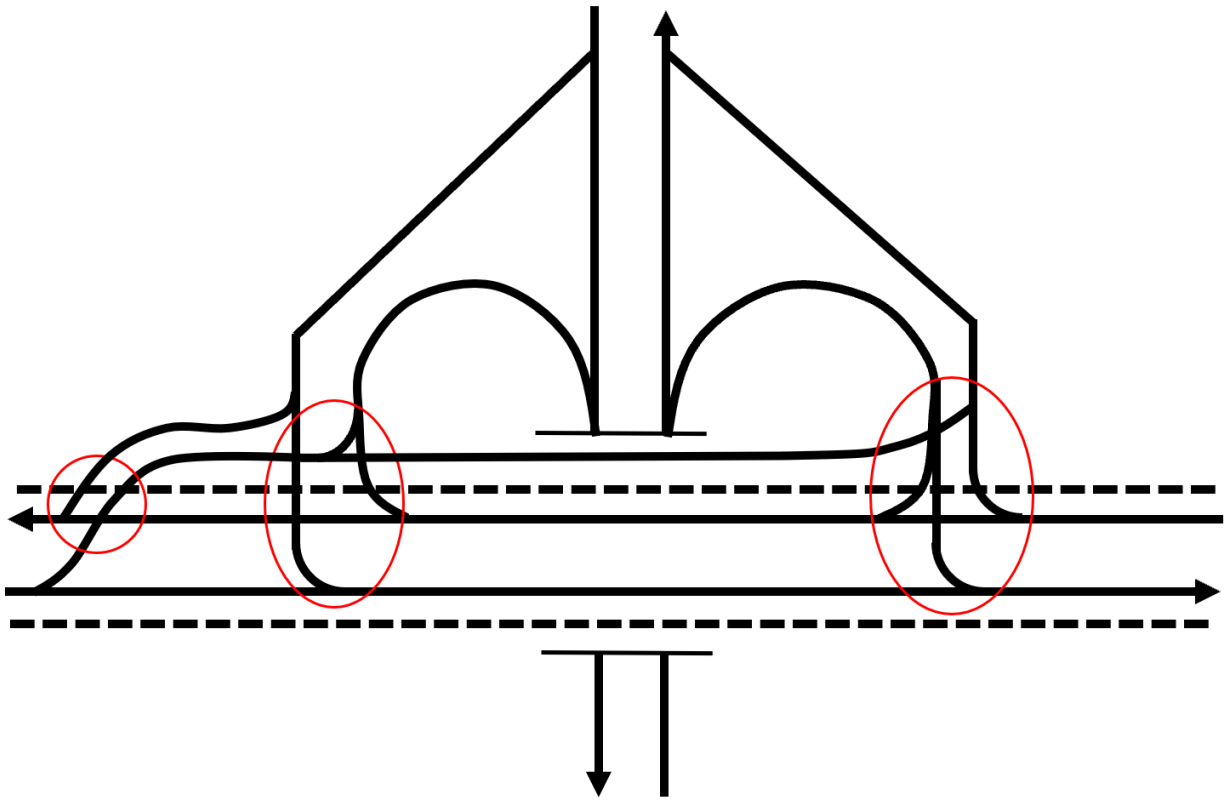
hiDI, Parclo AB with CFI

Summary: Supplies poor efficiency and safety scores. Requires a small extent along the freeway but lengthy travel distances.

History: This is a new design.

Rank: 124 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
2	1	0	1	3	1	4	0	1	2	5	1	3	9	9	21



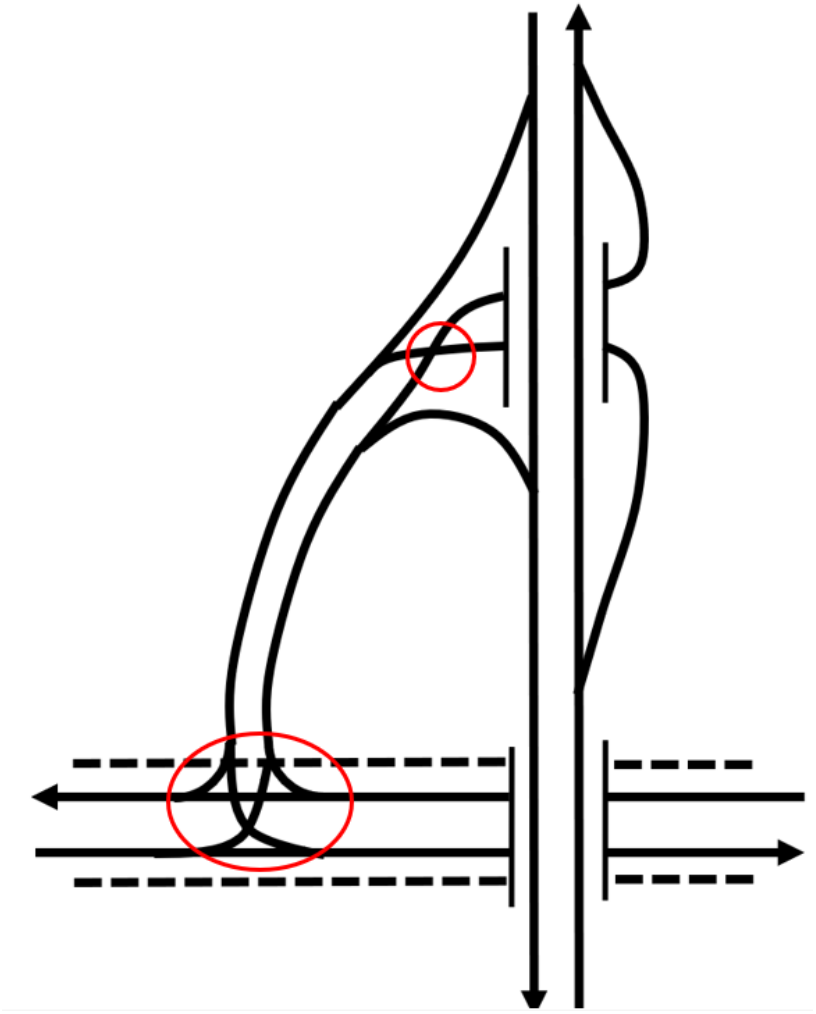
hiDL, Single Quadrant Half DDI

Summary: Has top marks for pedestrian quality and for extent along the arterial, but scores poorly for distance traveled and speed control. This could be a competitor to a parclo AB.

History: It is likely that this design has been constructed in the US.

Rank: 54 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
3	3	0	3	2	3	5	0	3	4	4	5	6	13	16	35



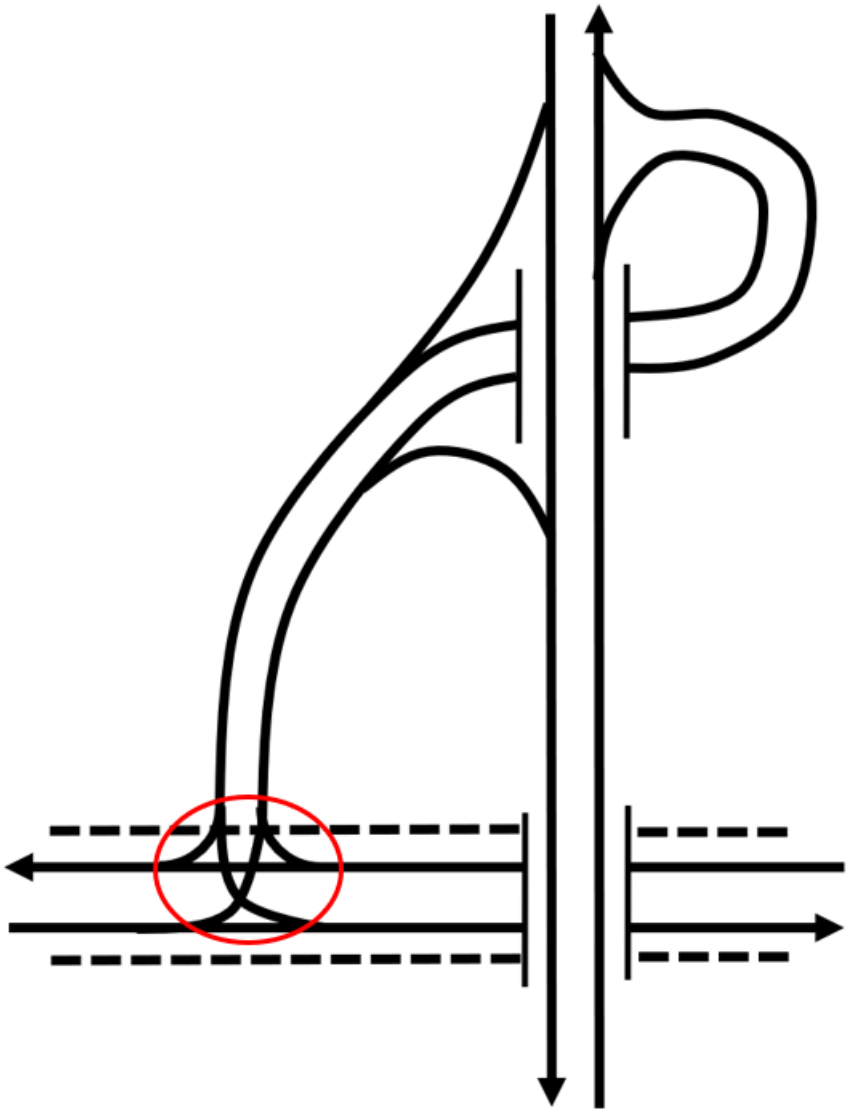
hiDL, Single Quadrant Loop

Summary: Has top marks for pedestrian quality and for extent along the arterial, but scores poorly for distance traveled and speed control. This could be a competitor to a parclo AB.

History: This is a fairly common design, particularly on toll facilities and where right of way is constrained in several quadrants.

Rank: 69 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
3	3	0	4	2	3	5	0	3	2	4	5	6	14	14	34



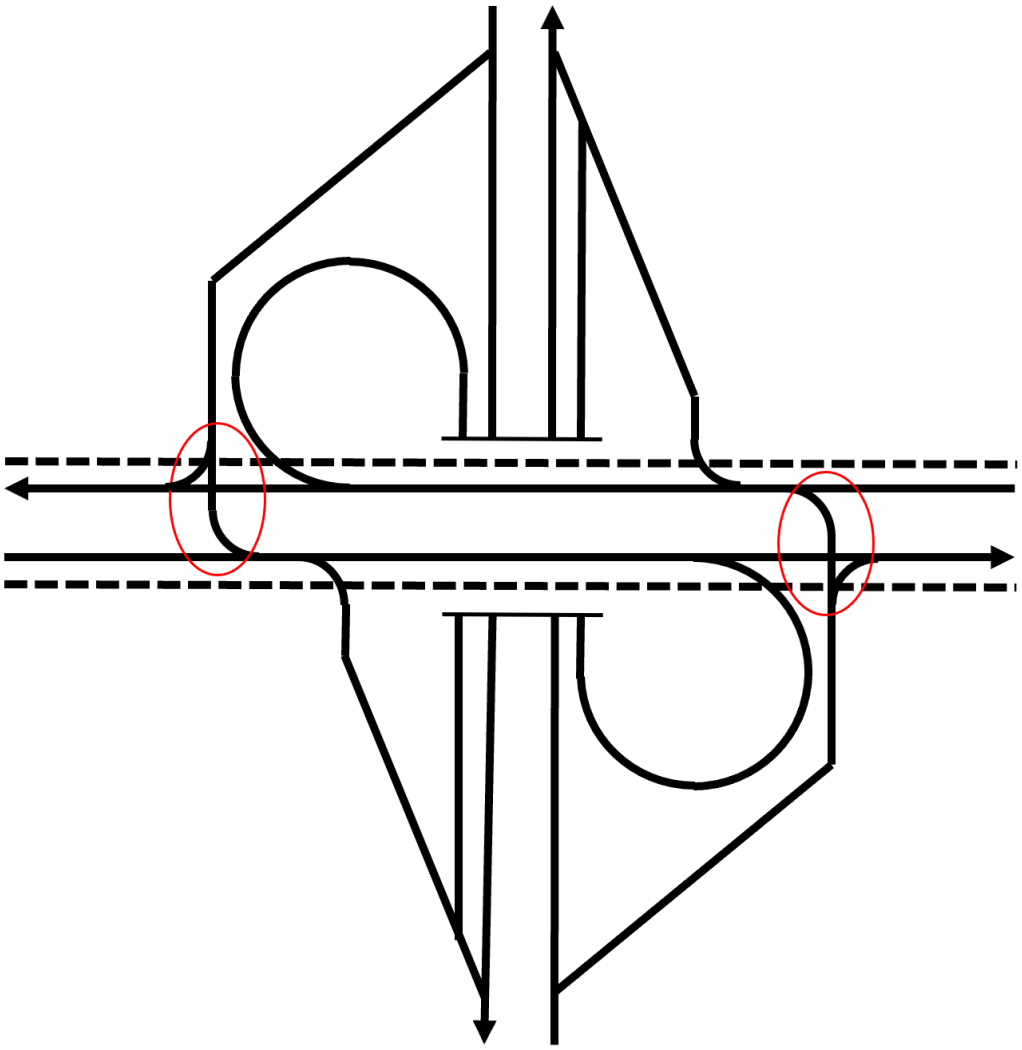
iiDD, Parclo A

Summary: Supplies poor efficiency and average safety and cost scores. Requires a small bridge but has lengthy travel distances and poor speed control.

History: This is a common design.

Rank: 108 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	1	1	3	4	4	1	0	5	2	2	2	6	12	11	29



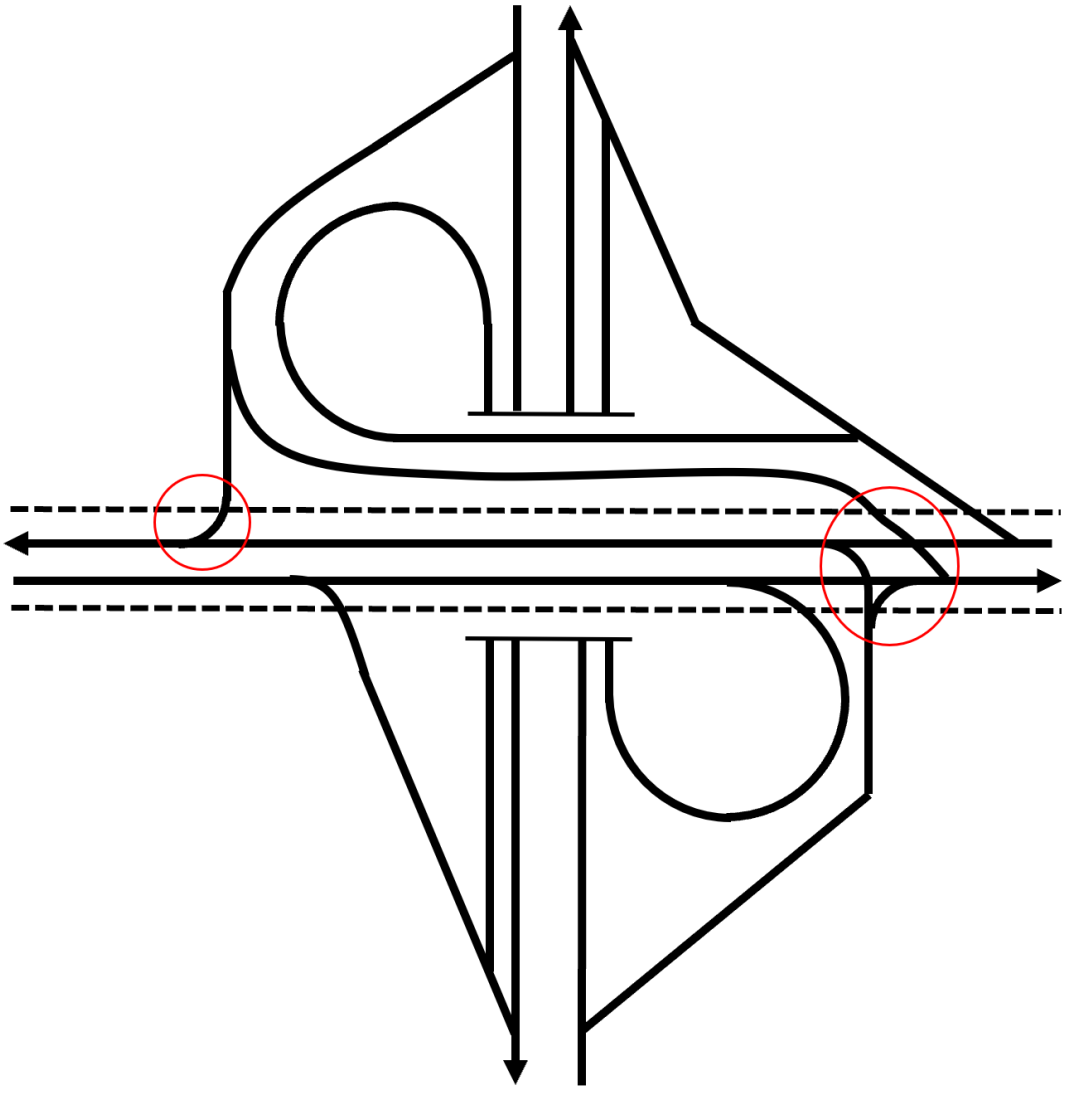
iiDH, One-Sided Displaced Parclo A

Summary: Supplies poor cost scores with lengthy travel distances, poor pedestrian service, and poor speed control.

History: First published by Yu and Wang, 2023.

Rank: 125 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
3	3	1	3	3	3	1	0	0	1	2	0	7	10	3	20



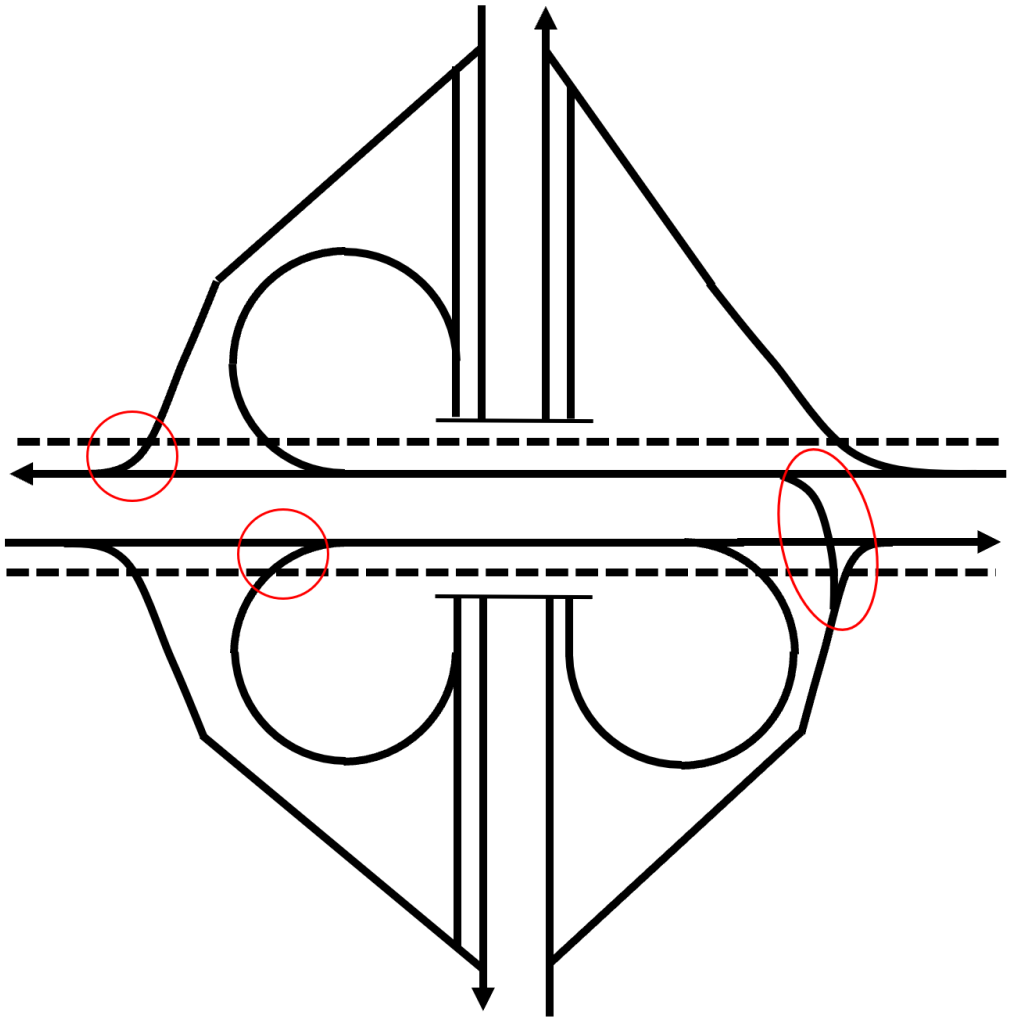
iiDI, Three Loop Missing B

Summary: Supplies below average performance in efficiency, safety, and cost. Requires a small bridge but has lengthy travel distances and poor pedestrian quality.

History: This is a rare design, typically created when a loop ramp is removed at a cloverleaf.

Rank: 117 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	4	0	3	3	3	0	1	5	1	2	1	8	10	9	27



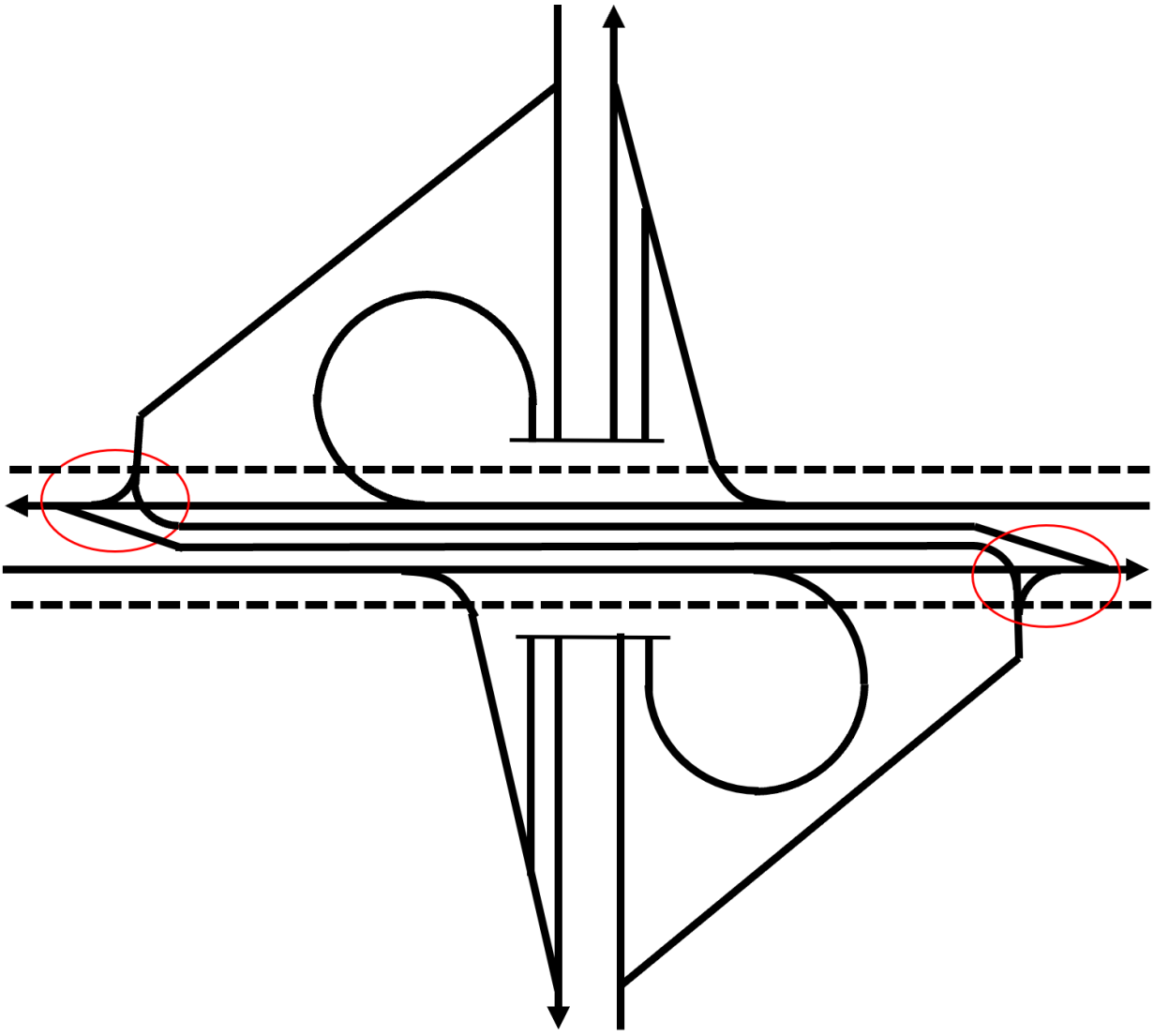
iiGG, Parclo ProgressA

Summary: Supplies superb progression but has poor cost performance. Has lengthy travel distances, poor pedestrian quality, and poor speed control.

History: First published by Molan and Hummer, 2021.

Rank: 111 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
3	5	1	3	3	4	1	1	1	2	2	2	9	12	7	28



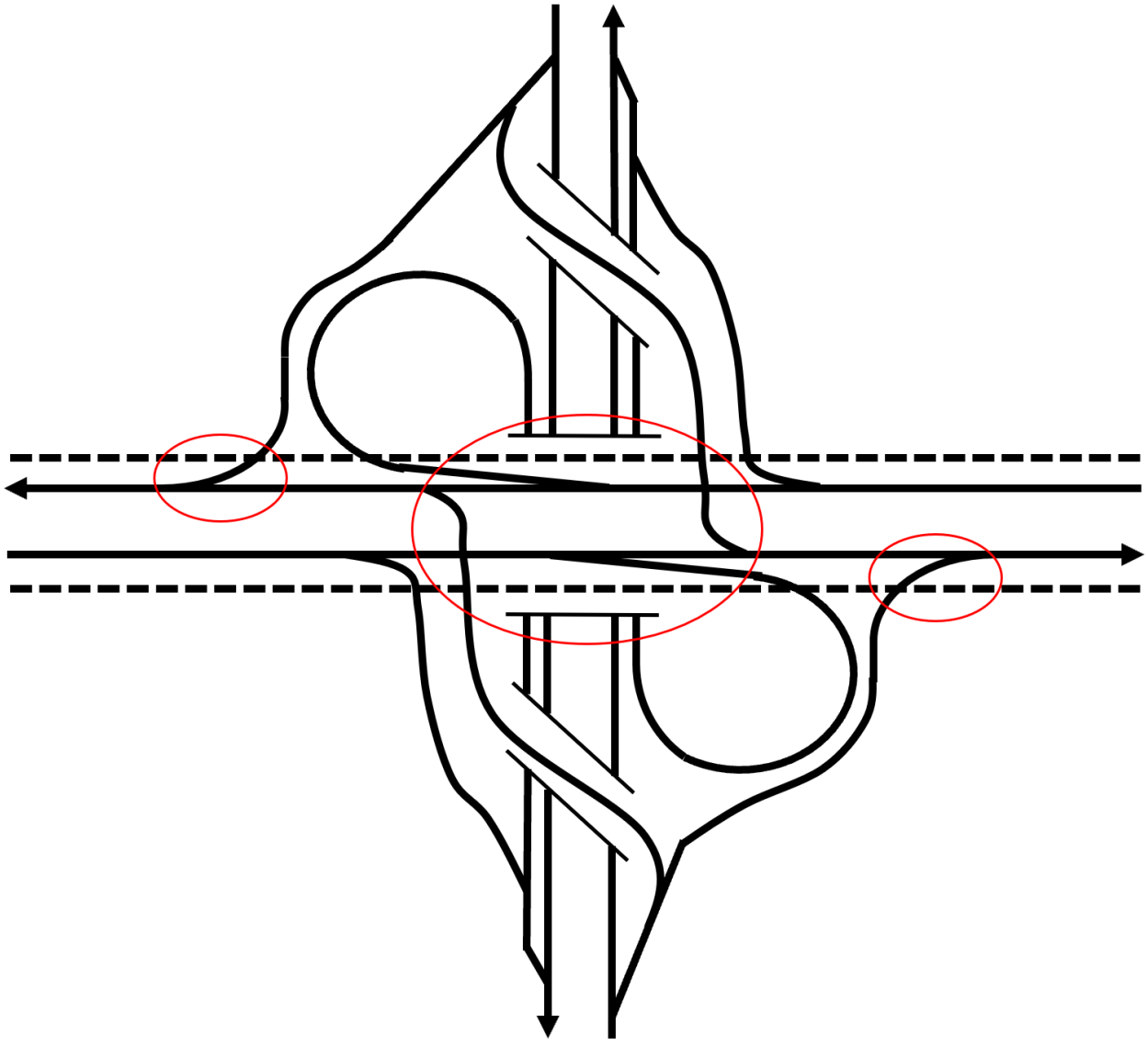
iiHH, Loops Displaced

Summary: Supplies good efficiency but has poor cost performance. Has great capacity, requires a large bridge, needs a large right of way, and has a lengthy extent along the freeway.

History: This is a new design.

Rank: 121 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
5	4	2	3	4	2	2	0	0	1	1	2	11	11	4	26



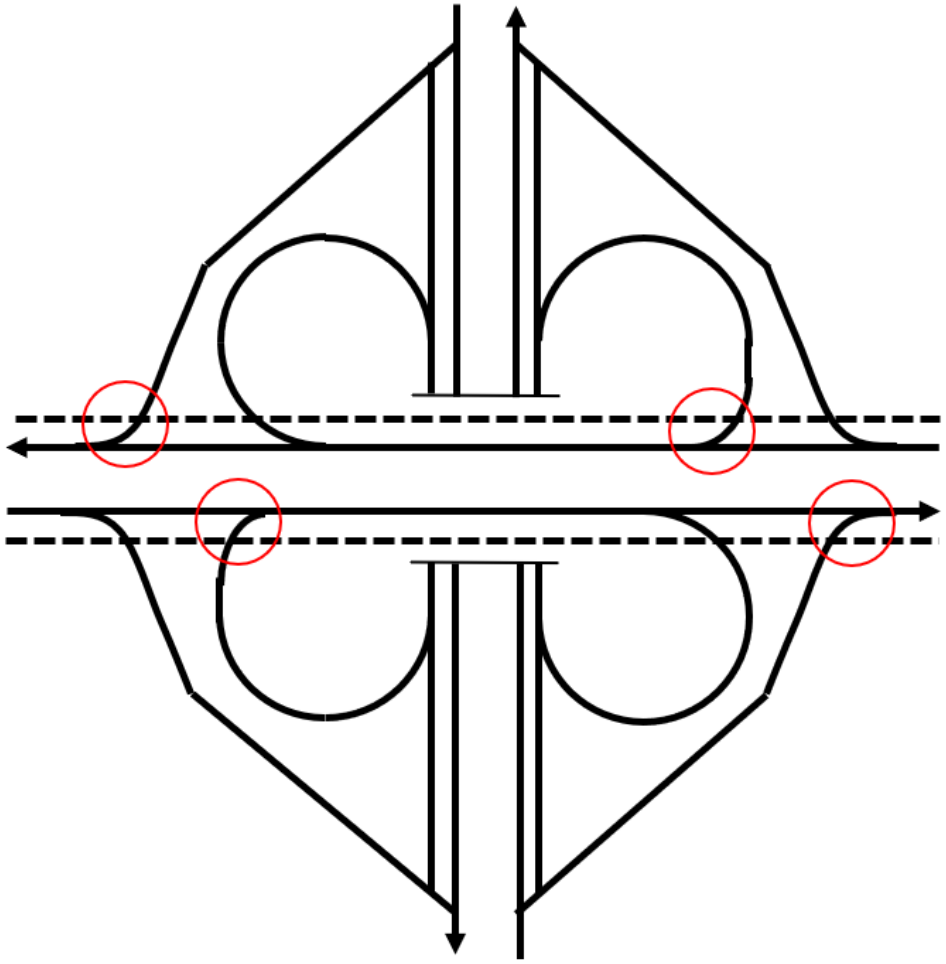
iiI, Cloverleaf

Summary: Has some good qualities, like progression and bridge size, but also some very poor qualities like distance traveled, pedestrian quality, and right of way size. The weaving areas created on the freeway are also an important negative quality.

History: This was the first interchange design. It was patented in 1912, was first constructed in 1928, and became a common interchanges design. The service interchange version is being phased out by some agencies; it is a fairly easy retrofit to a parclo B by removing two loops.

Rank: 115 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	5	0	3	3	4	0	3	5	0	1	0	9	13	6	28



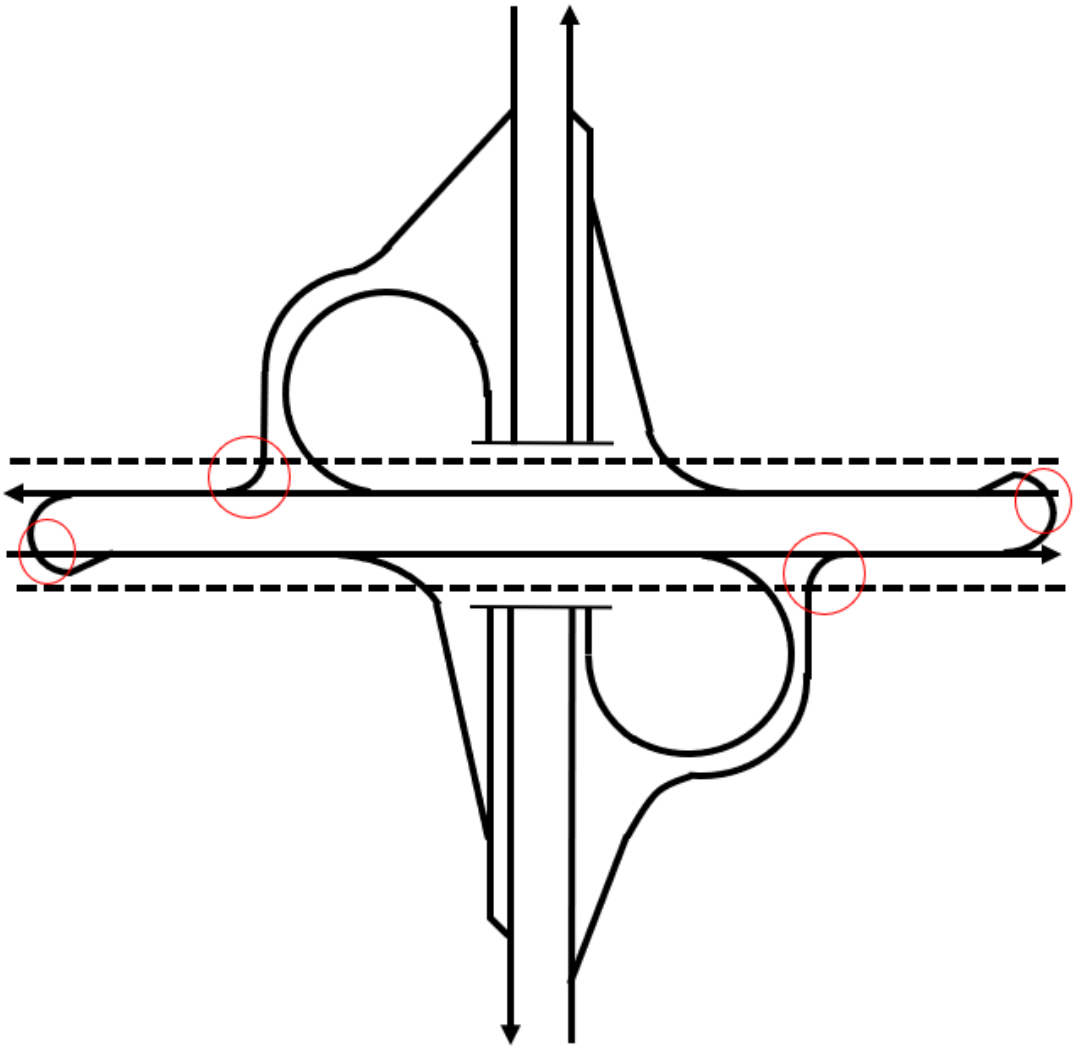
iiJJ, Loop U-Turn on Arterial

Summary: Supplies average safety performance. Has good progression and requires a small bridge but also results in extra travel distances and a lengthy extent along the arterial.

History: This is a new design.

Rank: 97 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
2	5	0	4	3	4	1	3	5	2	2	0	7	15	9	31



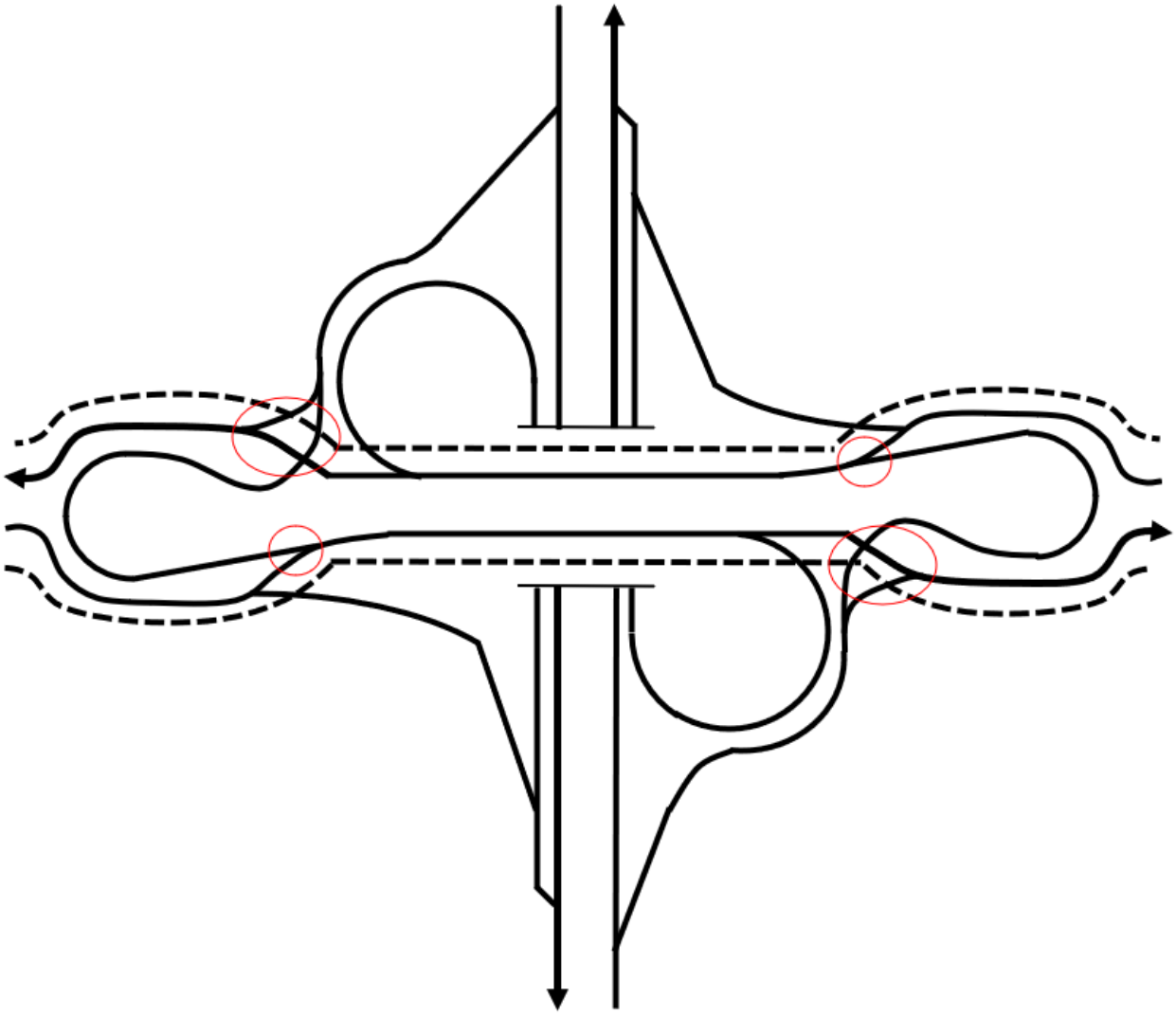
iiMM, Loop St. Aug.

Summary: Supplies average efficiency and safety performance. Requires a small bridge but has lengthy travel distances, a large right of way, and a lengthy extent along the arterial.

History: This is a new design.

Rank: 78 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	5	0	3	3	4	1	5	5	1	2	0	9	16	8	33



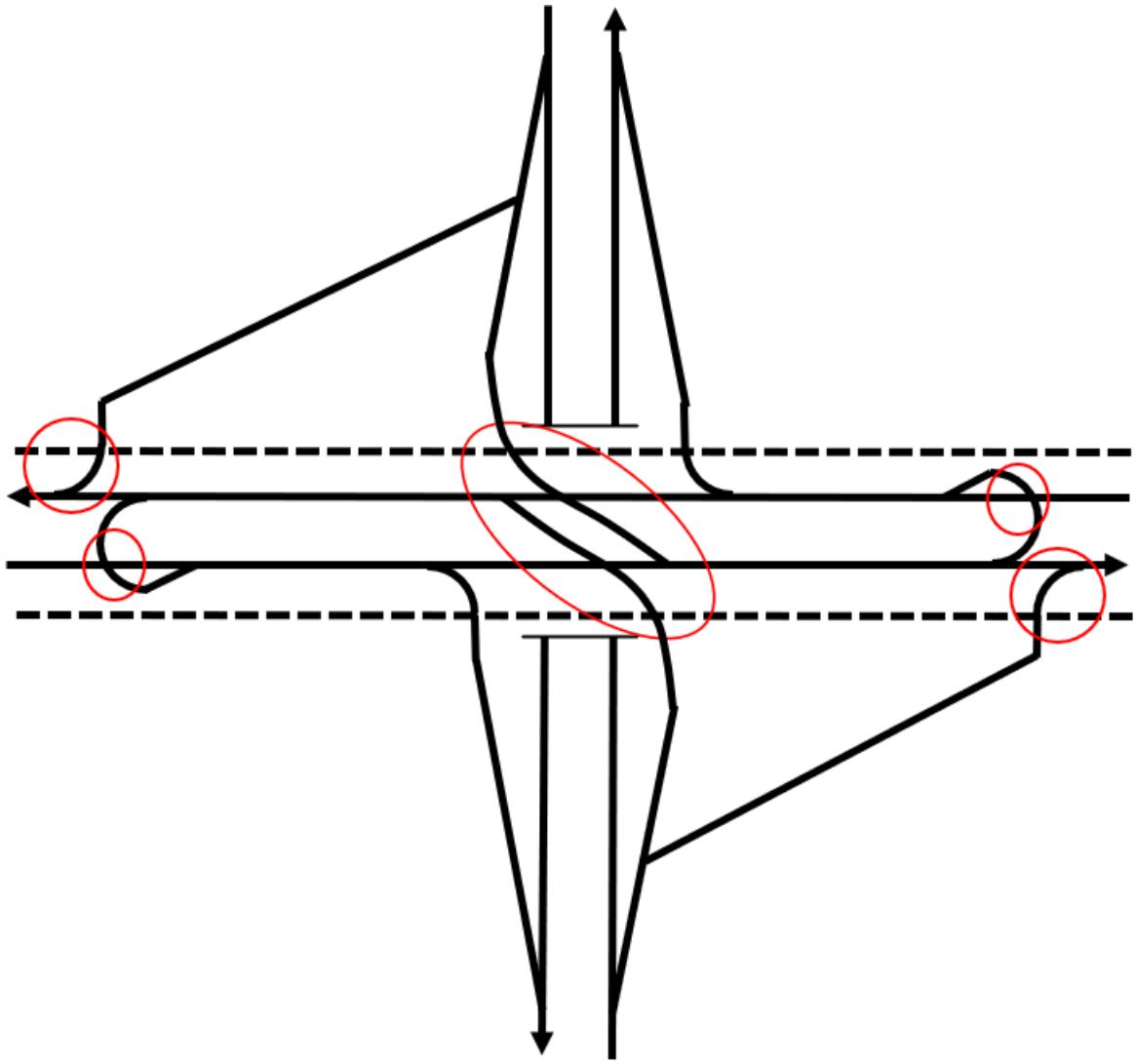
jjAA, U-Turn on Arterial Single Point

Summary: Supplies good efficiency but has poor safety performance. More specifically, this design has good capacity and progression but a high wrong way potential.

History: This is a new design.

Rank: 89 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	4	3	3	2	1	2	3	3	3	2	2	11	11	10	32



jjBB, U-Turn on Arterial Tight Diamond

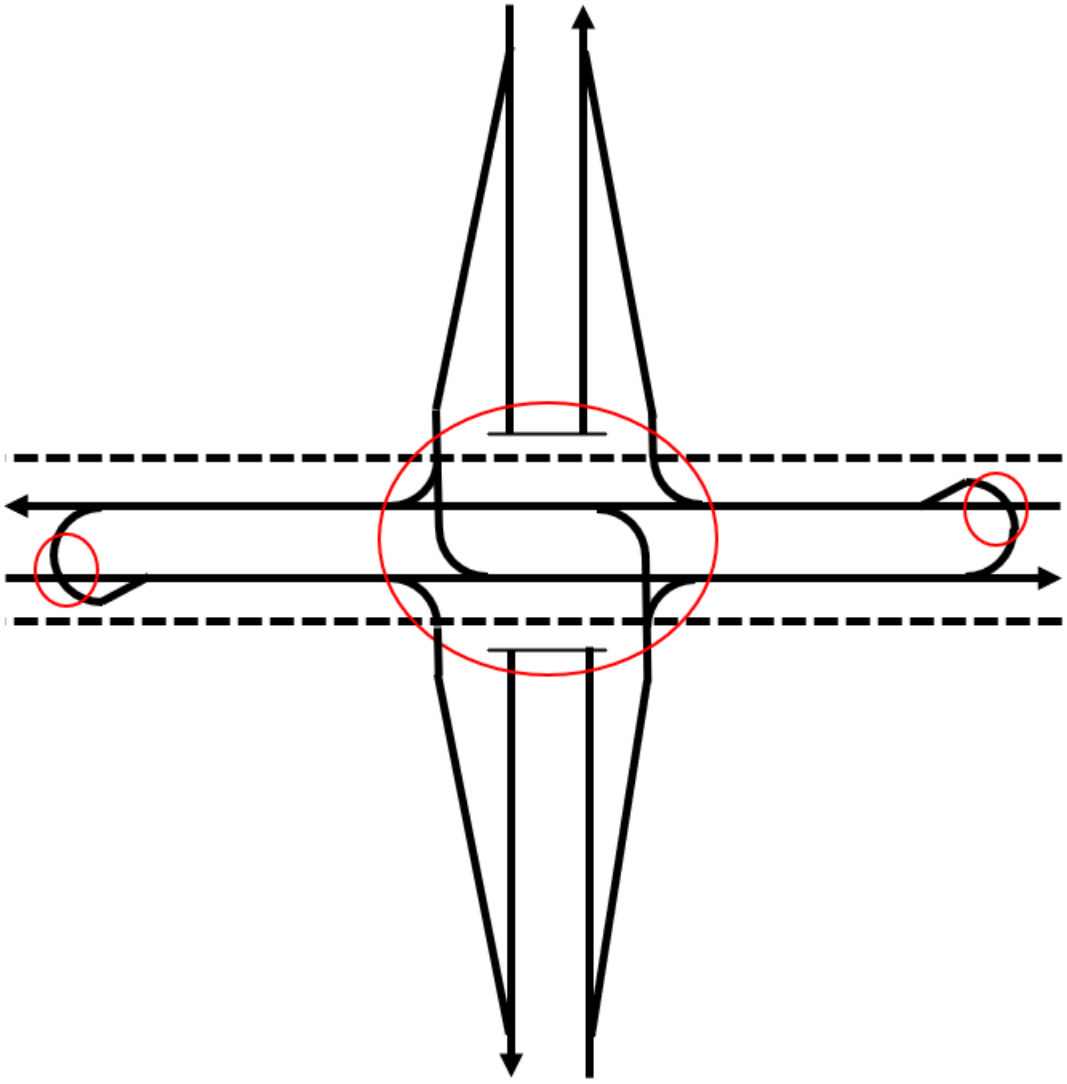
Summary: Supplies great cost scores. The capacity is poor but still a bit higher than a tight diamond so this might be a good competitor in some spots.

History: This is a new design.

Footprint: This design fits in a tight diamond footprint.

Rank: 14 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
1	3	3	3	3	3	5	1	5	5	5	4	7	15	19	41



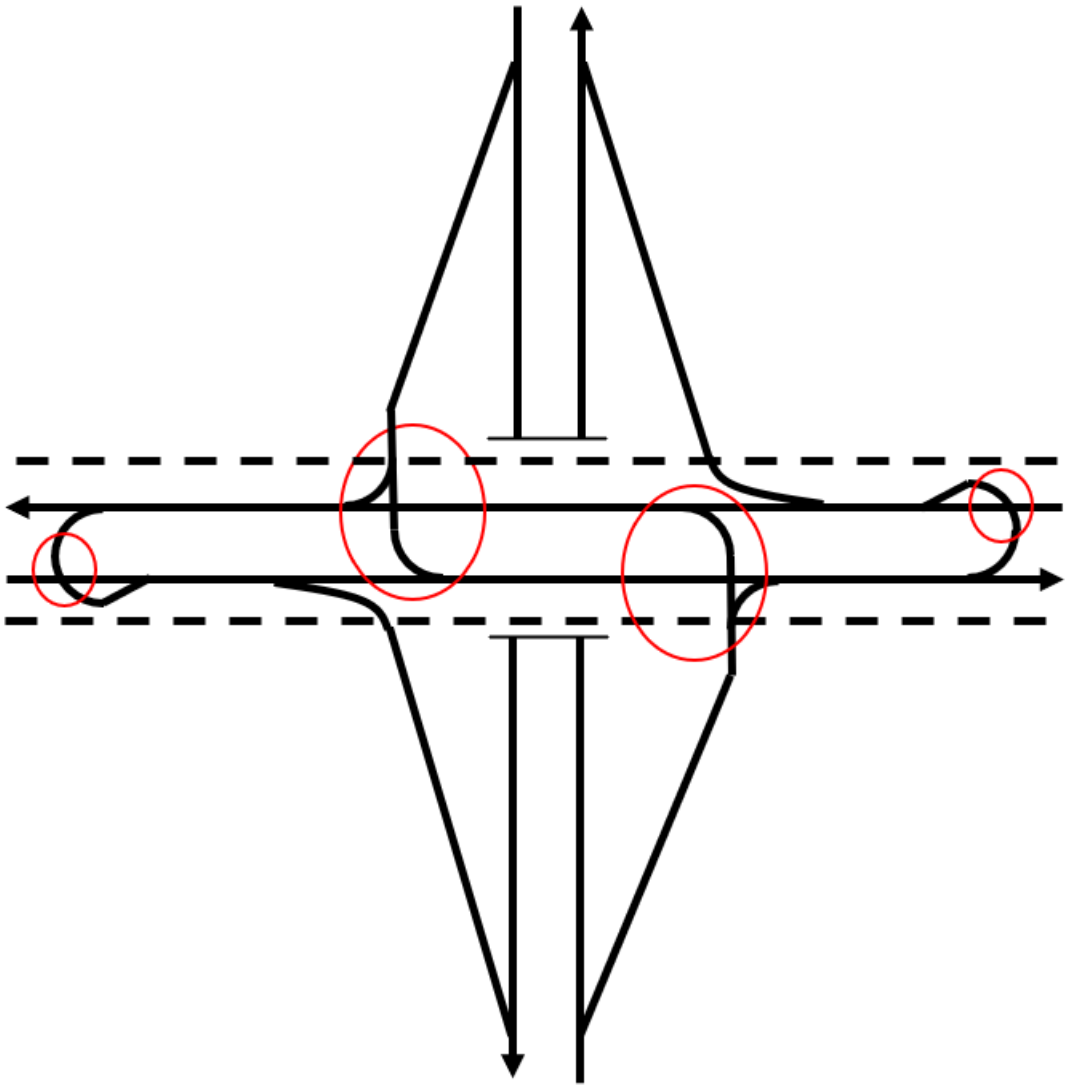
jjCC, U-Turn on Arterial Standard Diamond

Summary: Supplies poor efficiency but has good cost scores and average safety. Has poor progression and speed control but requires a small bridge.

History: This is a new design.

Rank: 68 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
2	1	2	3	4	3	3	1	5	4	4	2	5	14	15	34



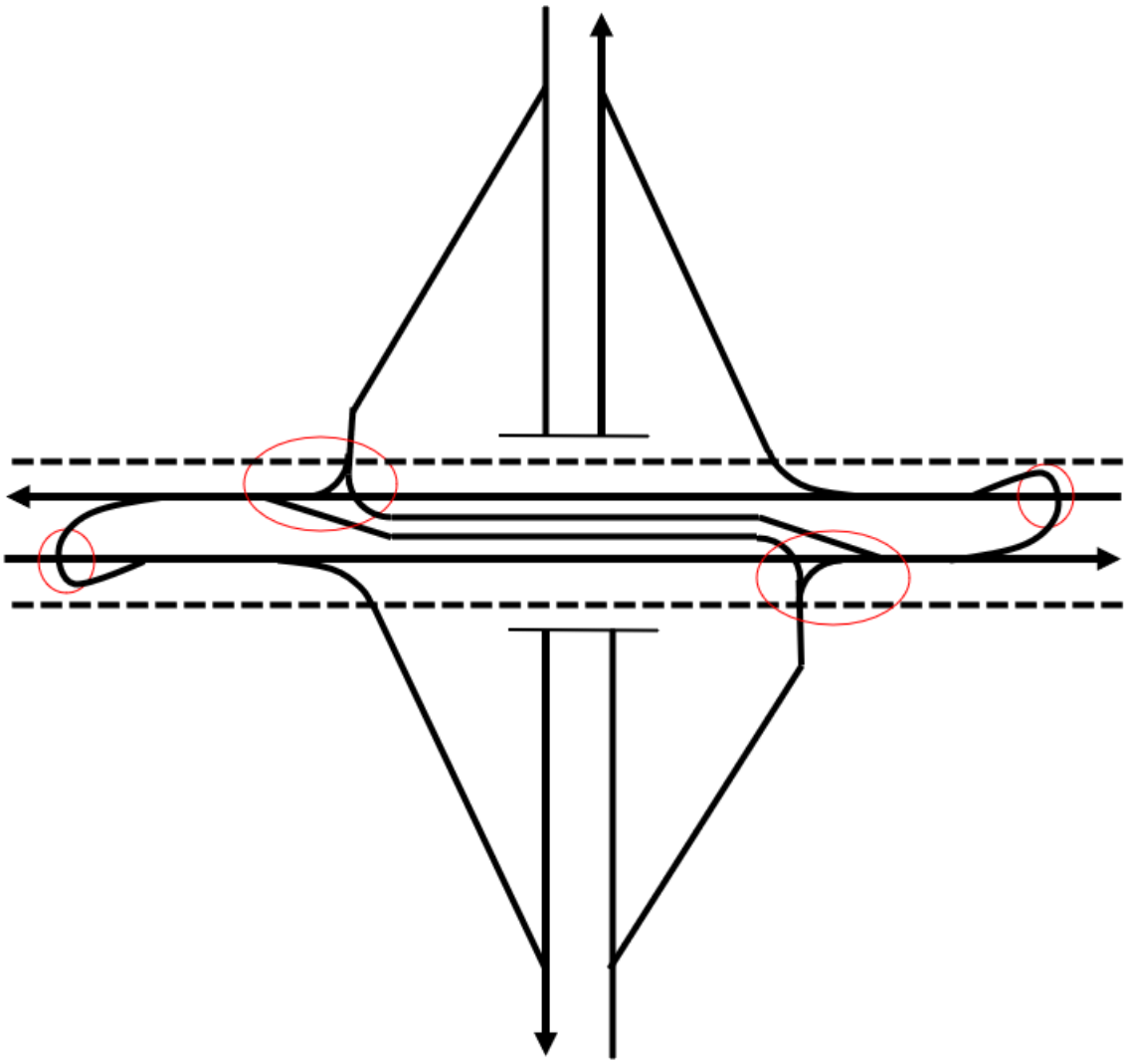
jjFF, U-Turn on Arterial Standard Contraflow

Summary: Supplies average efficiency, cost, and safety performance. Has poor capacity but great progression.

History: This is a new design.

Rank: 55 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
1	5	2	3	3	4	3	3	2	4	4	1	8	16	11	35



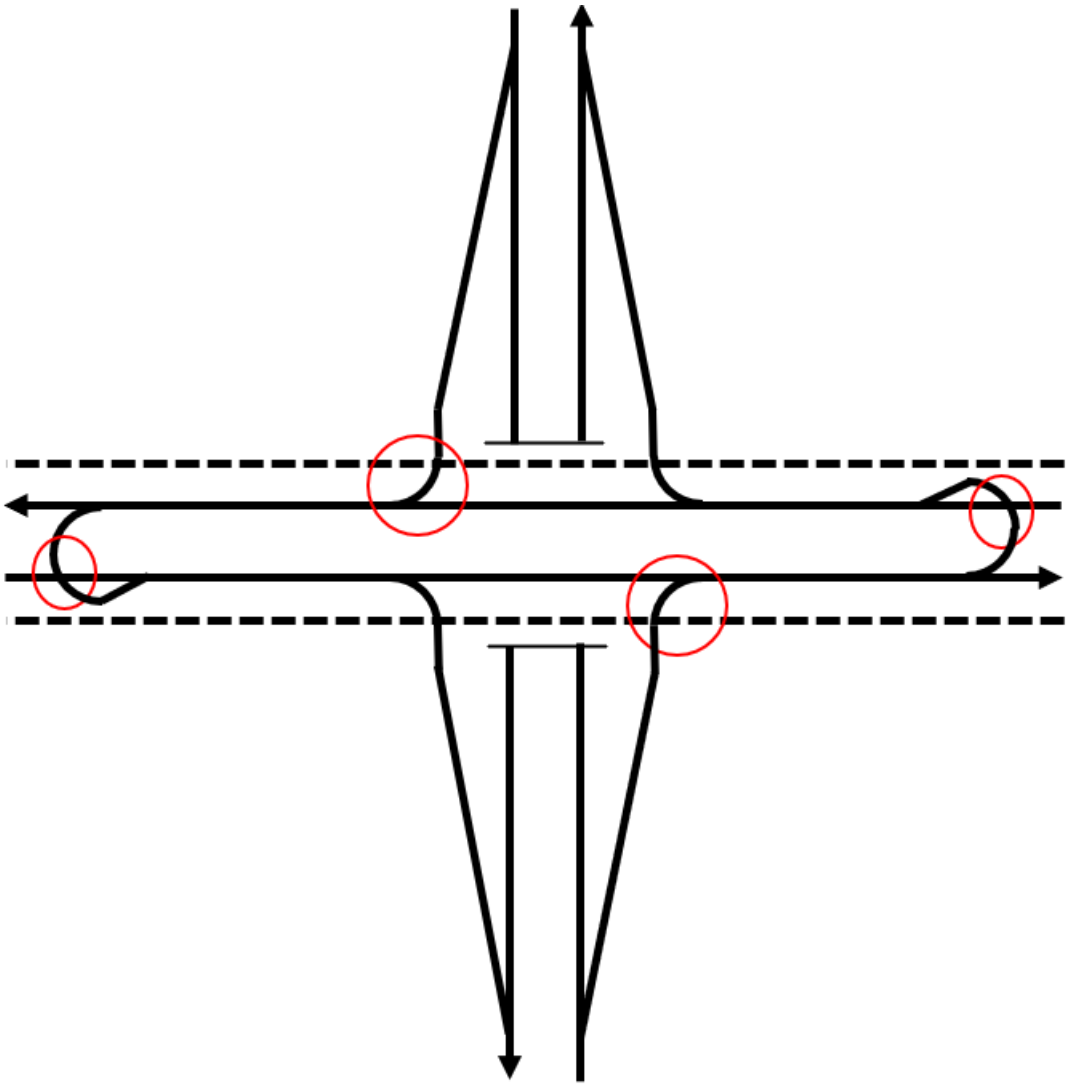
jjJJ, Signalized FRE

Summary: Supplies poor efficiency, good safety, and great cost performance. Has a low number of conflict points, small bridge size, and a small right of way. Where there is low demand and no space for roundabouts this concept may be competitive.

History: First published by Berry and Click, 2011.

Rank: 9 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
0	5	1	5	2	4	3	3	5	5	5	4	6	17	19	42



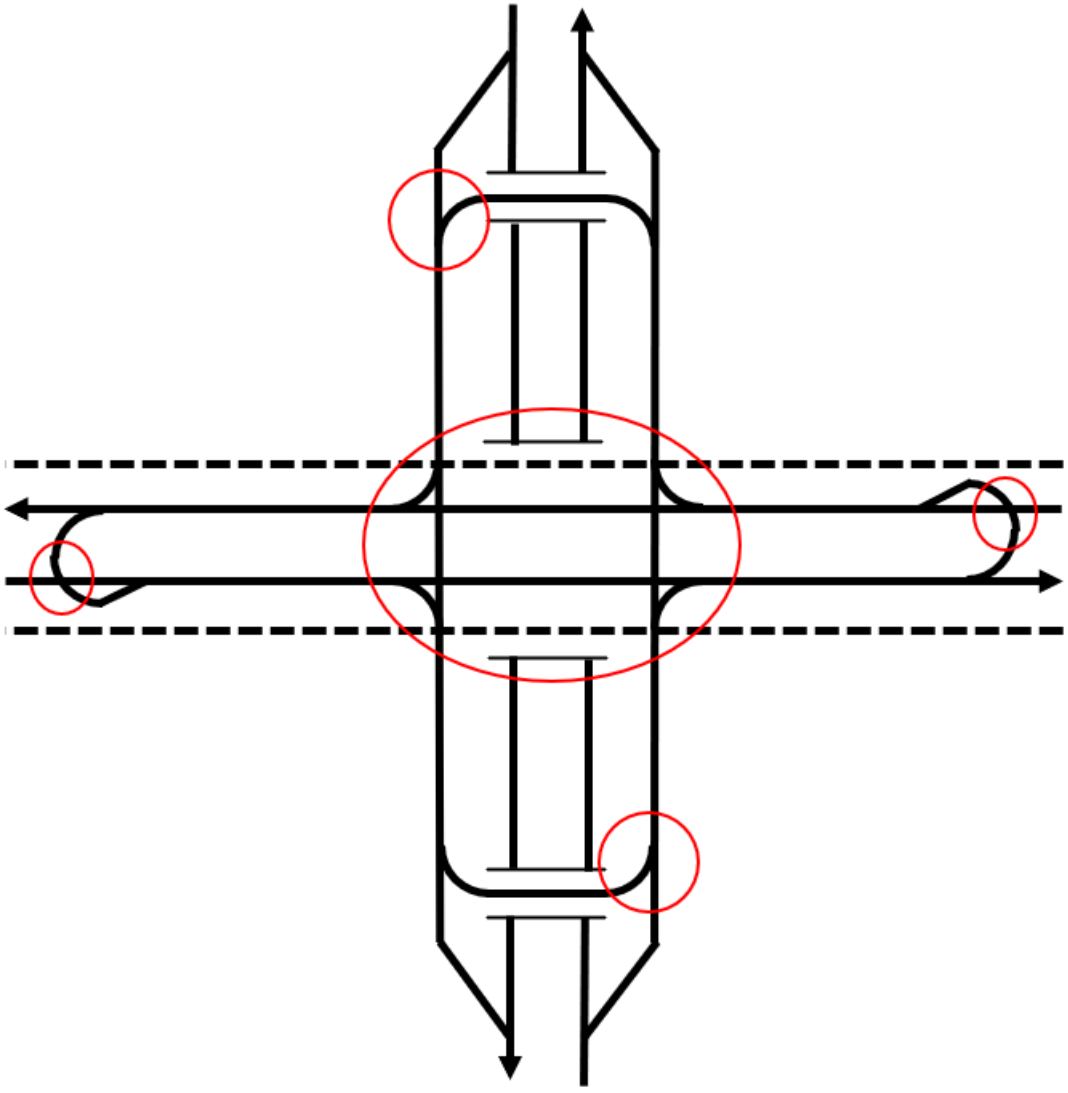
jjKK U-Turn on Arterial U-Turn over Freeway

Summary: Provides average efficiency and cost scores but is below average on the safety measures. Has a large number of conflict points and unusual maneuvers and has poor speed control.

History: This is a new design.

Rank: 92 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	4	1	1	1	3	4	1	4	4	1	4	9	10	13	32



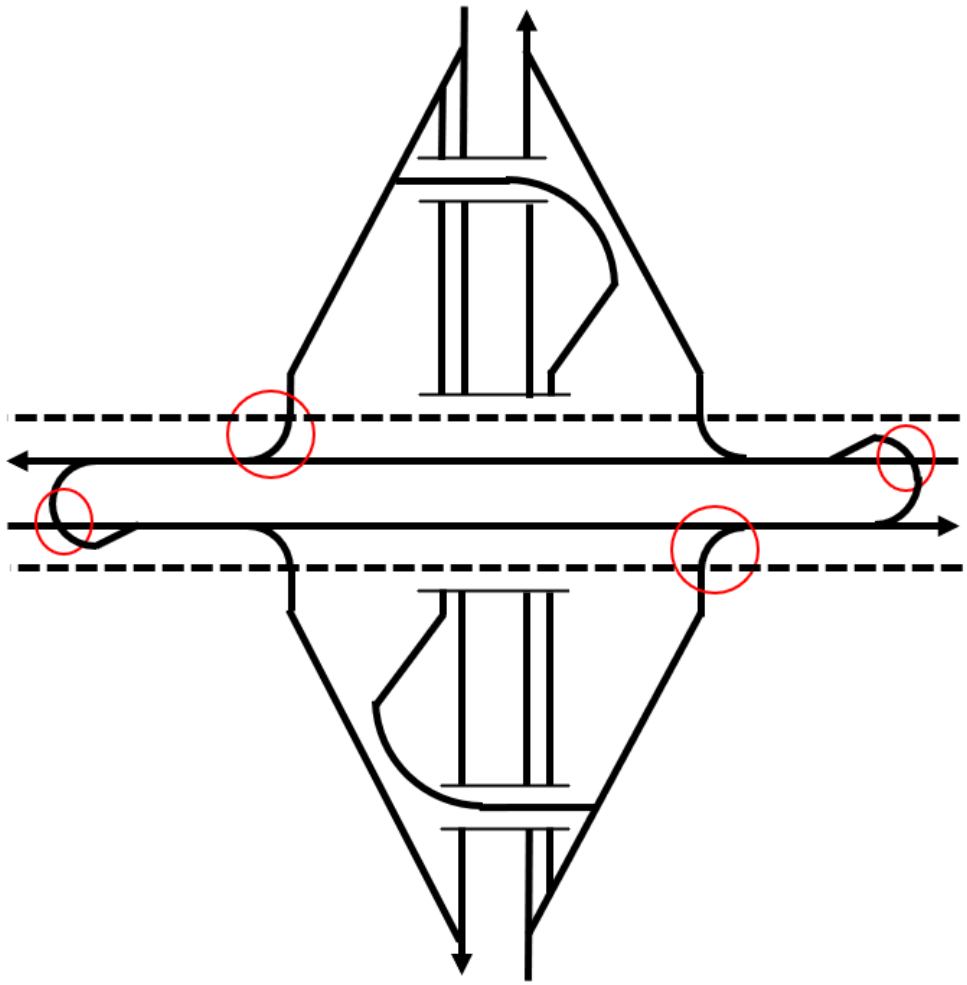
jjLL, U-Turn on Arterial U-Turn over Freeway with Slip

Summary: Provides good safety but poor cost performance. Features great progression but lengthy travel distances, a large right of way, and lengthy extents along the freeway.

History: This is a new design.

Rank: 77 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	5	0	4	4	4	3	3	3	0	1	2	9	18	6	33



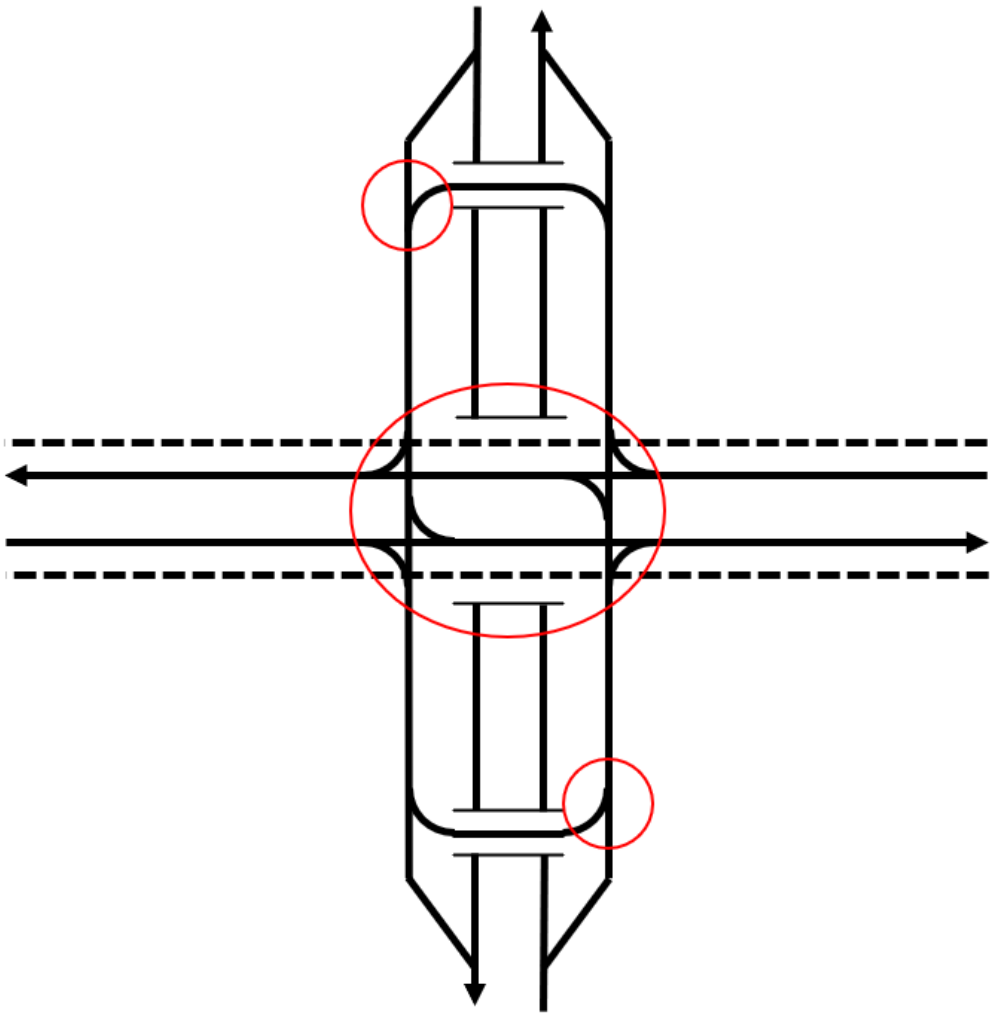
kkBB, Median U-Turn

Summary: Provides good cost scores with average efficiency and safety performance. Has a high number of conflict points, poor speed control, and a lengthy extent along the freeway but has great pedestrian quality and short extents along the arterial.

History: Introduced in the 1960s in Michigan, the design remains popular there.

Rank: 59 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
3	3	3	1	3	3	5	0	4	4	1	5	9	12	14	35



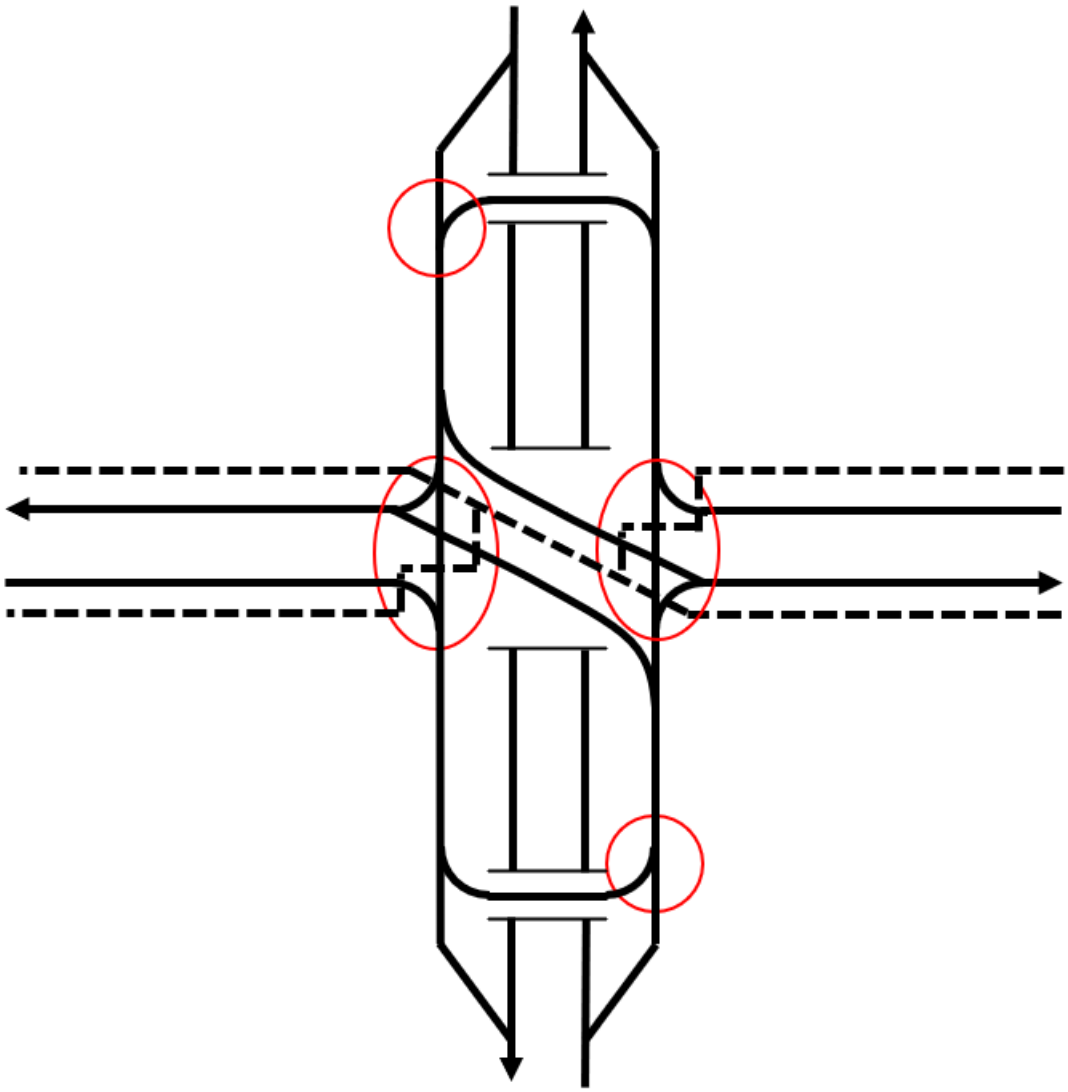
kkBB, RCI over Freeway

Summary: Supplies good safety benefits with great progression potential and short extents along the arterial. Requires lengthy travel distances and extents along the freeway.

History: This is a new design.

Rank: 17 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
2	5	1	3	4	4	3	5	3	4	1	5	8	19	13	40



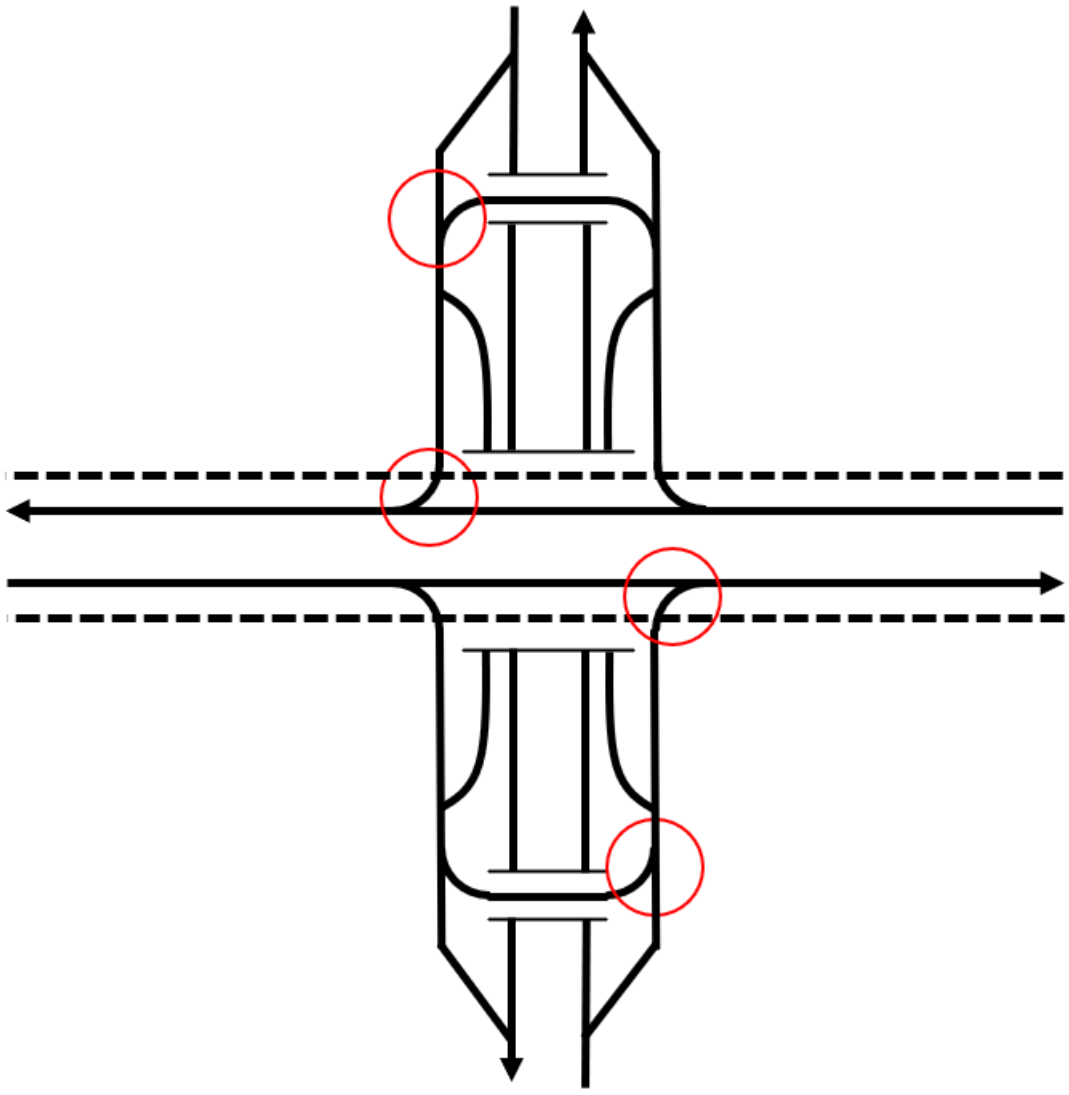
kkKK, Hourglass

Summary: Supplies excellent capacity and progression but poor cost performance. Requires lengthy travel distances, a large bridge, and a lengthy extent along the freeway.

History: This is a new design.

Rank: 82 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
5	5	1	4	2	4	3	1	0	3	0	4	11	14	7	32



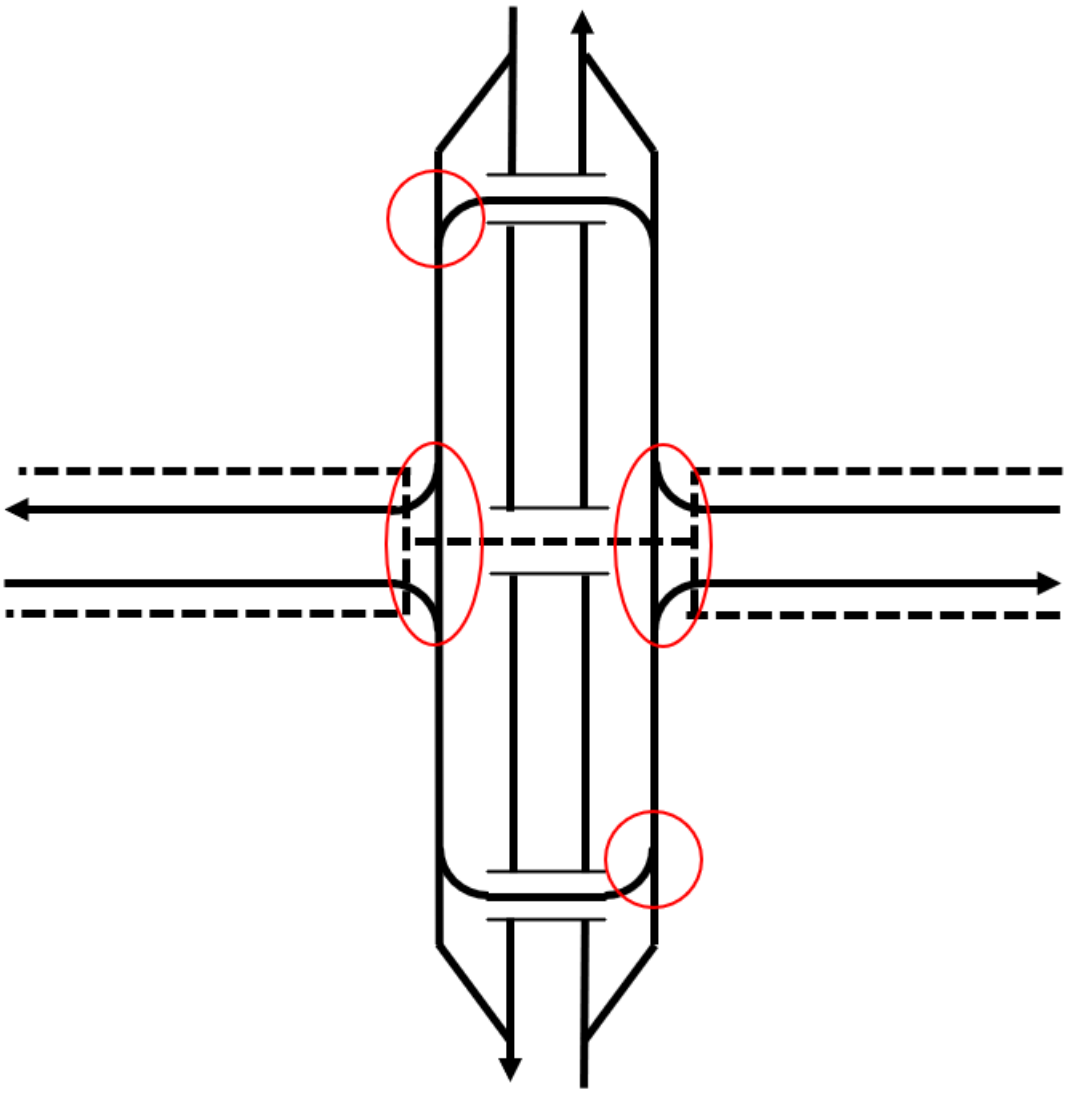
kkKK, ILAC over Freeway

Summary: Has many fine features, with even scores of 4 or 5, but several obvious weaknesses as well. In the right type of low demand site this design could be a competitor.

History: This is a new design.

Rank: 22 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
0	5	0	5	3	4	2	5	5	4	1	5	5	19	15	39



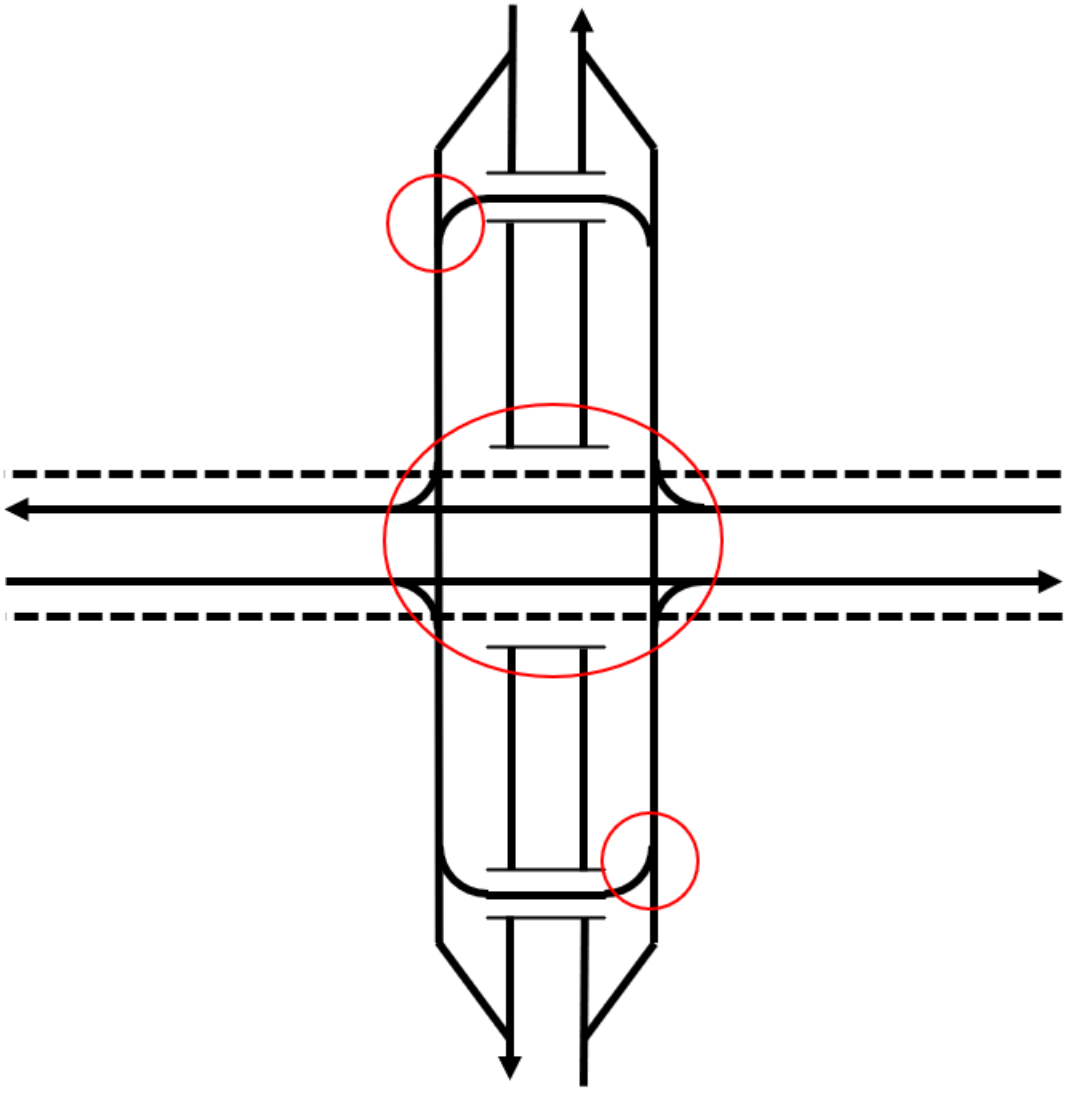
kkKK, U-Turn over Freeway

Summary: Supplies good cost scores with average efficiency and poor safety performance. Requires a high number of unusual maneuvers, and a provides poor speed control.

History: This is a new design.

Rank: 90 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	4	1	2	0	3	4	0	4	4	1	5	9	9	14	32



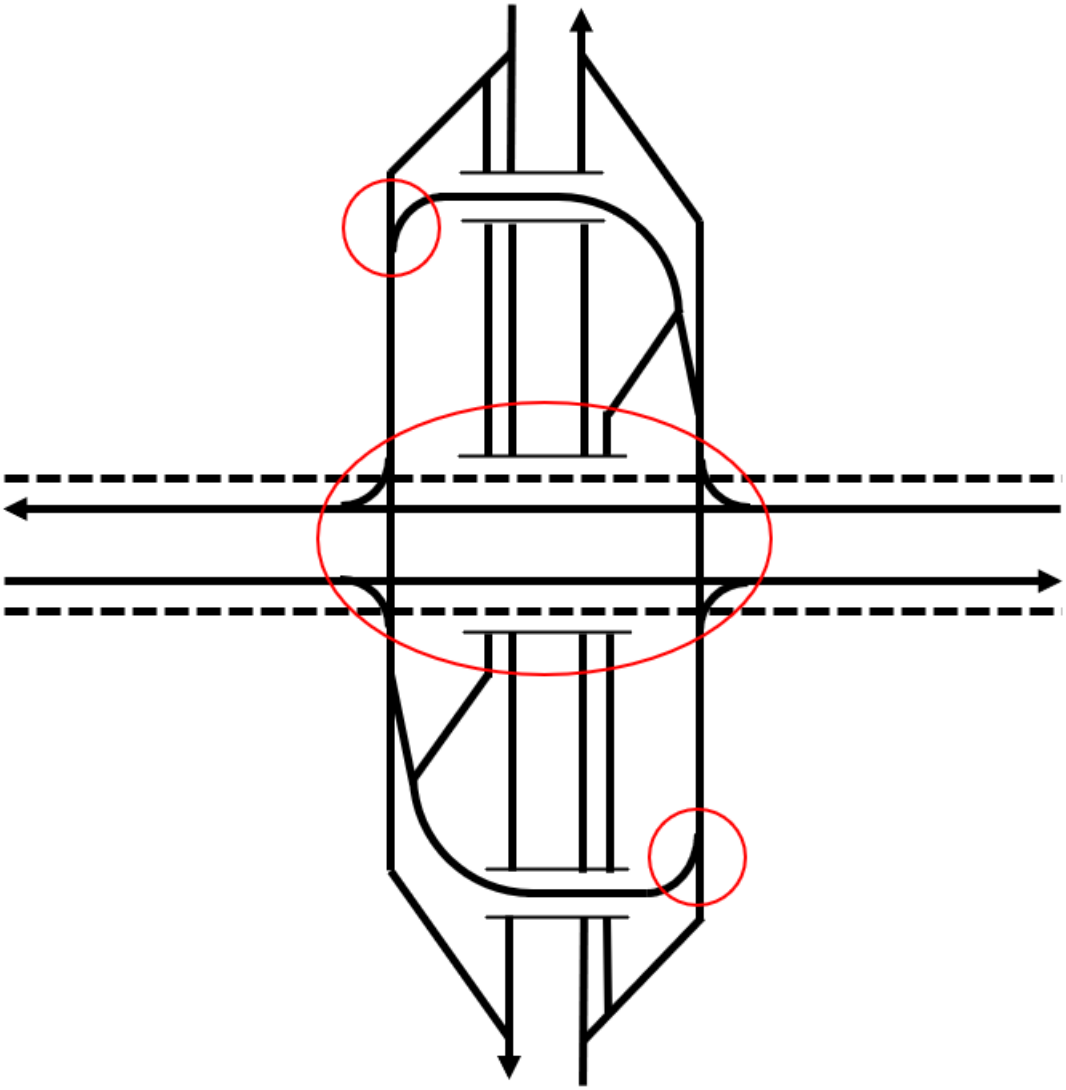
kkLL, U-Turn over Freeway U-Turn over Freeway with Slip

Summary: Supplies poor safety and cost scores. Has high capacity but provides poor speed control and requires a lengthy extent along the freeway.

History: This is a new design.

Rank: 116 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
5	4	1	1	2	3	4	0	3	1	0	3	10	10	7	27



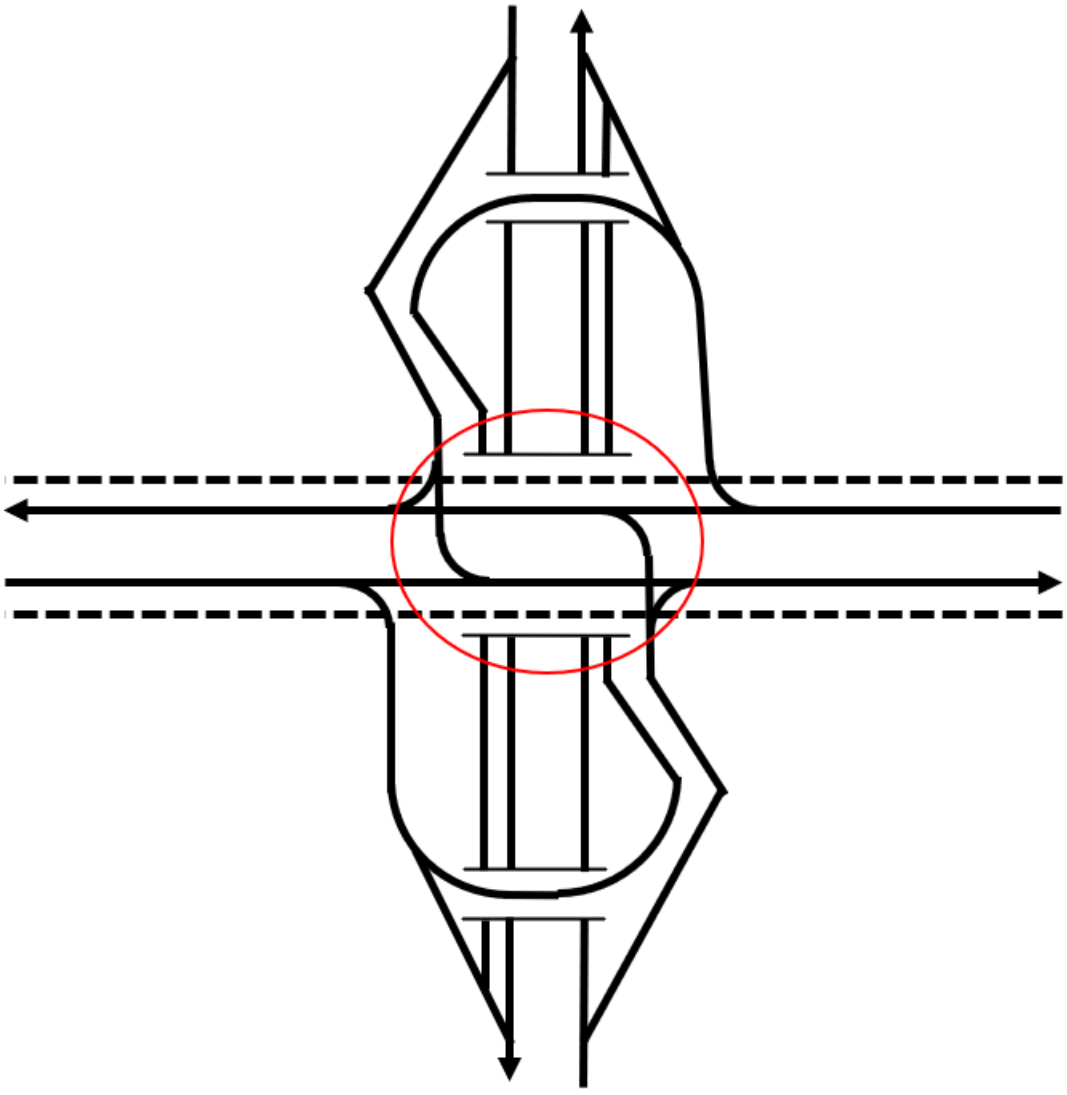
llBB, U-Turn over Freeway with Slip Tight Diamond

Summary: Provides poor speed control and requires a large right of way and lengthy extents along the freeway. Otherwise, the scores are all average.

History: This is a new design.

Rank: 107 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
3	3	3	3	3	3	3	0	3	1	1	3	9	12	8	29



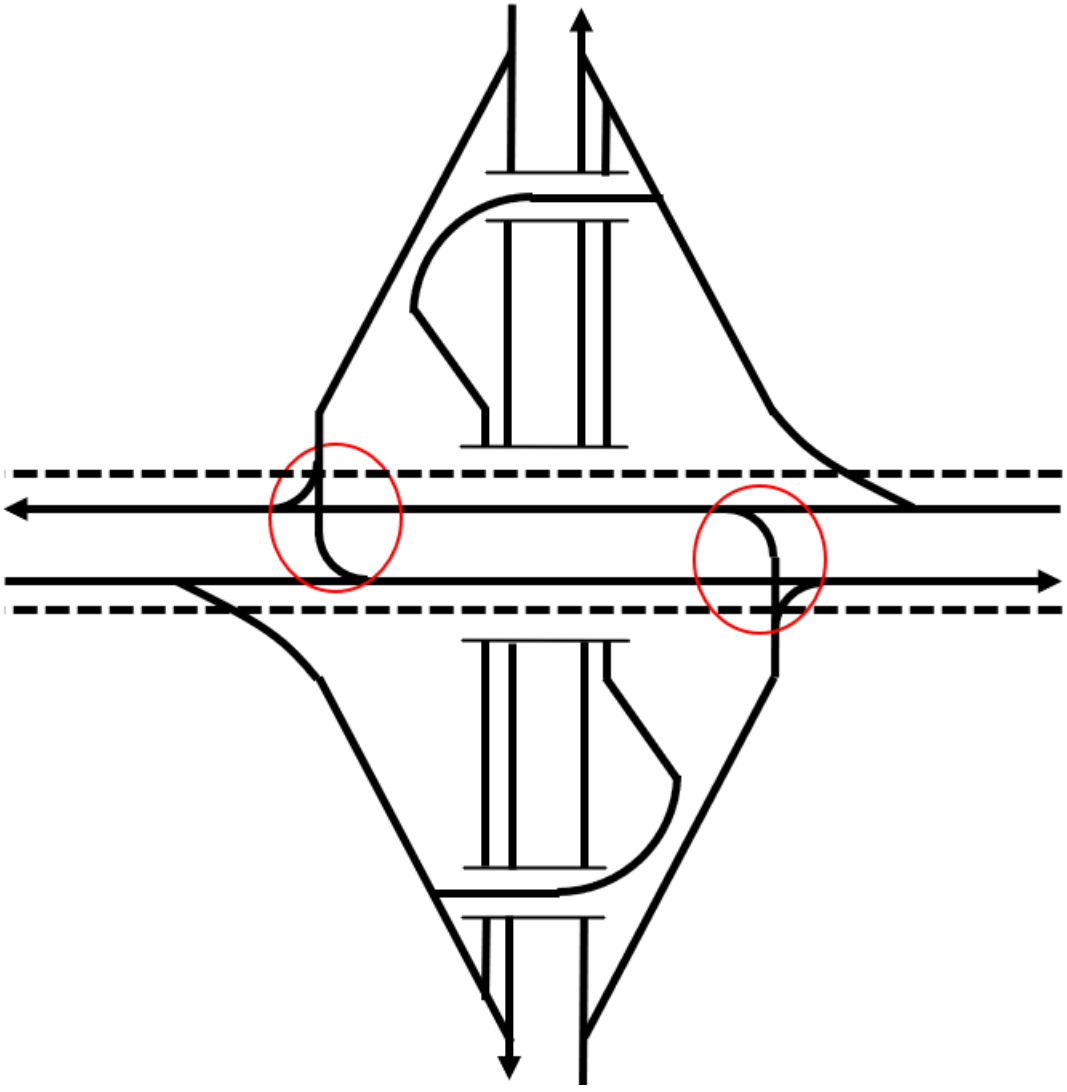
llCC, Milwaukee A

Summary: Provides good capacity and scores well for unusual maneuvers but has poor overall cost score. Provides poor speed control and requires a large right of way.

History: A Milwaukee A interchange has been built at I-894 and 27th Street in Milwaukee, Wisconsin.

Rank: 119 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	1	2	3	4	3	3	0	3	0	1	3	7	13	7	27



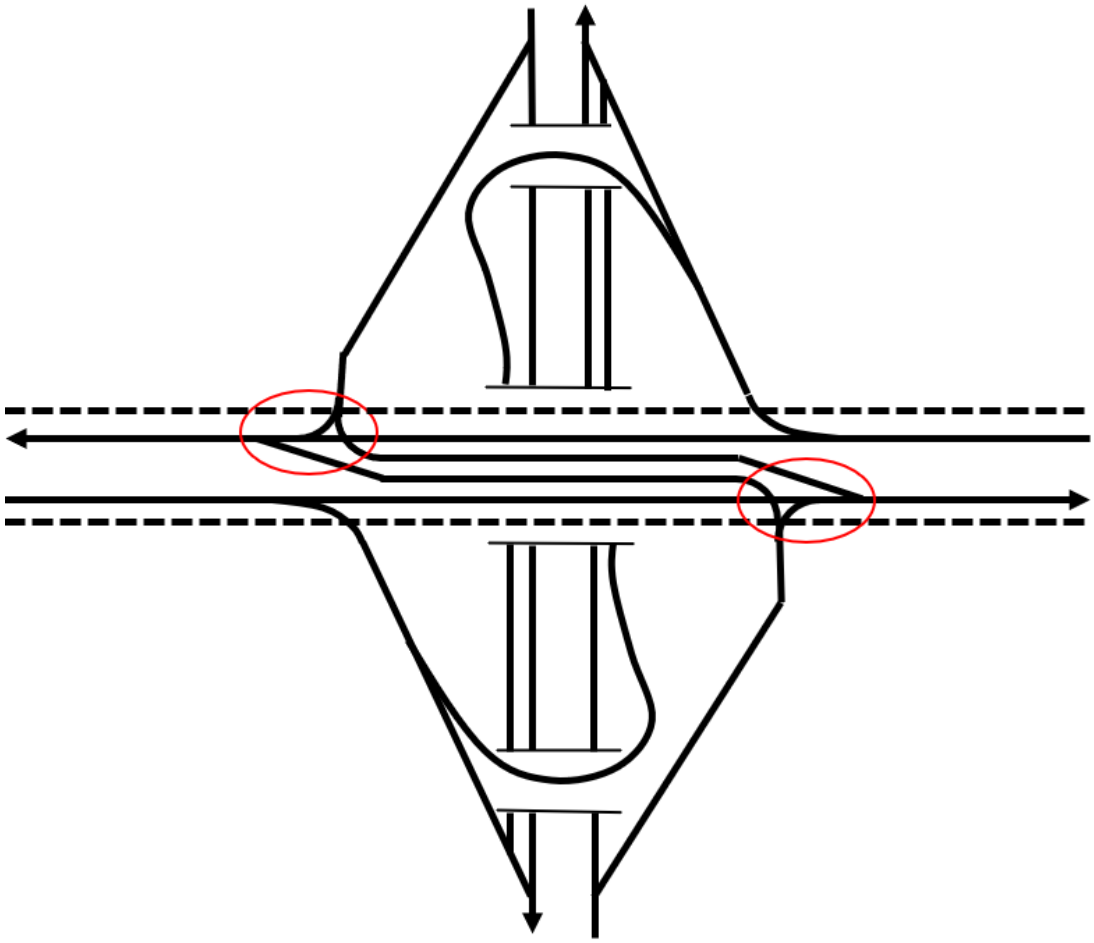
llFF, U-Turn over Freeway with Slip
Standard Contraflow

Summary: Supplies average efficiency and safety performance but low cost scores. Has great progression but requires a large right of way.

History: This is a new design.

Rank: 85 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
3	5	2	3	3	4	3	1	3	0	2	3	10	14	8	32



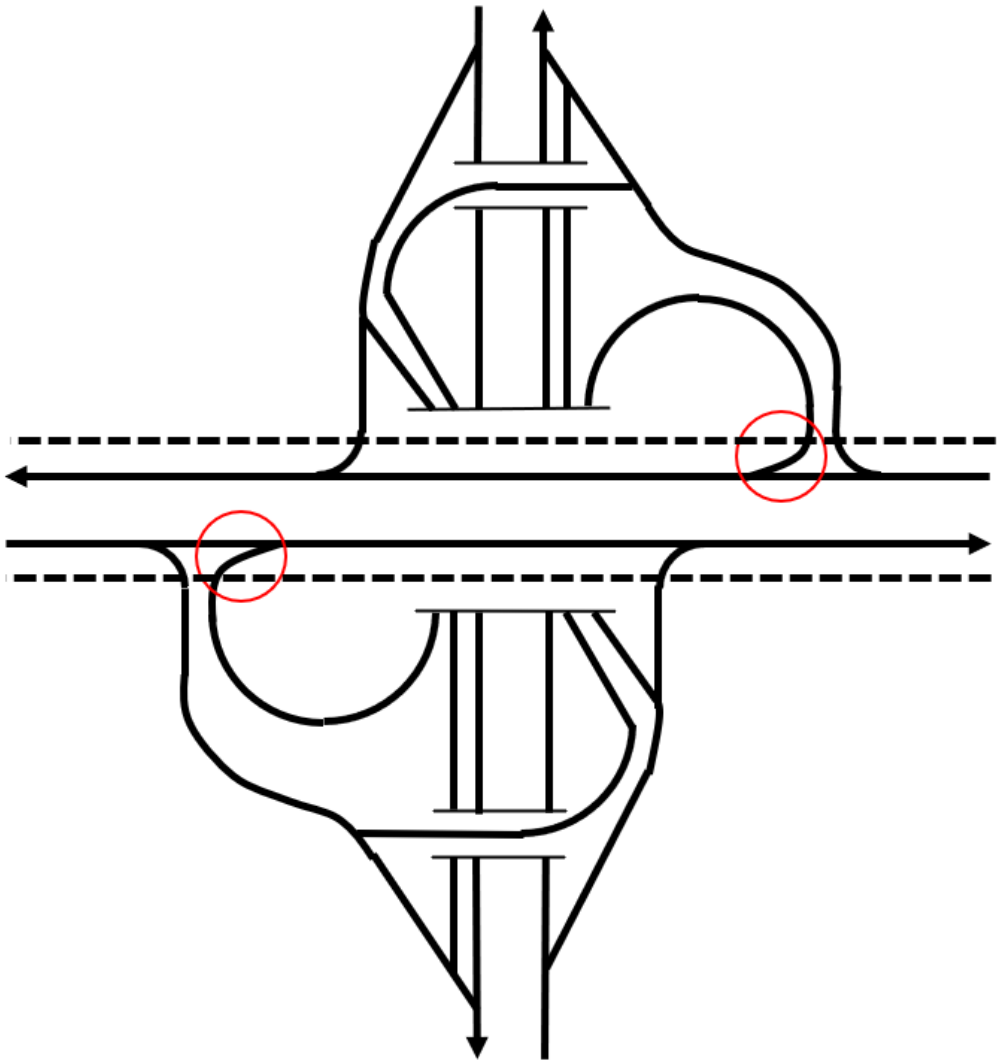
llII, U-Turn over Freeway with Slip Loops

Summary: Provides good safety performance but very poor cost scores. Has great progression and good capacity but requires lengthy travel distances.

History: This concept is in operation at I-41 and Watertown Plank Road in Milwaukee, WI.

Rank: 100 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	5	0	4	4	3	4	3	1	0	0	2	9	18	3	30



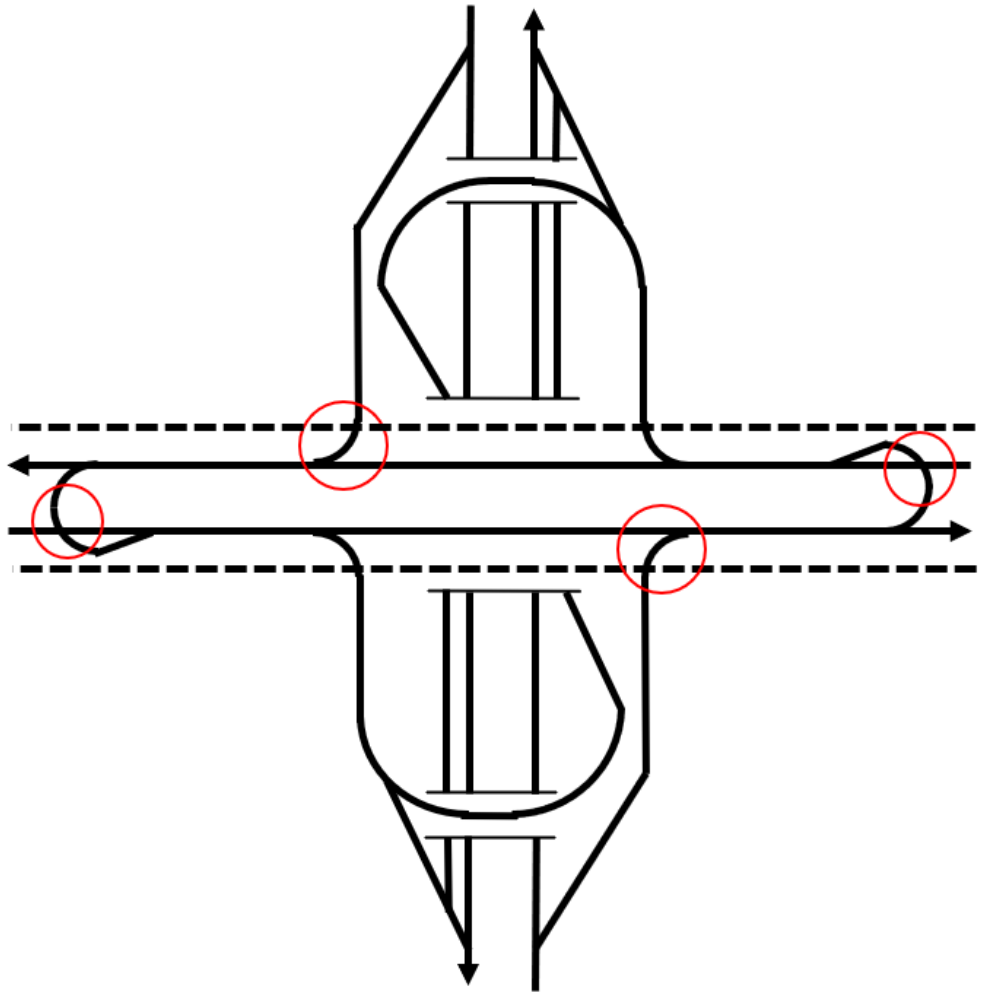
llJJ, U-Turn over Freeway with Slip U-Turn on Arterial

Summary: Provides good safety performance but poor cost scores. Has great progression and good capacity but requires lengthy travel distances.

History: This is a new design.

Rank: 86 of 125.

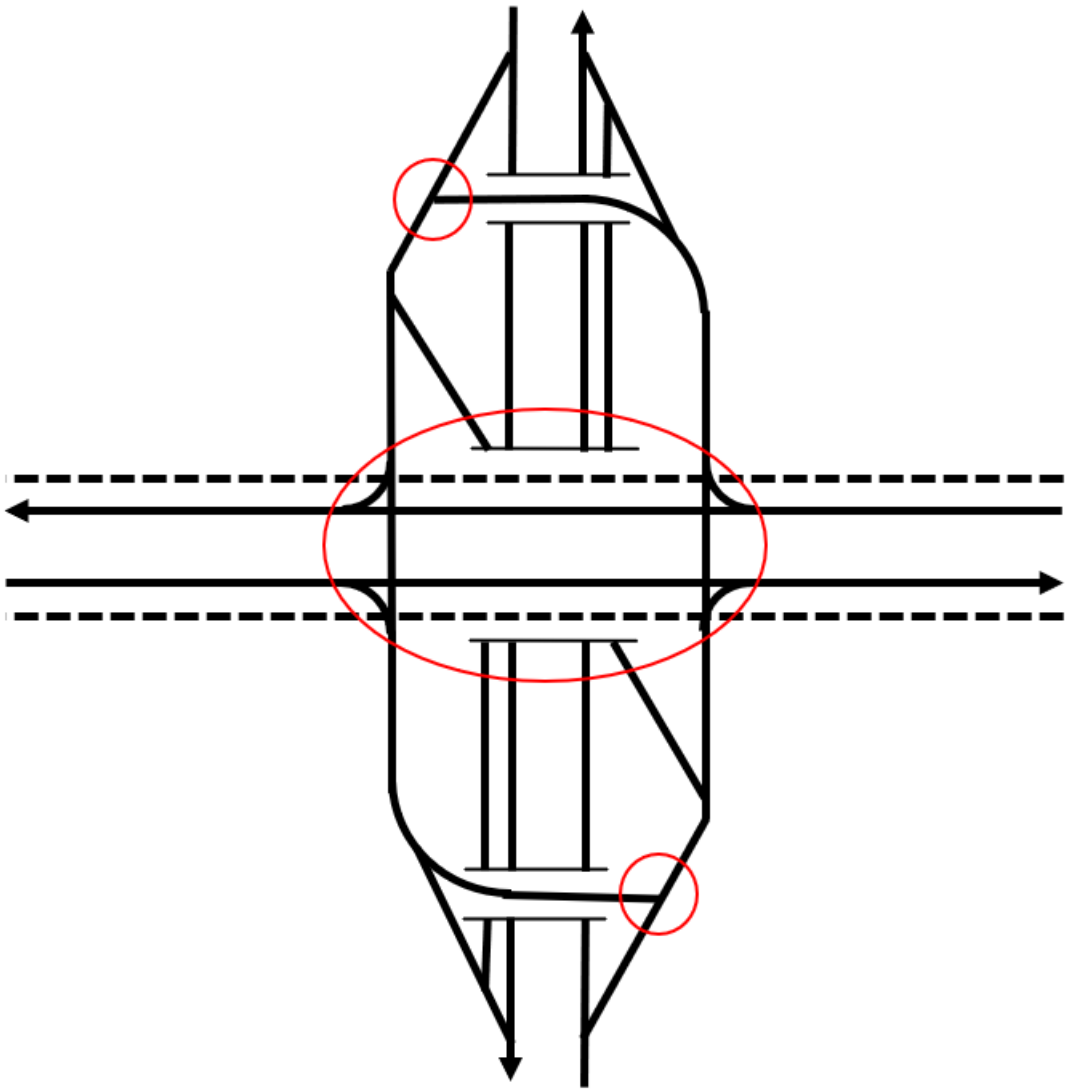
Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	5	0	4	3	4	3	3	3	0	1	2	9	17	6	32



llKK, U-Turn over Freeway with Slip U-Turn over Freeway

Summary: Provides poor safety and cost scores. Has great capacity but a number of serious drawbacks.
History: This is a new design.
Rank: 123 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
5	4	1	1	0	3	4	0	3	1	0	3	10	8	7	25



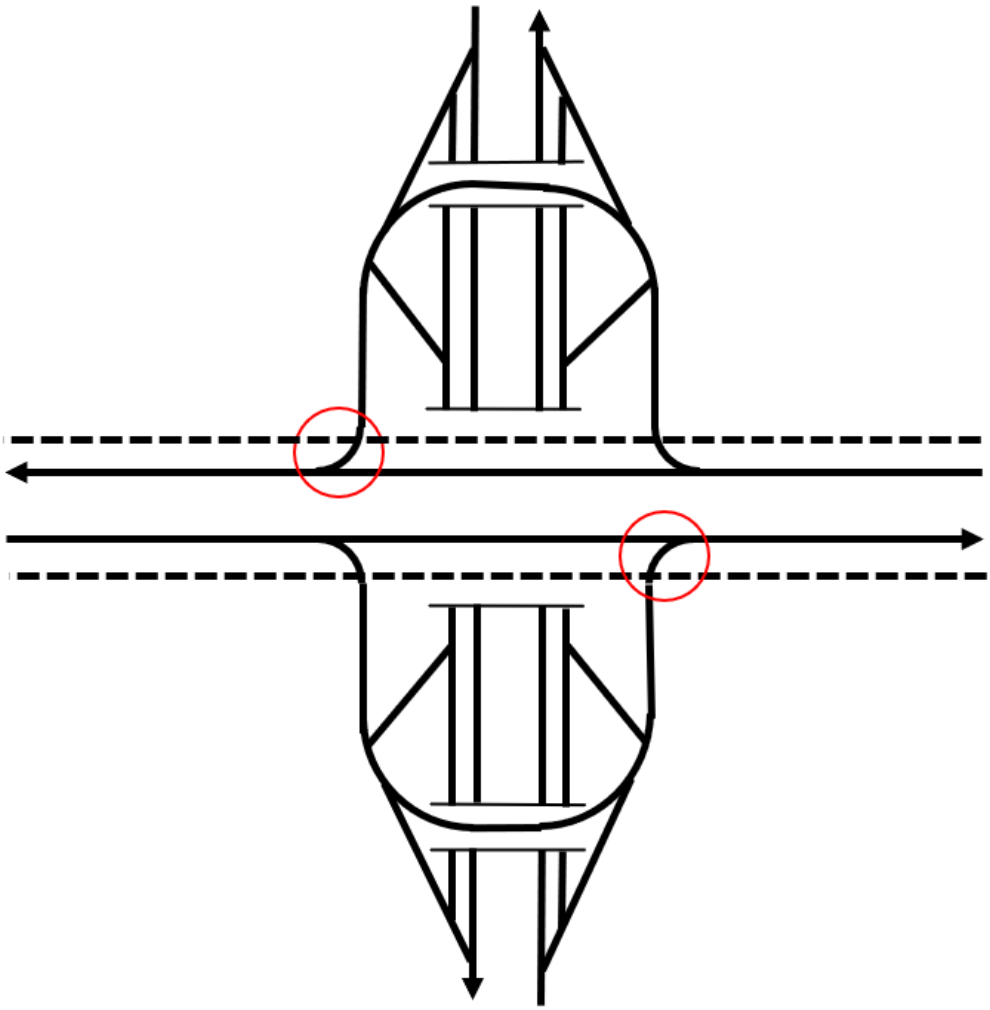
llLL, W

Summary: Supplies good efficiency but with poor cost performance. Requires lengthy travel distances, has a high number of unusual maneuvers, provides poor speed control, has a large right of way, and has a lengthy extent along the freeway.

History: First published by Thompson et. al., 2003.

Rank: 120 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
5	5	1	2	0	4	3	1	3	0	0	3	11	10	6	27



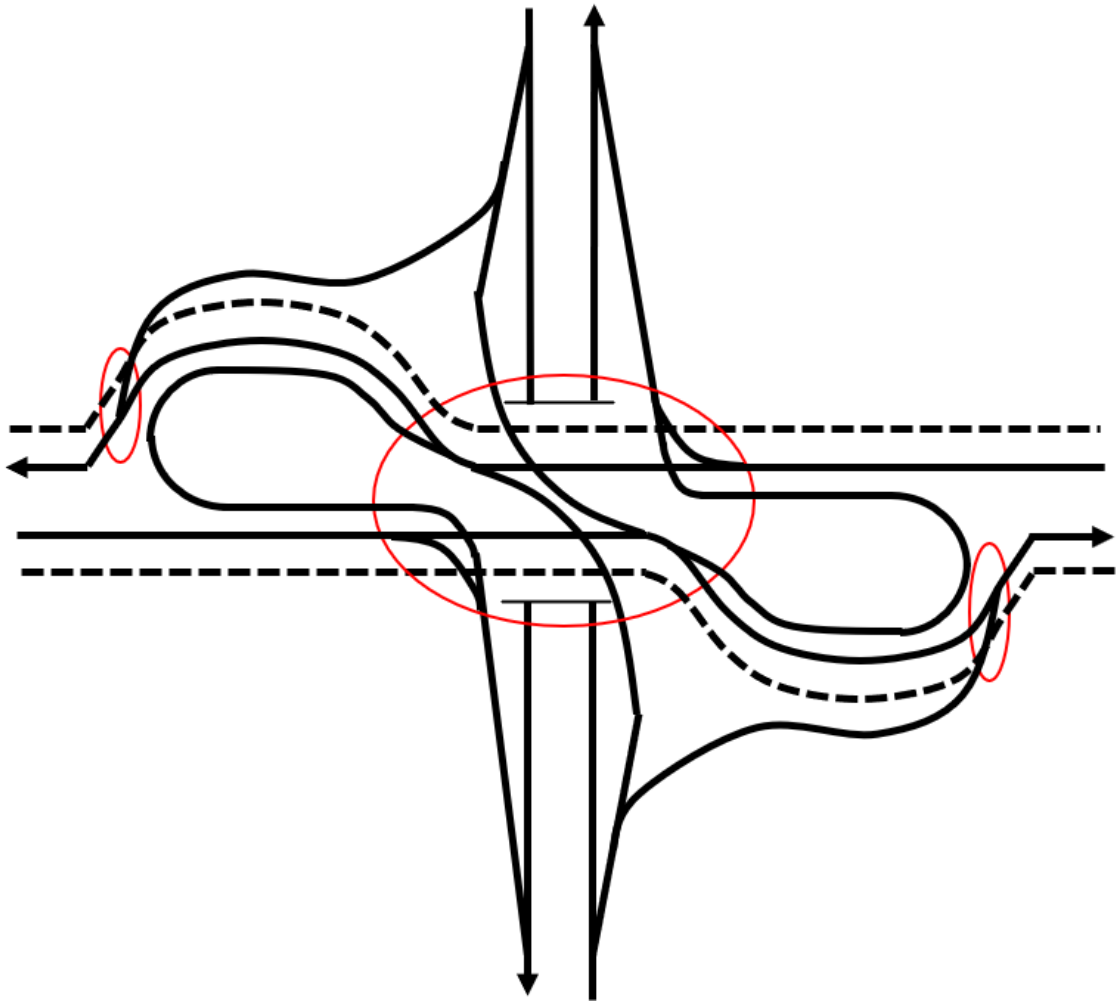
mmAA, St. Aug. Single Point

Summary: Supplies good efficiency and cost scores with short extents along the freeway and a small right of way. This may be the most promising of the designs that use Saint Augustine left turns.

History: This is a new design.

Rank: 5 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	4	4	2	4	2	4	5	3	4	5	2	12	17	14	43



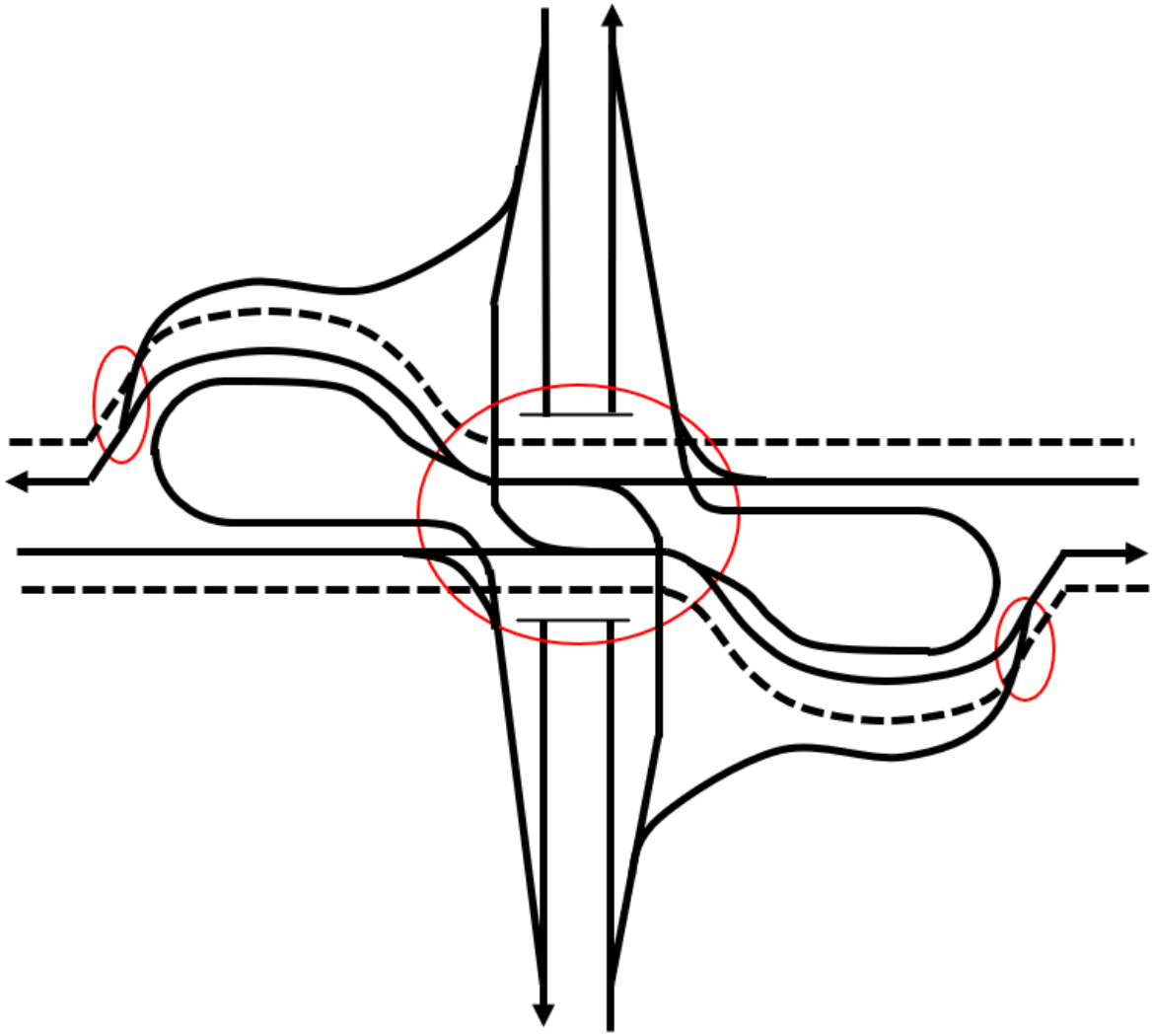
mmBB, St. Aug. Tight Diamond

Summary: Provides good cost scores with a small bridge, small right of way, and short extents along the freeway. Has excellent speed control but lower capacity.

History: This is a new design.

Rank: 15 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
1	3	4	2	4	2	4	5	5	4	5	2	8	17	16	41



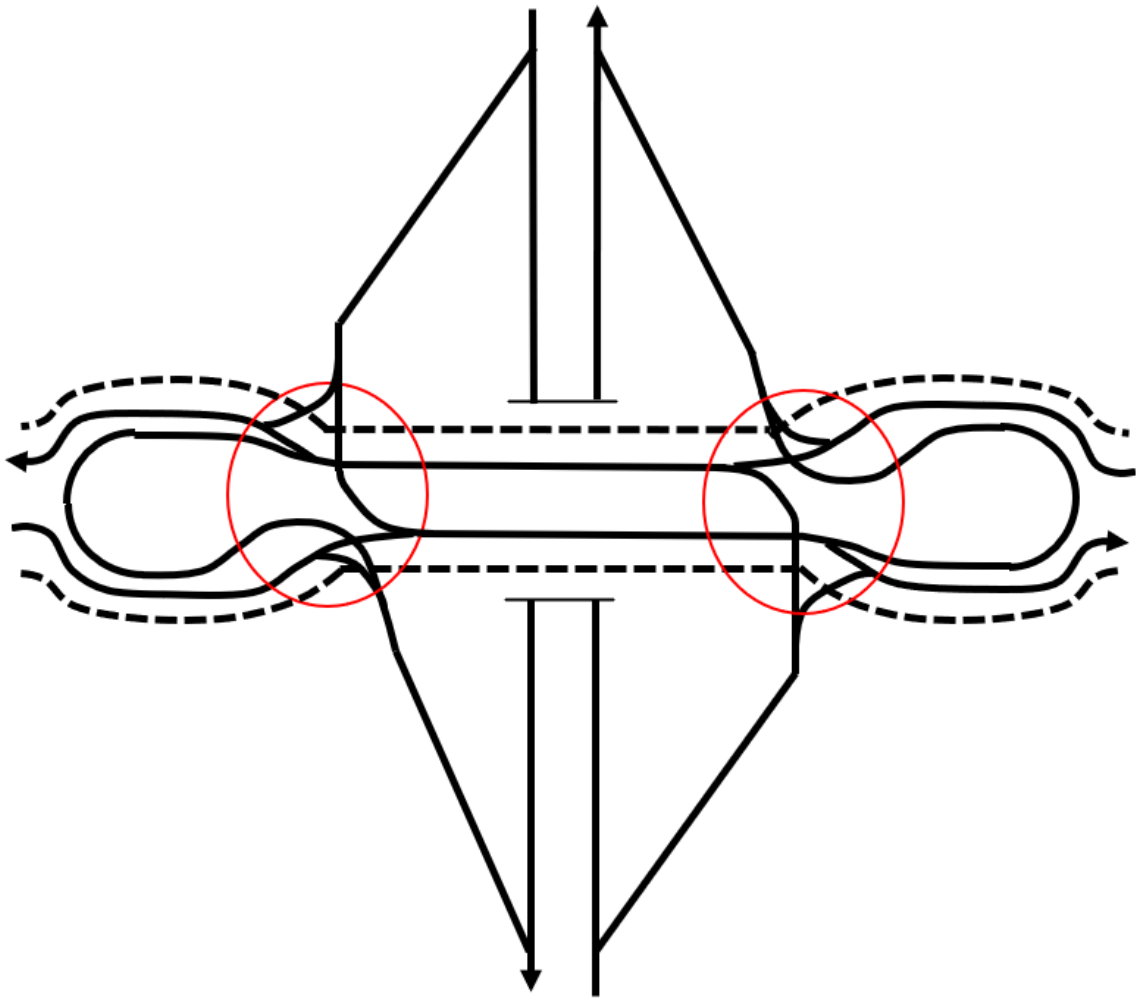
mmCC, St. Aug. Standard Diamond

Summary: Supplies average efficiency, safety, and cost performance. Requires a small bridge but a lengthy extent along the arterial.

History: One is open at I-95 and FL-16 west of Saint Augustine, FL.

Rank: 43 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	1	3	2	4	3	4	4	5	3	4	0	8	17	12	37



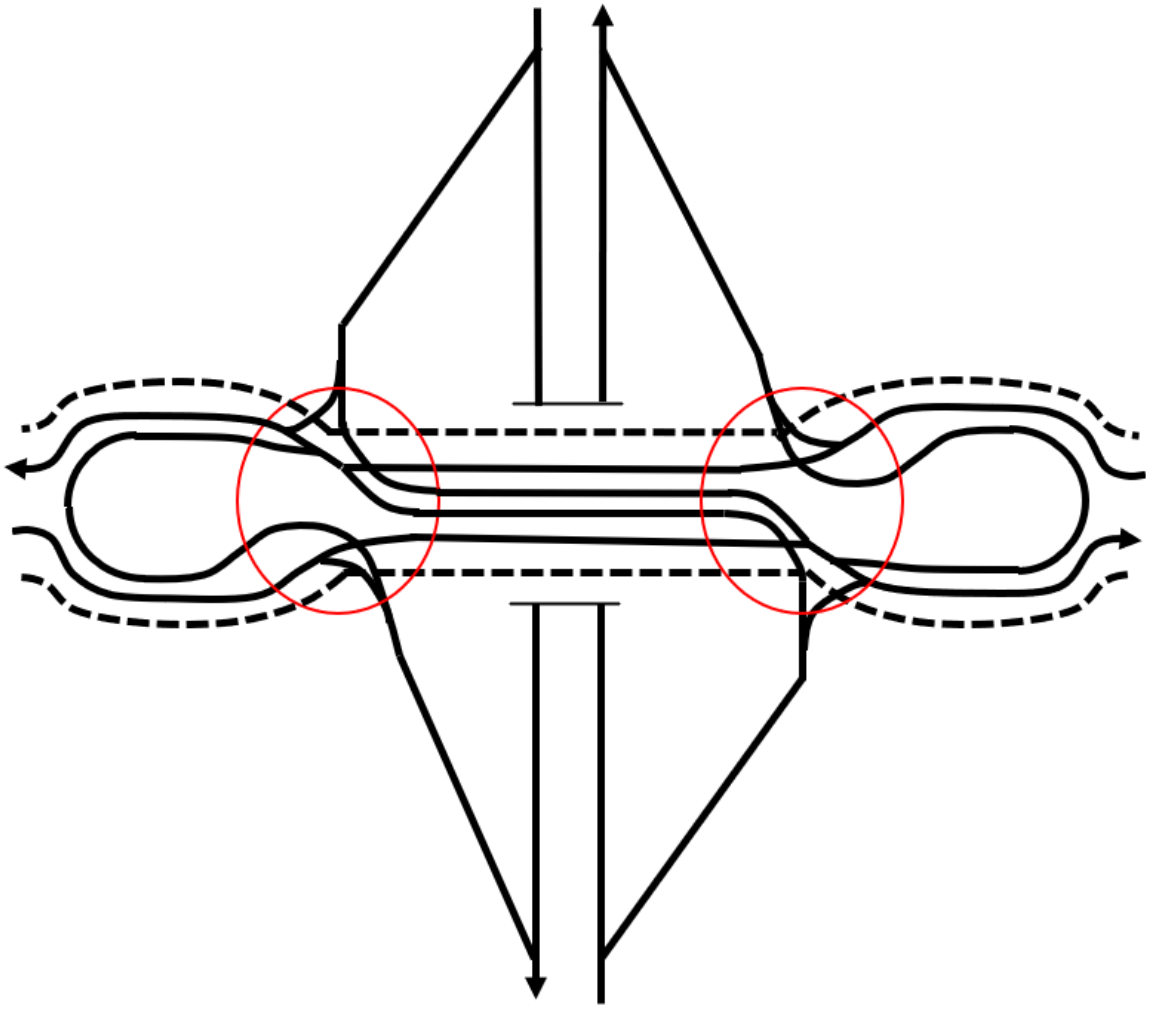
mmFF, St. Aug. Standard Contraflow

Summary: Supplies good efficiency and better-than-average safety performance. Has great progression and speed control but requires a lengthy extent along the arterial.

History: This is a new design.

Rank: 26 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	5	3	2	3	3	4	5	3	3	4	0	12	17	10	39



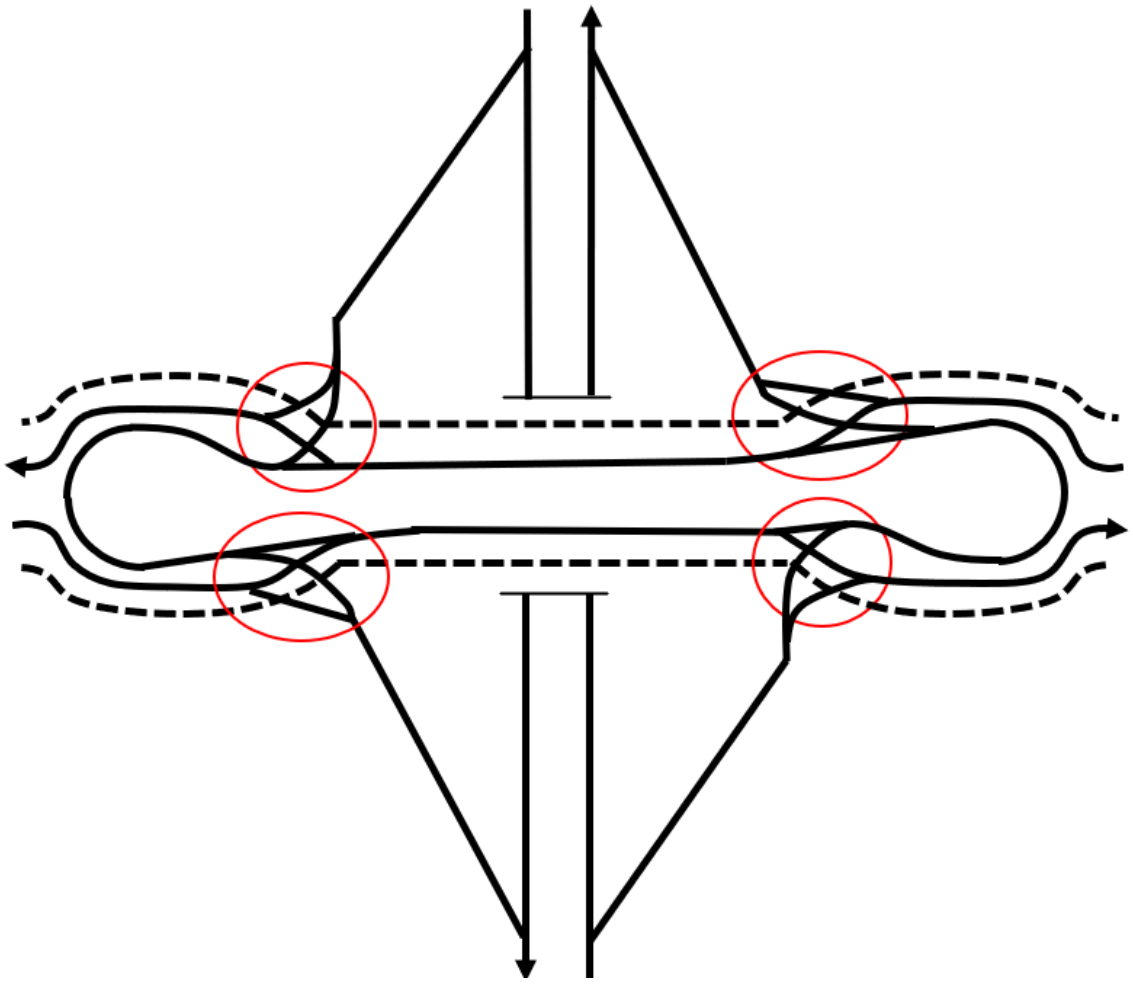
mmMM, St. Aug. St. Aug.

Summary: Supplies better-than-average efficiency and safety performance. Has great progression and speed control but requires a lengthy extent along the arterial.

History: This is a new design.

Rank: 28 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	5	1	1	3	4	4	5	4	3	4	0	10	17	11	38



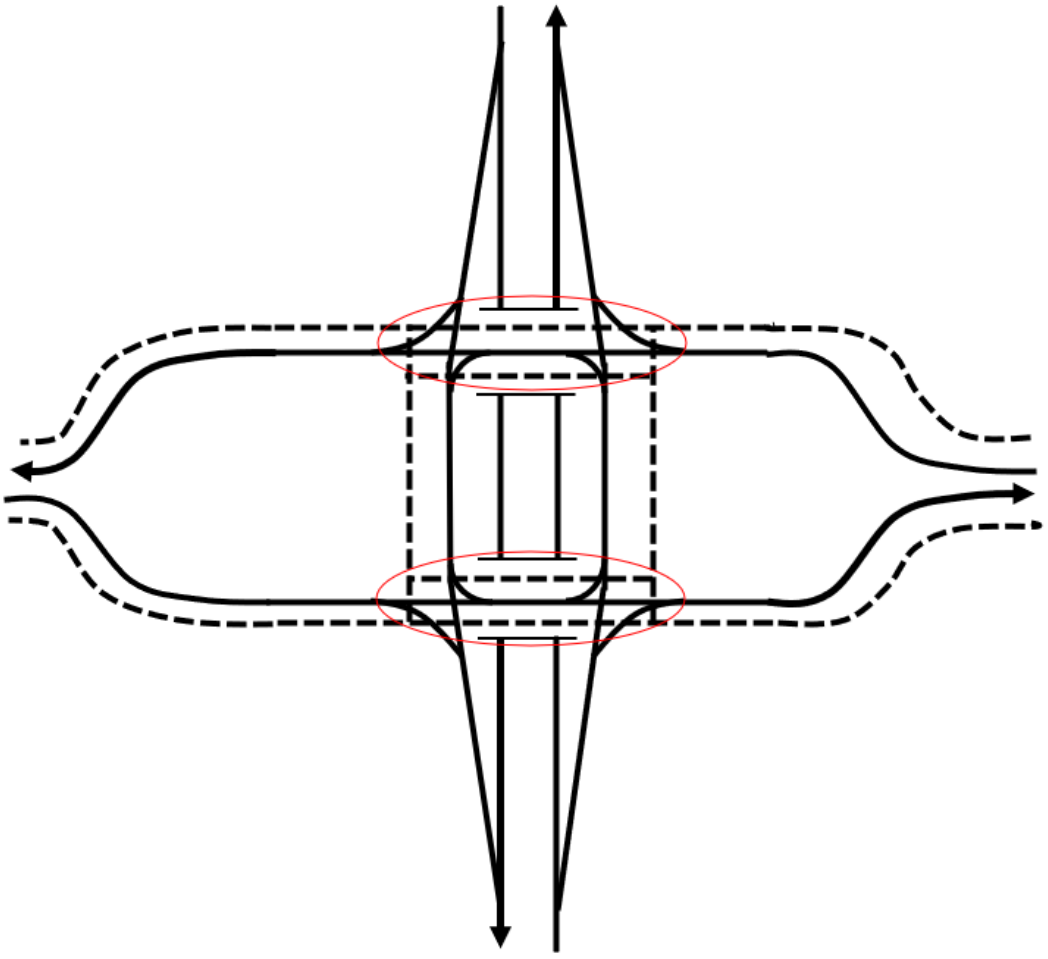
nnBB, Split Diamond Tight Diamond

Summary: Features strong scores across the board. The only low score is for the number of conflict points. The right of way need is not high because the area between the arterial one-way streets is developable.

History: This design is in operation in a few spots across the US, primarily in downtown areas at interchanges with one-way pairs.

Rank: 4 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
3	5	3	1	4	2	5	5	4	4	3	5	11	17	16	44



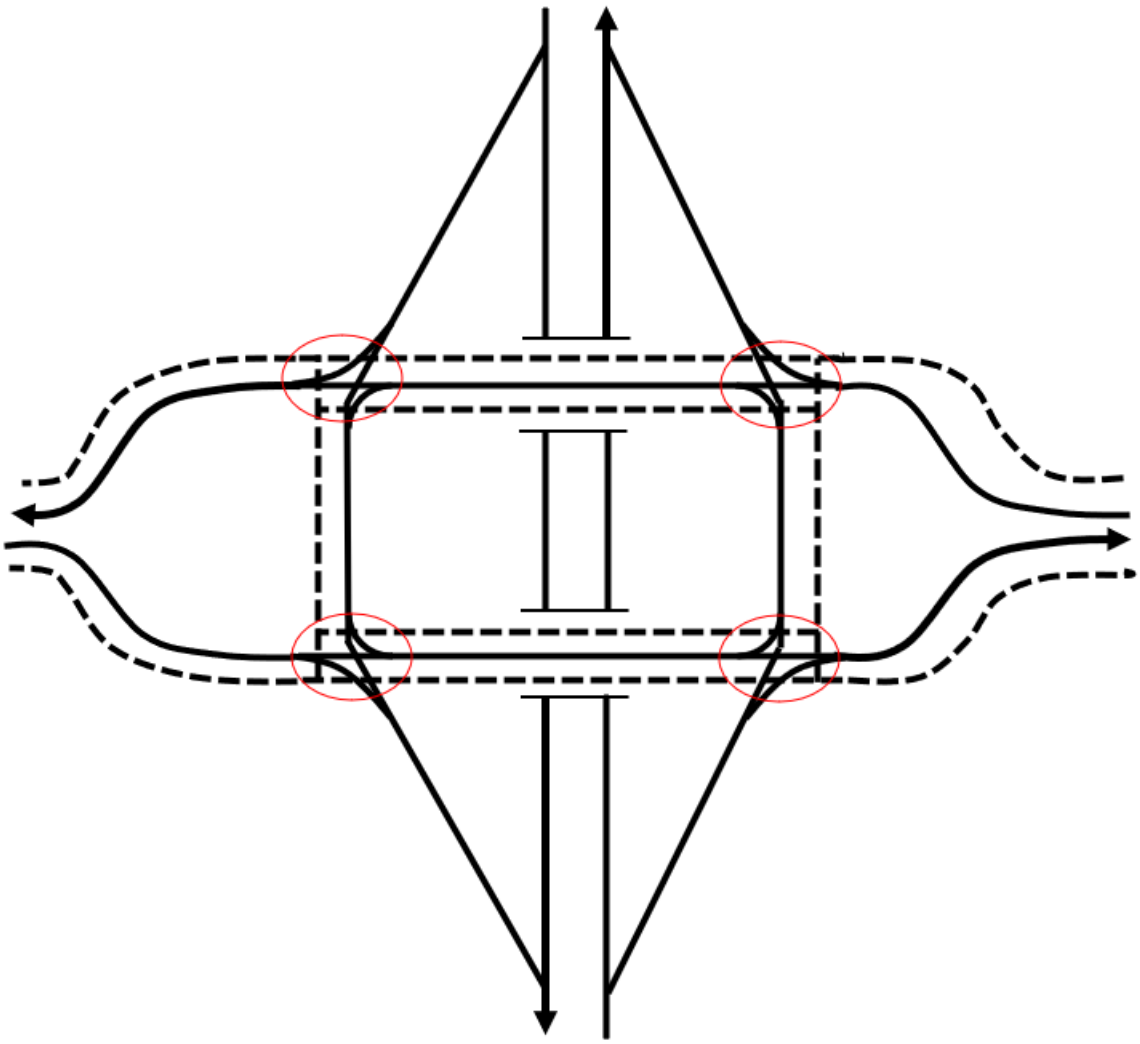
nnCC, Split Diamond Standard Diamond

Summary: Supplies average efficiency, safety, and cost performance. Provides great progression and speed control but requires lengthy travel distances and has a large number of conflict points.

History: This design is likely in place somewhere in the US.

Rank: 30 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	5	1	1	4	2	4	5	4	2	3	3	10	16	12	38



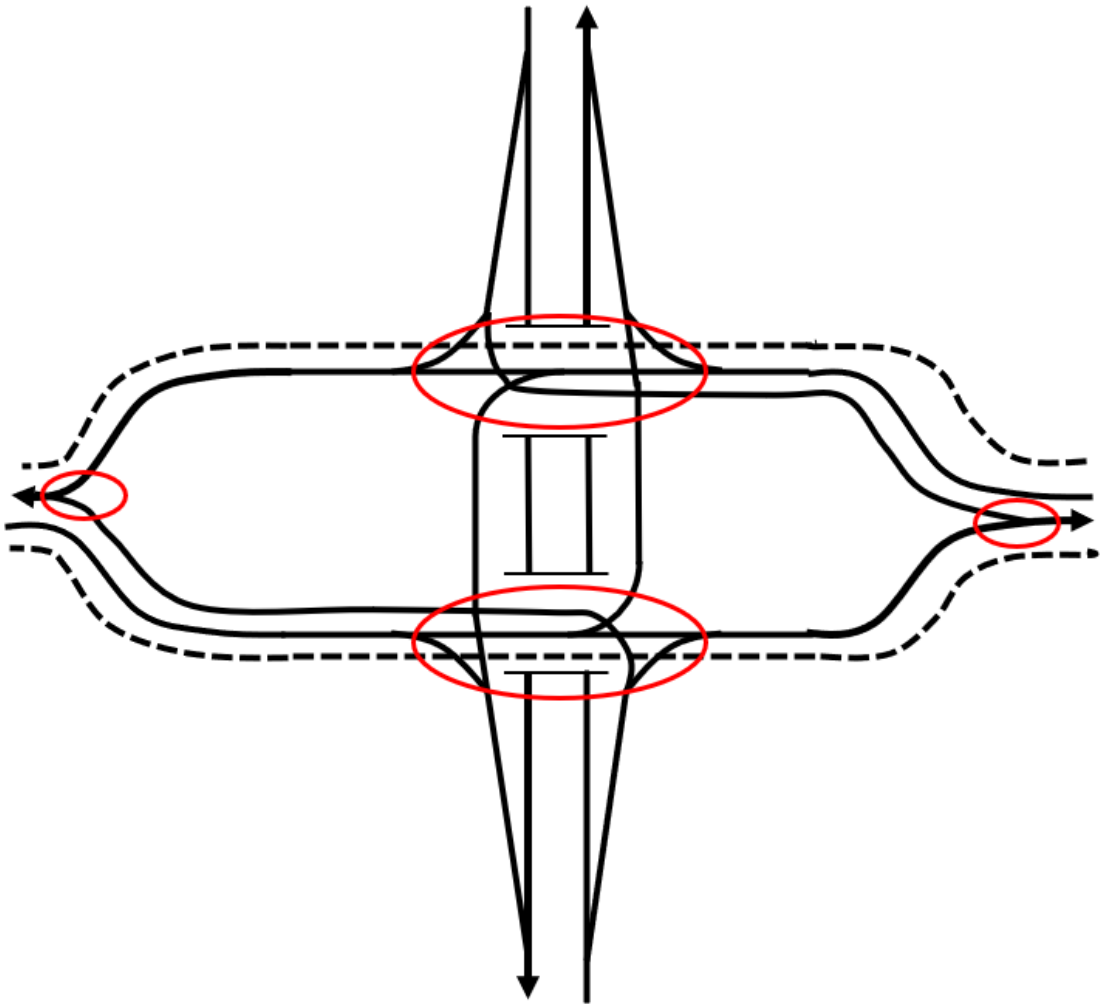
nnEE, Split Diamond Tight Contraflow

Summary: Features mostly strong scores. The only low score is for the number of conflict points. The right of way need is not high because the area between the arterial one-way streets is developable.

History: This is a new design.

Rank: 3 of 125.

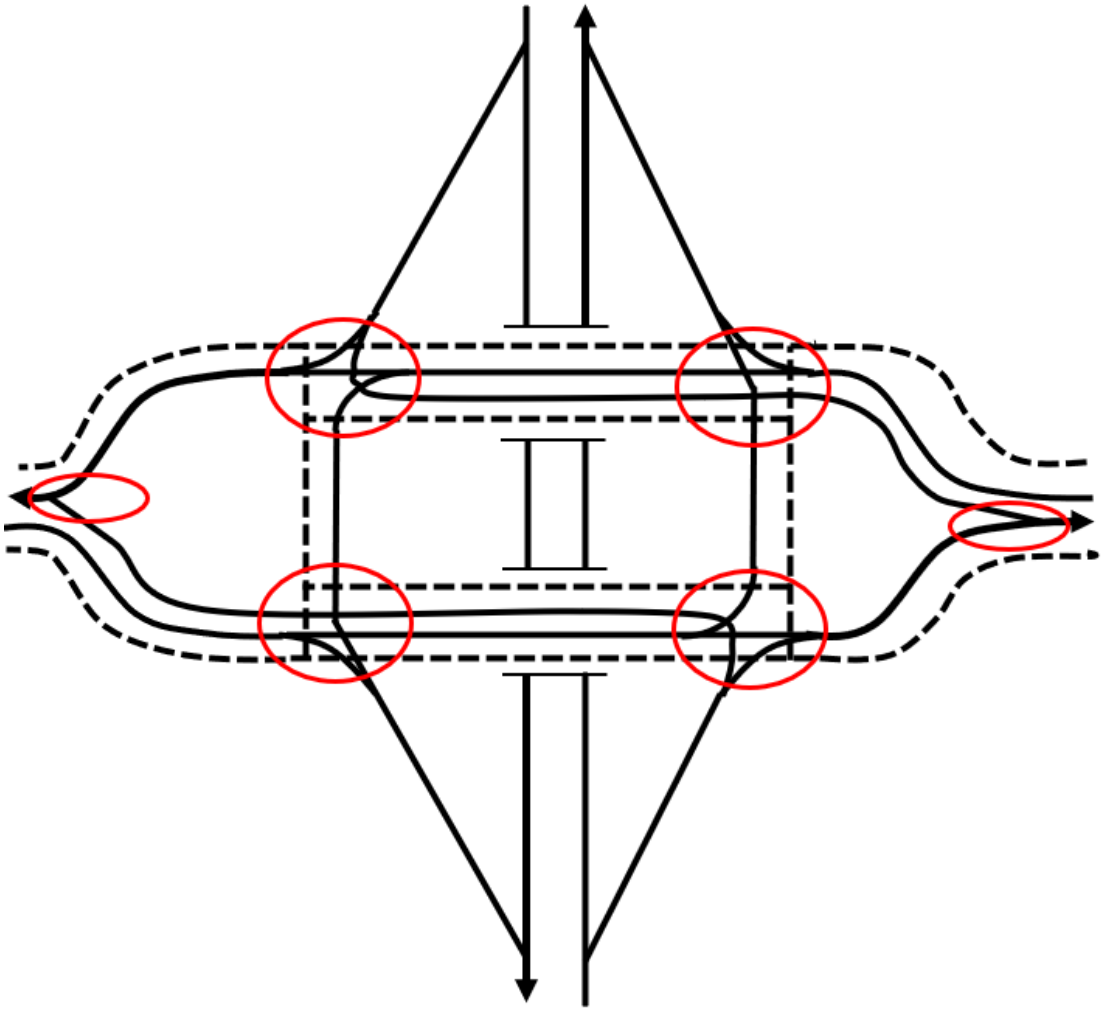
Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
3	5	4	0	4	3	5	5	3	4	3	5	12	17	15	44



nnFF, Split Diamond Standard Contraflow

Summary: Supplies above-average efficiency and safety scores. Has a large number of conflict points.
History: This is a new design.
Rank: 29 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	5	2	0	4	3	4	5	3	2	3	3	11	16	11	38



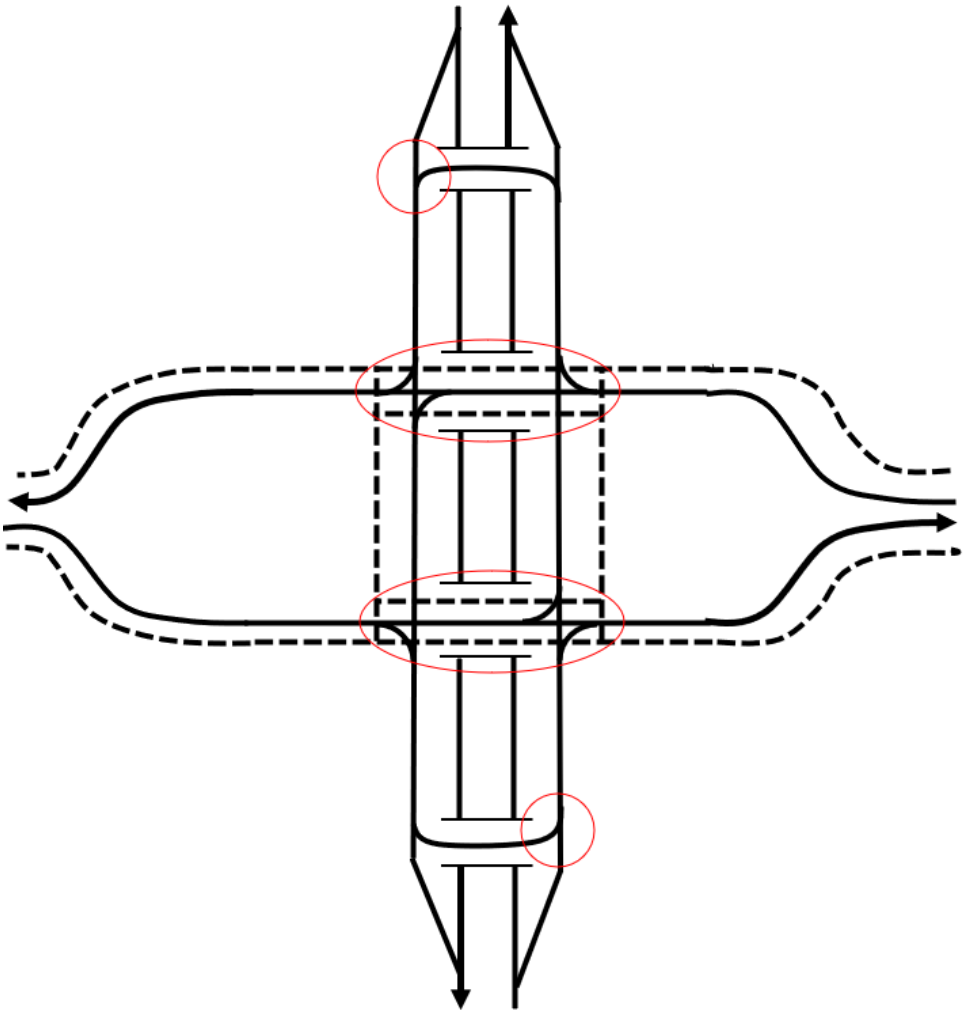
nnKK, Split Diamond U-Turn over Freeway

Summary: Provides good safety and cost performance. Results in lengthy travel distances, a high number of conflict points, and a lengthy extent along the freeway. The right of way need is not high because the area between the arterial one-way streets is developable.

History: This is a new design.

Rank: 31 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
2	5	1	1	3	3	5	5	4	3	1	5	8	17	13	38



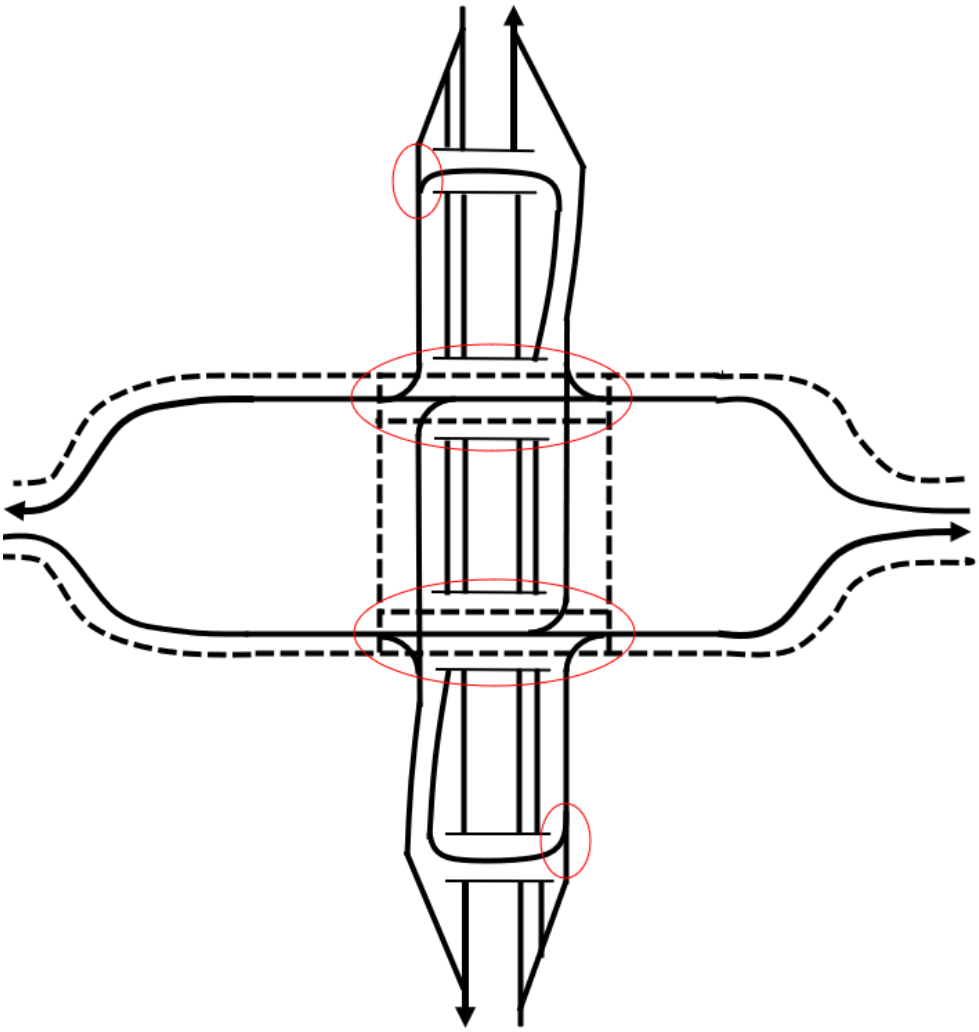
nnLL, Split Diamond U-Turn over Freeway with Slip

Summary: Provides good efficiency and exceptional safety performance. Requires lengthy extents along the freeway. The right of way need is not high because the area between the arterial one-way streets is developable.

History: This is a new design.

Rank: 6 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
5	5	1	3	5	3	5	5	3	2	0	5	11	21	10	42



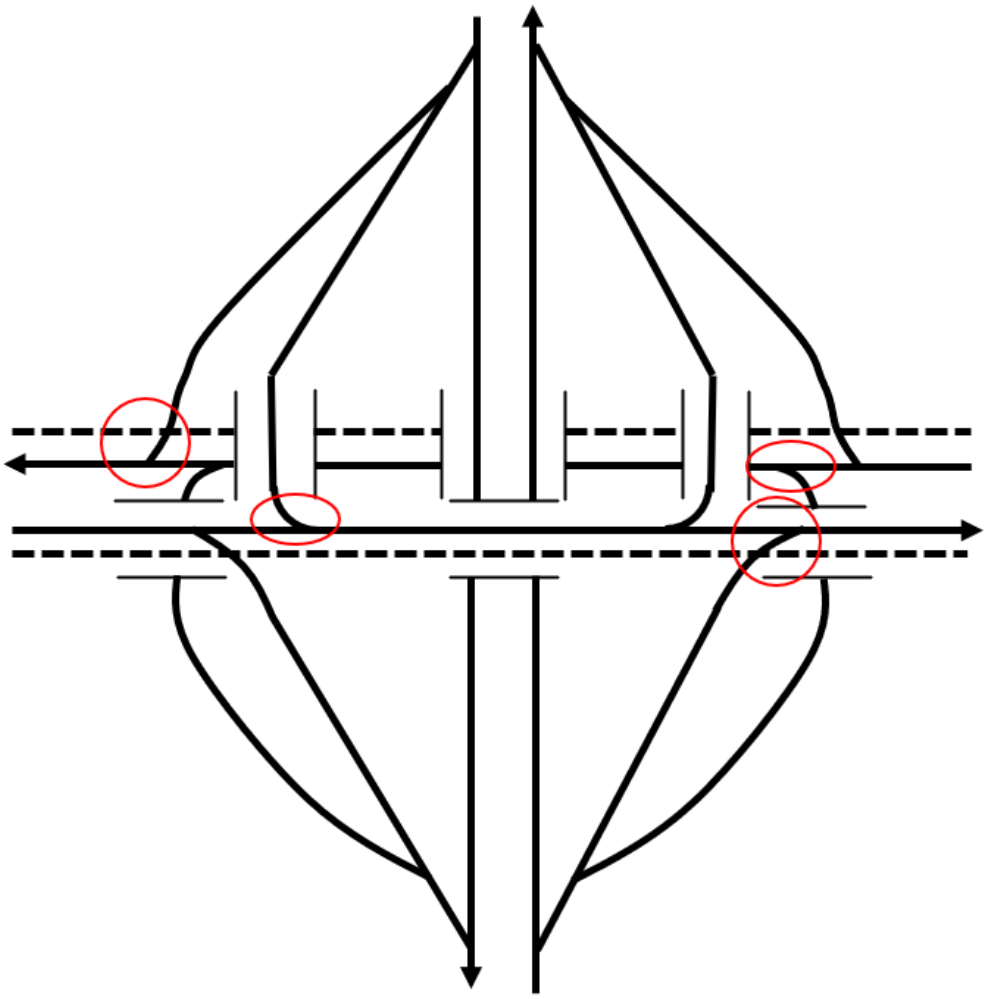
No Code, Over-Under

Summary: This should be a very efficient and safe design but with high costs. Has a large bridge and requires lengthy extents along the freeway and the arterial.

History: A version of this three-level concept is in operation at I-95 and FL-84 in Ft. Lauderdale, FL.

Rank: 58 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
4	5	4	4	5	3	3	3	0	3	1	0	13	18	4	35



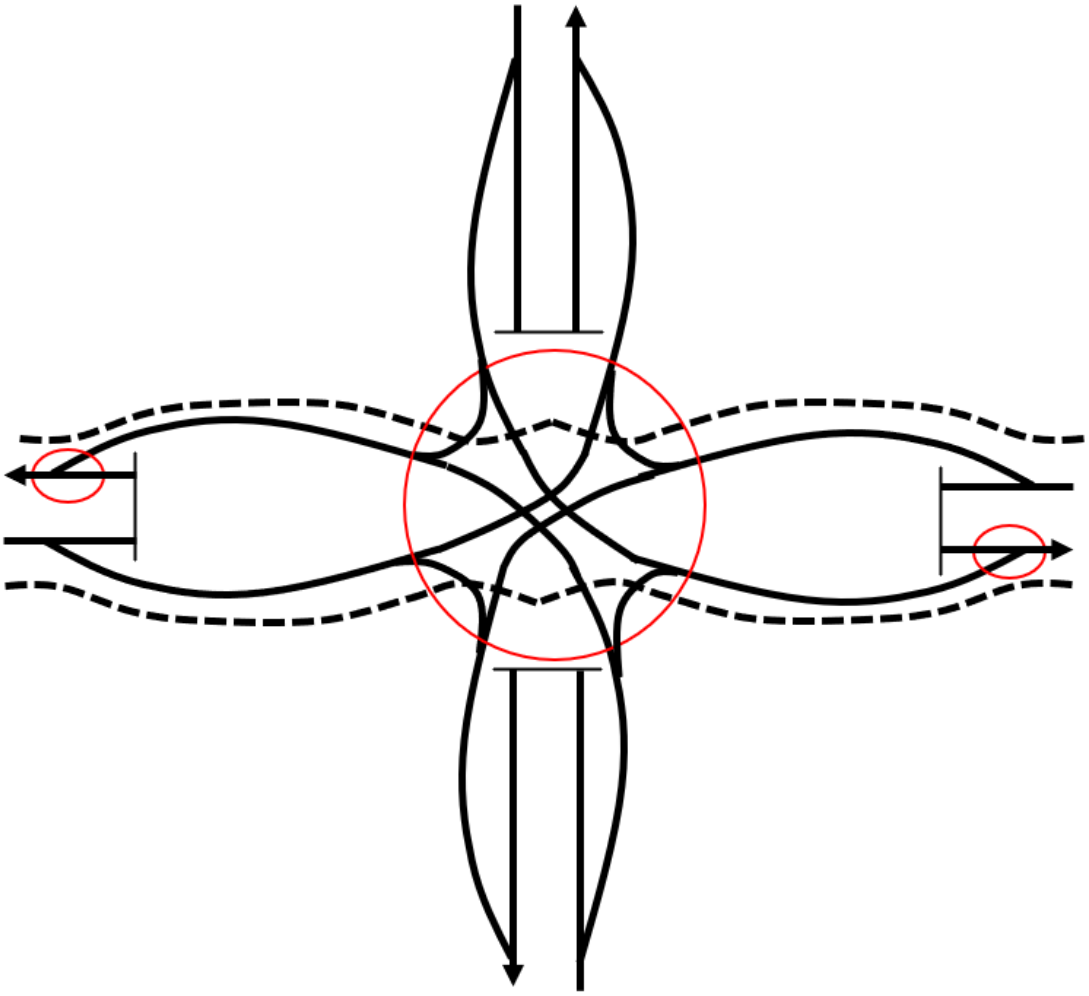
No Code, Three Level Center Turn

Summary: Meets ideal efficiency criteria but has poor cost performance. Requires two large bridges and a lengthy extent along the arterial.

History: This is a new design.

Rank: 45 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
5	5	5	2	5	2	2	4	0	4	3	0	15	15	7	37



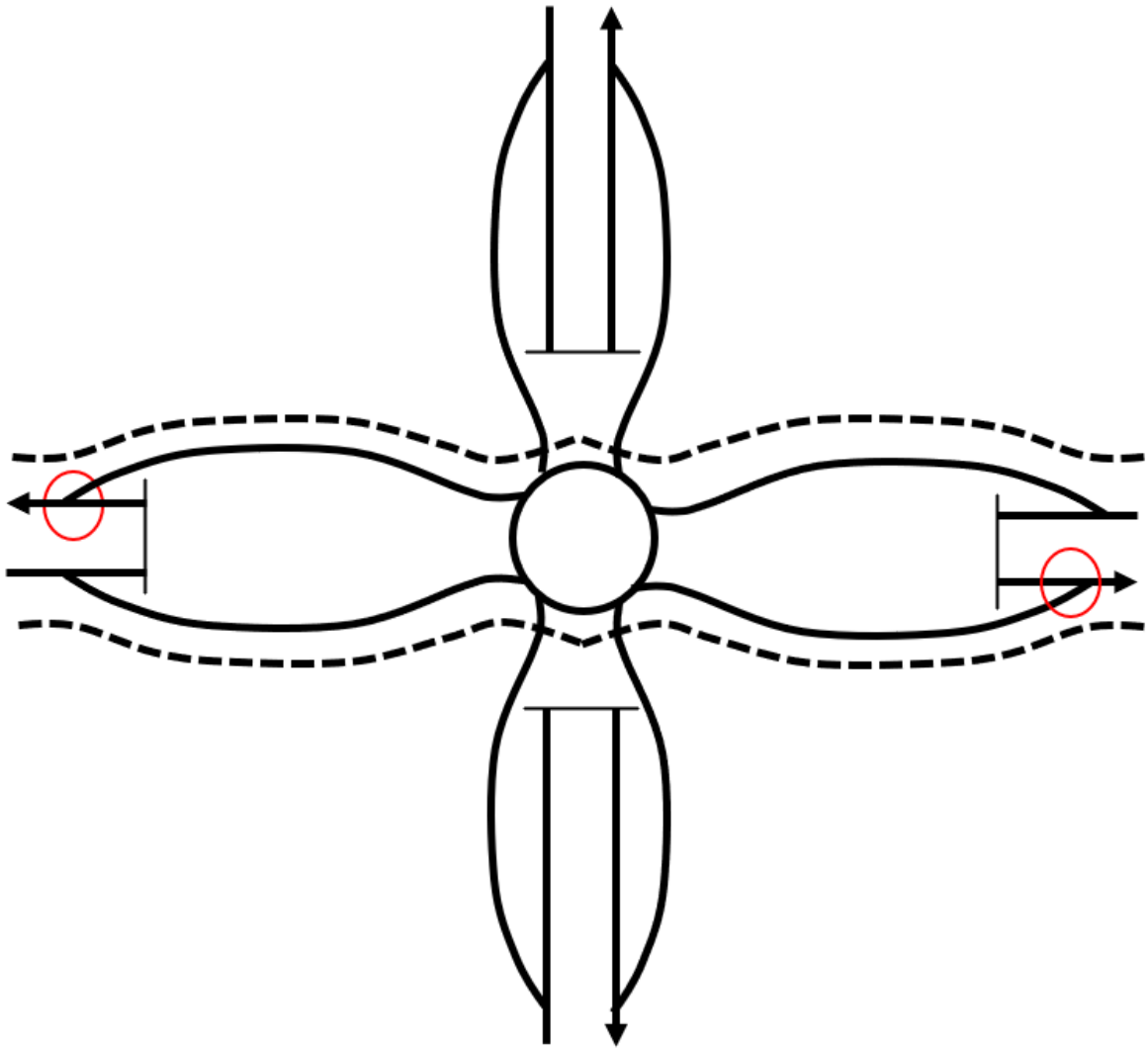
No Code, Three Level Roundabout

Summary: Meets ideal efficiency criteria and has good safety performance. Requires a large bridge and a lengthy extent along the arterial.

History: This is a new design in the US.

Rank: 27 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
5	5	5	4	5	4	3	1	0	4	3	0	15	17	7	39



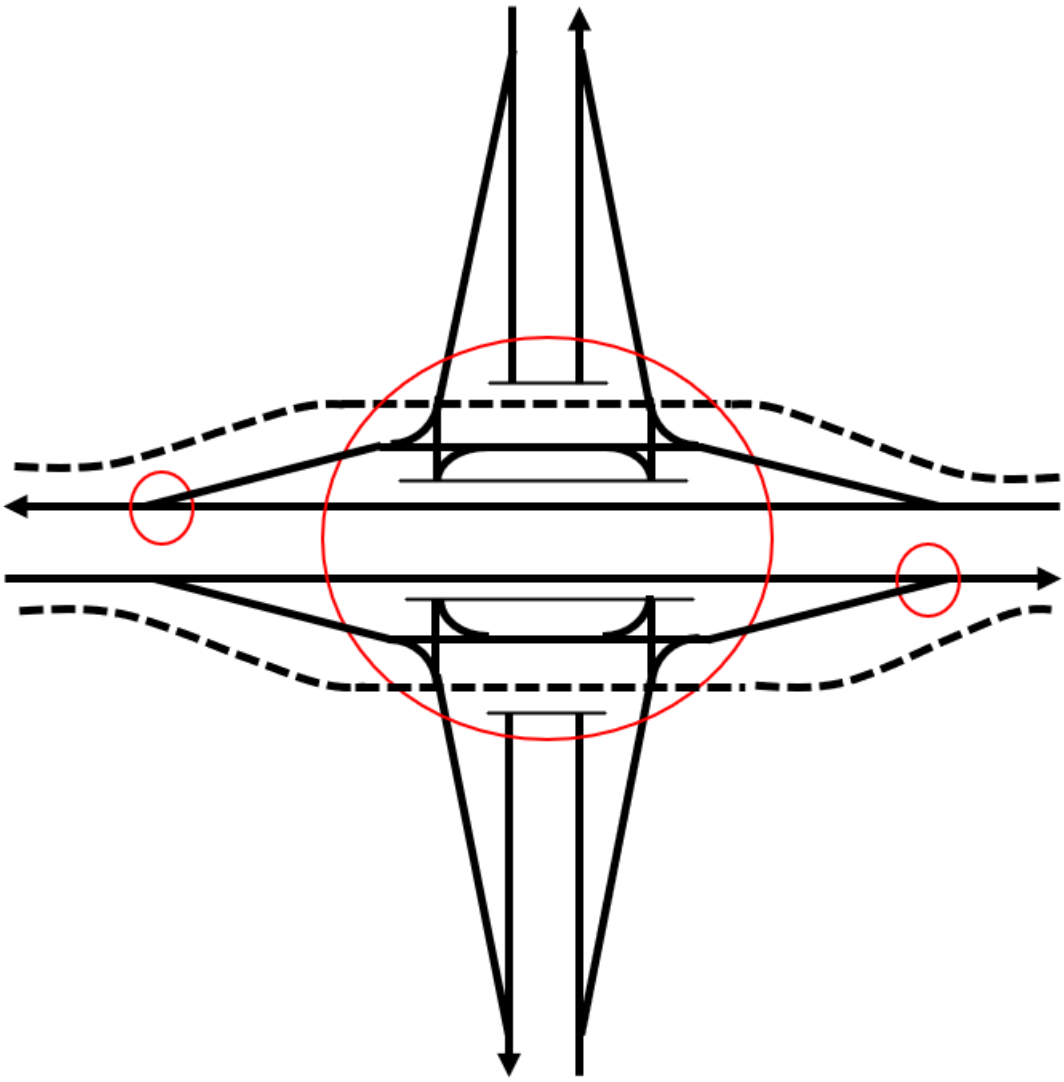
No Code, Three Level Traditional

Summary: Meets ideal efficiency criteria. Requires two large bridges, needs a long extent along the arterial, results in a large number of conflict points, and scores poorly for speed control.

History: First constructed in the 1960s, this is now a fairly common design built in over a dozen states.

Rank: 42 of 125.

Capacity	Progression	Distance Traveled	Conflict Points	Unusual Maneuvers	Wrong Way Potential	Pedestrian Quality	Speed Control	Bridge Size	Right of Way Size	Extent Along Freeway	Extent Along Arterial	Efficiency (of 15)	Safety (of 25)	Cost (of 20)	Total (of 60)
5	5	5	0	5	3	5	0	0	4	5	0	15	13	9	37



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