Route: US 30
Date of Information:

Date of Base Design Manual Information: 7/29/2011

February 23, 2012

Last Opudted 1/29/2011	Last Updated 7/29/2011			Preferred Values	Project Values	Comments
			Acceptable Values		Project Values	Comments
Design Element		Roadway Type  Expressways/ Freeways	Roadway Type  Expressways/ Freeways			
design speed (mph)			Cannot be less than the posted speed limit	70	70	
full depth paved width (ft)		outside lane	12	14', 12' if using full depth paved shoulders		
design lane width (ft)		inside lane(s)	12 12	12 12	12 12	
auxiliary-lane width (ft) (includes turn	lanes)		10	12	12	
parking-lane width (ft)	iai ies)		10	12	12	
pavement cross-slope (%)			1.5% minimum, 3% maximum	2%, However, when adjacent lanes slope in the same direction, increase slope by 0.5% per lane up to 3%	2%	
effective shoulder width and type (see	e Section 3C-4)		See Shoulder Tables	See Shoulder Tables	outside: 10' effective (4' paved, 4' granular) inside: 6' effective (4' paved, 2' granular)	
shoulder cross-slope (%)			not less than the adjacent lane, 2 to 6% for paved, 4 to 6% for granular, 6 to 8% for earth	4% unless shoulders will be used for staging or potential future lanes.	4%	
	adjacent to shoulder		3:1 10:1 for 4' then 6:1		10:1 for 4' then 6:1	
foreslope (see Roadway Typical Cross Sections)	beyond standard ditch depth and desi	gn clearzone	3:1	3.5:1	3.5:1	
	Curbed roadways		r 12' behind curbs, then not steeper that	steeper than 4.1	N/A	
normal outside ditch (depth x width) (fi	t)			5 x 10	5 x 10	
normal median ditch depth (ft)			3' minimum	4	4	
normal median width (ft) (if applicable)	)		no barrier: 50 barrier: 10	82	82	
(For cut areas greater than 25 feet, contact the Soils Design Section for assistance with backslope						
Backslope (For cut areas greater than 25 feet, co benches.)	ntact the Soils Design Section for assis	stance with backslope	2.5:1	3:1	3:1	
(For cut areas greater than 25 feet, co benches.)	ntact the Soils Design Section for assis	stance with backslope	2.5:1  design lane widths + effective shoulder widths	3:1  design lane widths + effective shoulder widths or curb to curb street width		
(For cut areas greater than 25 feet, co		stance with backslope	design lane widths + effective	design lane widths + effective shoulder widths or curb to curb street		
(For cut areas greater than 25 feet, cobenches.)  bridge width—new (ft)  bridge width—for Use as Constructed	bridges (ft) w/ drainage structures	stance with backslope	design lane widths + effective shoulder widths  design lane widths + 2 ft offset each side  6:1	design lane widths + effective shoulder widths or curb to curb street width	40' =12'+12'+6'+10' N/A	
(For cut areas greater than 25 feet, co benches.) bridge width—new (ft)	bridges (ft)  W/ drainage structures W/o drainage structures	stance with backslope	design lane widths + effective shoulder widths  design lane widths + 2 ft offset each side  6:1 6:1	design lane widths + effective shoulder widths or curb to curb street width  8:1  10:1	40' =12'+12'+6'+10' N/A 8:1 10:1	
(For cut areas greater than 25 feet, co benches.)  bridge width—new (ft)  bridge width—for Use as Constructed	bridges (ft) w/ drainage structures		design lane widths + effective shoulder widths  design lane widths + 2 ft offset each side  6:1 6:1 6:1 6:1	design lane widths + effective shoulder widths or curb to curb street width  8:1 10:1 6:1	40' =12'+12'+6'+10' N/A 8:1 10:1 6:1	
(For cut areas greater than 25 feet, co benches.)  bridge width—new (ft)  bridge width—for Use as Constructed	bridges (ft)  W/ drainage structures W/o drainage structures	stance with backslope	design lane widths + effective shoulder widths  design lane widths + 2 ft offset each side  6:1 6:1	design lane widths + effective shoulder widths or curb to curb street width  8:1 10:1 6:1 16.5	40' =12'+12'+6'+10' N/A 8:1 10:1	
(For cut areas greater than 25 feet, co benches.)  bridge width—new (ft)  bridge width—for Use as Constructed transverse slopes	bridges (ft)  w/ drainage structures  w/o drainage structures at sideroads	Over primary over non-primary	design lane widths + effective shoulder widths  design lane widths + 2 ft offset each side  6:1 6:1 6:1 16 14	design lane widths + effective shoulder widths or curb to curb street width  8:1 10:1 6:1 16.5 16.5 at interchange locations, 15 at all other locations	40' =12'+12'+6'+10' N/A 8:1 10:1 6:1 16.5 N/A	
(For cut areas greater than 25 feet, cobenches.) bridge width—new (ft) bridge width—for Use as Constructed transverse slopes	bridges (ft)  w/ drainage structures  w/o drainage structures at sideroads	Over primary over non-primary over railroad	design lane widths + effective shoulder widths  design lane widths + 2 ft offset each side  6:1  6:1  6:1  16  14  23.3	design lane widths + effective shoulder widths or curb to curb street width  8:1 10:1 6:1 16.5 at interchange locations, 15 at all other locations 23.3	8:1 10:1 6:1 16.5 N/A	
(For cut areas greater than 25 feet, cobenches.)  bridge width—new (ft)  bridge width—for Use as Constructed  transverse slopes  Vertical clearance (ft) (above lanes & shoulders)(see Section	bridges (ft)  w/ drainage structures  w/o drainage structures at sideroads	Over primary over non-primary	design lane widths + effective shoulder widths  design lane widths + 2 ft offset each side  6:1 6:1 6:1 16 14 23.3 17	design lane widths + effective shoulder widths or curb to curb street width  8:1 10:1 6:1 16.5 16.5 at interchange locations, 15 at all other locations 23.3 17.5	8:1 10:1 6:1 16.5 N/A N/A 17.5	
(For cut areas greater than 25 feet, cobenches.)  bridge width—new (ft)  bridge width—for Use as Constructed transverse slopes	bridges (ft)  w/ drainage structures  w/o drainage structures at sideroads	Over primary over non-primary over railroad	design lane widths + effective shoulder widths  design lane widths + 2 ft offset each side  6:1  6:1  6:1  16  14  23.3	design lane widths + effective shoulder widths or curb to curb street width  8:1 10:1 6:1 16.5 16.5 at interchange locations, 15 at all other locations 23.3	8:1 10:1 6:1 16.5 N/A	
(For cut areas greater than 25 feet, cobenches.)  bridge width—new (ft)  bridge width—for Use as Constructed  transverse slopes  Vertical clearance (ft) (above lanes & shoulders)(see Section	bridges (ft)  w/ drainage structures  w/o drainage structures at sideroads	Over primary over non-primary over railroad	design lane widths + effective shoulder widths  design lane widths + 2 ft offset each side  6:1 6:1 6:1 16 14 23.3 17	design lane widths + effective shoulder widths or curb to curb street width  8:1 10:1 6:1 16.5 16.5 at interchange locations, 15 at all other locations 23.3 17.5	8:1 10:1 6:1 16.5 N/A N/A 17.5	

#### Route: IA 21 & US 218 Date of Information:

Date of Base Design Manual Information: 7/29/2011

February 23, 2012

Last Updated 7/29/2011			Acceptable Values	Preferred Values	Project Values	Comments
2401 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			Roadway Type	Roadway Type	110000 10000	Comments
Design Element		Rural Two-Lane Highways	Rural Two-Lane Highways			
design speed (mph)			Cannot be less than the posted speed limit	60	60	
full depth paved width (ft)		outside lane	12	14	14	
design lane width (ft)		inside lane(s)	11	12	12	
auxiliary-lane width (ft) (includes turn	lanes)		10	12	12	
parking-lane width (ft)	anco		10	12	12	
pavement cross-slope (%)				2%, However, when adjacent lanes slope in the same direction, increase slope by 0.5% per lane up to 3%		
effective shoulder width and type (see	Section 3C-4)		See Shoulder Tables	See Shoulder Tables	10' effective (4' paved, 4' granular)	Assume 2' of outside 14' lane included
shoulder cross-slope (%)			lane, 2 to 6% for paved, 4 to 6% for granular, 6 to 8% for earth	4	4%	
	adjacent to shoulder		3:1	10:1 for 4' then 6:1	10:1 for 4' then 6:1	
foreslope (see Roadway Typical Cross Sections)	beyond standard ditch depth and design clearzone		3:1	3.5:1	3.5:1	
	Curbed roadways		behind curbs, then not steep	4% toward roadway for 12', then not steeper than 4:1	N/A	
normal outside ditch (depth x width) (fi	t)			5 x 10	5 x 10	
normal median ditch depth (ft)					4	
normal median width (ft) (if applicable)					N/A	
Backslope (For cut areas greater than 25 feet, co benches.)	ntact the Soils Design Section for assis	stance with backslope	2.5:1	3:1	3:1	
bridge width—new (ft)			design lane widths + effective shoulder widths	design lane widths + effective shoulder widths or curb to curb street width	44' =12'+12'+10'+10'	
bridge width—for Use as Constructed	bridges (ft)		design lane widths + 2 ft offset each side		N/A	
	w/ drainage structures		6:1	8:1	8:1	
	w/o drainage structures		6:1	10:1	10:1	
	at sideroads		6:1	6:1	6:1	
		Over primary	16	16.5	16.5	
Vertical clearance (ft)     over non-primary       (above lanes & shoulders)(see Section 8A-2)     over railroad		over non-primary	14	16.5 at interchange locations, 15 at all other locations	N/A	
		23.3	23.3	N/A		
sign truss		17	17.5	17.5		
Structural Capacity			tact Office of Bridges and Struct		N/A	
Level of Service		В		В		

#### Project Number: NHS-030-6(87)--19-06 Route: US 30 Interchanges (IA 21 & US 218)

Date of Information:

February 23, 2012

Last Updated 7/29/2011			Acceptabl	e Values	Preferre	d Values		Project	t Values			Comments
			Roadwa		Roadwa			One				
			Ram	ips	Rar	mps	Exit F	Ramp	Entran	ce Ramp	]	
	Design Element		one lane	two lanes	Loops	one lane	Curve near free flow terminal	Loops				
design speed (mph)							60	45	60	40	30	
full depth paved width (ft)		outside lane inside lane(s)	See Ramp	o Tables	See Ram	ip Tables			16		18	
design lane width (ft)									16		18	
auxiliary-lane width (ft) (includes turn parking-lane width (ft)	lanes)		10	10	1	2		1	12		N/A	
parking-iane width (it)											N/A	
pavement cross-slope (%)			1.5% minimum,	3% maximum	2	%			2%		1	
effective shoulder width and type (see	e Section 3C-4)		See Ramp		See Ram	p Tables		4' granular (left),	6' granular (right)		4' paved (left), 6' paved (right)	
shoulder cross-slope (%)			not less than the a 6% for paved, 4 to 6 to 8% fo	6% for granular, 6	4	4			4%			
	adjacent to shoulder		4:1 for interstates	s, 3:1 for others	10:1 for 4	then 6:1			10:1 for 4' then 6:1			
foreslope (see Roadway Typical Cross Sections)	beyond standard ditch depth and design	gn clearzone	3:	1	3.5	5:1			3.5:1			
	Curbed roadways		not steepe	r than 3:1		surbed roadways are not preferred			N/A			
normal outside ditch (depth x width) (fi	t)		-		5 x				5 x 10			
normal median ditch depth (ft)			-		-	-			-			
normal median width (ft) (if applicable)	1								-			
Backslope (For cut areas greater than 25 feet, co benches.)	ntact the Soils Design Section for assist	stance with backslope	2.5:1		3:1		3:1					
bridge width—new (ft)			design lane widths + widt	effective shoulder hs	design lane widths wid	+ effective shoulder lths	N/A					
bridge width—for Use as Constructed			design lane widths sid	е					N/A			
	w/ drainage structures		6:		8		8:1					
transverse slopes	w/o drainage structures		6:		10		10:1					
	at sideroads	0	6:		6:		6:1					
Vertical clearance (ft)		Over primary over non-primary	16		16.5 at interchange	6.5 locations, 15 at all			N/A N/A			
(above lanes & shoulders)(see Section 8A-2)		23.		other lo				N/A				
sign truss		17			.5			17.5				
Structural Capacity		Contact Office of Brid						N/A				
Level of Service					-							
			•									

Project Number: NHS-030-6(87)--19-06 Route: 21st Ave (South)

Date of Information:

October 22, 2012

Last Updated 7/29/2011			Project Values	Comments
Design Element				
design speed (mph)			60 Level, 50 Rolling	
design lane width (ft)			12	
<del>pavement</del> cross-slope (%)			2%	
effective shoulder width and type (see	Section 3C-4)		8	I.M.3.210 Design Aids For Rural Collectors (p.2)
shoulder cross-slope (%)			4%	
foreslope	adjacent to shoulder		4:1	I.M.3.210 Design Aids For Rural Collectors (p.2)
(see Roadway Typical Cross Sections)	beyond standard ditch depth and desi	gn clearzone	4:1	
normal outside ditch (depth x width) (ft	)		5 x 10	
Backslope (For cut areas greater than 25 feet, cor benches.)	ntact the Soils Design Section for assis	stance with backslope	3:1	
bridge width—for Use as Constructed I	bridges (ft)		N/A	
	w/ drainage structures		8:1	
	w/o drainage structures		10:1	
	at sideroads		6:1	
Vertical clearance (ft)		Over primary	N/A	
(above lanes & shoulders)(see Section	(above lanes & shoulders)(see Section 8A-2) over non-primary		N/A	
Structural Capacity			N/A	
Level of Service				

Route: 13th Ave (South), 15th Ave/V42 (North), 21st Ave/V66 (North)

Date of Information: October 23, 2012

Last Updated 7/29/2011			Project Values	Comments
Design Element				
design speed (mph)			55 Level, 50 Rolling	
design lane width (ft)			11	
<del>pavement</del> cross-slope (%)			2%	
effective shoulder width and type (see	e Section 3C-4)		6	I.M.3.210 Design Aids For Rural Collectors (p.2)
shoulder cross-slope (%)			4%	
foreslope	adjacent to shoulder		3:1	I.M.3.210 Design Aids For Rural Collectors (p.2)
(see Roadway Typical Cross Sections)	beyond standard ditch depth and desi	gn clearzone	3:1	
normal outside ditch (depth x width) (ff	t)		5 x 10	
Backslope (For cut areas greater than 25 feet, co benches.)	ntact the Soils Design Section for assis	stance with backslope	3:1	
bridge width—for Use as Constructed	bridges (ft)		N/A	
	w/ drainage structures		8:1	
transverse slopes	w/o drainage structures		10:1	
	at sideroads	To .	6:1	
Vertical clearance (ft)		Over primary	N/A	
(above lanes & shoulders)(see Section 8A-2) over non-primary			N/A	
Structural Capacity			N/A	
Level of Service				

Project Number: NHS-030-6(87)--19-06 Route: V44/16th Ave

Date of Information:

October 23, 2012

Last Updated 7/29/2011			Project Values	Comments
Design Element				
design speed (mph)			55 Level, 45 Rolling	
design lane width (ft)			11	
pavement cross-slope (%)			2%	
effective shoulder width and type (see	e Section 3C-4)		6	I.M.3.210 Design Aids For Rural Collectors (p.2)
shoulder cross-slope (%)			4%	
foreslope	adjacent to shoulder		3:1	I.M.3.210 Design Aids For Rural Collectors (p.2)
(see Roadway Typical Cross Sections)	beyond standard ditch depth and des	sign clearzone	3:1	
normal outside ditch (depth $\times$ width) (ff	)		5 x 10	
Backslope (For cut areas greater than 25 feet, co benches.)	ntact the Soils Design Section for ass	istance with backslope	3:1	
bridge width—for Use as Constructed	bridges (ft)		N/A	
	w/ drainage structures		8:1	
transverse slopes	w/o drainage structures		10:1	
	at sideroads	0	6:1	
Vertical clearance (ft) (above lanes & shoulders)(see Section 8A-2)  Over primary  over non-primary		N/A N/A		
Structural Capacity  Level of Service			N/A	

Project Number: NHS-030-6(87)--19-06
Route: 11th Ave Dr (South), 13th Ave (north), 14th Ave (North), 15th Ave, 17th Ave Drive, 19th Ave, 24th Ave

Date of Information: October 22, 2012

Last Updated 7/29/2011			Project Values	Comments
Design Element				
design speed (mph)			55 Level, 45 Rolling	
design lane width (ft)			10	
<del>pavement</del> cross-slope (%)			3%	
effective shoulder width and type (se	e Section 3C-4)		4	I.M.3.210 Design Aids For Rural Collectors (p.2)
shoulder cross-slope (%)			3%	
foreslope	adjacent to shoulder		3:1	I.M.3.210 Design Aids For Rural Collectors (p.2)
(see Roadway Typical Cross Sections)	beyond standard ditch depth and des	ign clearzone	3:1	
normal outside ditch (depth × width) (f	t)		5 x 10	
Backslope (For cut areas greater than 25 feet, co benches.)	ntact the Soils Design Section for assis	stance with backslope	3:1	
bridge width—for Use as Constructed	bridges (ft)		N/A	
	w/ drainage structures		8:1	
transverse slopes	w/o drainage structures		10:1	
	at sideroads		6:1	
Vertical clearance (ft)		Over primary	N/A	
(above lanes & shoulders)(see Section	<u>1 8A-2)</u>	over non-primary	N/A	
Structural Capacity	-		N/A	
Level of Service				

11th Ave, 11th Ave Dr (North), 12th Ave, 14th Ave (South), Route: 14th Ave Dr, 16th Ave (South), 17th Ave, 18th Ave, 20th

Ave, 22nd Ave, 23rd Ave

Date of Information: October 22, 2012

Last Updated 7/29/2011			Project Values	Comments
Design Element				
design speed (mph)			50 Level, 40 Rolling	
design lane width (ft)			10	
<del>pavement</del> cross-slope (%)			3%	
effective shoulder width and type (see	e Section 3C-4)		2	I.M.3.210 Design Aids For Rural Collectors (p.2)
shoulder cross-slope (%)			4%	
foreslope	adjacent to shoulder		3:1	I.M.3.210 Design Aids For Rural Collectors (p.2)
(see Roadway Typical Cross Sections)	beyond standard ditch depth and desi	ign clearzone	3:1	
normal outside ditch (depth $\times$ width) (f	t)		5 x 10	
Backslope (For cut areas greater than 25 feet, co benches.)	ntact the Soils Design Section for assis	stance with backslope	3:1	
bridge width—for Use as Constructed	bridges (ft)		N/A	
	w/ drainage structures		8:1	
transverse slopes	w/o drainage structures		10:1	
	at sideroads	Over primary	6:1 N/A	
Vertical clearance (ft)				
(above lanes & shoulders)(see Section	<u>18A-2)</u>	over non-primary	N/A	
Structural Capacity			N/A	
Level of Service				

Chapter 1 - General Information 1C-1 - Selecting Design Criteria

Project Number: NHS-030-6(87)--19-06 Route: All Routes Date of Information: 23-Feb-12 Date of Base Design Manual Information: 7/29/2011 Acceptable Values Preferred Values Comments Design Speed, mph Design Speed, mph (Preferred design speed is (Preferred design speed is Project Values 5mph over posted speed limit 5mph over posted speed limit Design Element and a minimum of 70mph for and a minimum of 70mph for Interstates) Interstates) 40 45 60 70 40 45 60 70 45 60 70 Stopping sight distance (ft) (see 305 360 570 730 305 360 570 730 Section 6D-1)  $e_{max} = 4\%$ Minimum horizontal 533 711 533 711 curve radius (ft) 485 1330  $e_{max} = 6\%$ 643 485 643 2040  $e_{max} = 8\%$ 444 587 1200 1810 Minimum vertical curve length (ft) 120 180 210 120 135 180 210 Minimum rate of vertical crest 44 61 151 247 70 98 245 401 curvature (K) 64 136 181 64 79 136 181 Use Table Values 0.3% with a curb, 0.0% without a Minimum gradient (%) 0.5 curb 4% Maximum gradient (%) Upgrades on ramps Equal to the maximum upgrade Downgrades Maximum gradient (%) on roadways 5 other than ramps See "Acceptable Clear Zone" Clearzone 16 32 in Section 8A-2
4" Sloped is table in Section 8A-2 4" Sloped is maximum maximum height height for interstate for interstate 6" routes routes, 6" Curb type Standa 6" Standard N/A Sloped for all rd 6" Sloped for all other other routes routes 6" Sloped for all

Acceptable Shoulder widths for Two-Lane Highways (values shown in feet)						
Auxiliary Lanes (includes turn lanes)			4			
Two-Lane Highways		Effective Shoulder	Paved			
	under 400	4	2			
Design Year Traffic in Vehicles / Day	400-2000	6	2			
	over 2000	8	2			

Acceptable Shoulder widths for Expressways / Freeways (values shown in feet)						
Auxiliary Lanes (includes turn lanes)		4				
	Out	tside	Media	ın Side		
Effective Shoulder Paved Effective Shoulder Paved						
Expressways / Freeways	8	0	4	4		

Acceptable Shoulder widths for Interstates (values shown in feet)							
		Inter	rstate				
	Out	side	Mediar	n Side			
	Effective Shoulder	Paved	Effective Shoulder	Paved			
Auxiliary Lanes	6	6					
Interstates with 6 or more lanes							
Design year truck traffic equal to or less than 250 DDHV	10	full width	10	full width			
Design year truck traffic exceeds 250 DDHV	12	full width	12	full width			
Interstates with 4 lanes							
Design year truck traffic equal to or less than 250 DDHV	10	full width	4	full width			
Design year truck traffic exceeds 250 DDHV	12	full width	4	full width			

Preferred Effective Shoulder widths for Two-Lane Highways (values shown in feet)					
Auxiliary Lanes (includes turn lanes)		6			
	Outside				
Two-Lane Highways	Effective Shoulder	Paved			
On all other NHS	10	4			
On non-NHS routes with an existing ADT > 3000	10	4			

### Preferred Effective Shoulder widths for Expressways / Freeways (values shown in feet)

Auxiliary Lanes (includes turn lanes)		6			
F	Ou	tside	Median Side		
Expressways / Freeways	Effective Shoulder	Paved	Effective Shoulder	Paved	
On non-NHS routes with an existing ADT > 3000	10	4	6	4	
On non-NHS routes with an existing ADT < 3000	10	See Section 3C-4	6	4	

## Acceptable Lane and Shoulder Widths for Ramps with Paved Shoulders

	Ramp Type									
Design Element		Diagonal		Laan	Semi-Directional		Directional			
		one lane	two lane	Loop	one lane	two lane	one lane	two lane		
full depth paved width (ft)		14	22	17	15	22	14	24		
design lane width (ft)		14	11	17	15	11	14	12		
Paved shoulder width (ft) (in	Left	4	4	4	4	4	1	1		
the direction of travel)	Right	6	6	6	6	6	8	8		

# **Acceptable Lane and Shoulder Widths** for Ramps without Paved Shoulders

Design Element		Ramp Type									
		Diagonal		Loop	Semi-Directional		Directional				
		one lane	two lane	Loop	one lane	two lane	one lane	two lane			
full depth paved width (ft)		14	24								
design lane width (ft)		14	12								
Granular shoulder width (ft) Le	ft	4	4								
(in the direction of travel) Rig	ght	6	6								

Acceptable Design Speed for Ramps									
		Ramp Type							
		Diagonal							
Design Element	Exit f	Exit Ramp		Entrance Ramp		Semi-Directional	Directional		
	Curve near free	Curve near at-	Curve near free	Curve near at-	Loop	Semi-Directional	Directional		
	flow terminal	grade terminal	flow terminal	grade terminal					
design speed (mph)	Lower	Range Value - See	Exhibit 10-56 in A	ASHTO	25	30	40		

#### **Preferred Pavement and Shoulder widths for Ramps (Interstate)**

Design Element		Ramp Type									
		Diagonal		Loon	Semi-Directional		Directional				
		one lane	two lane	Loop	one lane	two lane	one lane	two lane			
full depth paved width (ft)		16	24	18	16	24	16	24			
design lane width (ft)		16	12	18	16	12	16	12			
Paved shoulder width (ft) (in	Left	4	4	4	4	4	4	4			
the direction of travel)	Right	6	6	6	6	6	8	8			

## Preferred Pavement and Shoulder widths for Ramps (Expressways and Freeways)

Design Element		Ramp Type								
		Diagonal		Loop	Semi-Directional		Directional			
		one lane	two lane	Loop	one lane	two lane	one lane	two lane		
full depth paved width (ft)		16								
design lane width (ft)		16		Use paved						
Granular shoulder width (ft) (in the direction of travel)  Right	Left	4		shoulders and criteria from						
	Right	6		Interstate table						

Preferred Design Speed for Ramps									
		Ramp Type							
		Diagonal							
Design Element	Exit f	Exit Ramp		Entrance Ramp		Semi-Directional	Directional		
	Curve near free	Curve near at-	Curve near free	Curve near at-	Loop	Seilli-Directional	Directional		
	flow terminal	grade terminal	flow terminal	grade terminal					
design speed (mph)	60	45	60	40	30	50	60		