

Last Updated 7/29/2011		Acceptable Values	Preferred Values	Project Values	Comments
Design Element		Roadway Type	Roadway Type		
		Expressways/ Freeways	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	14	
	inside lane(s)	12	12	12	
design lane width (ft)		12	12	12	
auxiliary-lane width (ft) (includes turn lanes)		10	12	12	
parking-lane width (ft)					
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%	
<a href="#">effective shoulder width and type (see Section 3C-4)</a>		<a href="#">See Shoulder Tables</a>	<a href="#">See Shoulder Tables</a>	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%	
foreslope (See Roadway Typical Cross Sections)	adjacent to shoulder	3:1	10:1 for 4' then 6:1	10:1 for 4' then 6:1	
	beyond standard ditch depth and design clearzone	3:1	3.5:1	3.5:1	
	Curbed roadways	for 12' behind curbs, then not steeper than 4:1	4% toward roadway for 12', then not steeper than 4:1	N/A	
normal outside ditch (depth x width) (ft)		--	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	
Backslope (For cut areas greater than 25 feet, contact the Soils Design Section for assistance with backslope benches.)		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	40' = 12'+12'+6'+10'	
bridge width—for Use as Constructed bridges (ft)		design lane widths + 2 ft offset each side		N/A	
transverse slopes	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	
<a href="#">Vertical clearance (ft)</a> <a href="#">(above lanes &amp; shoulders)(see Section 8A-2)</a>	Over primary	16	16.5	16.5	
	over non-primary	14	16.5 at interchange locations, 15 at all other locations	N/A	
	over railroad	23.3	23.3	N/A	
	sign truss	17	17.5	17.5	
Structural Capacity		Contact Office of Bridges and Structures	--	N/A	
Level of Service		B for Rural, C for Urban	--	B	

Last Updated 7/29/2011		Acceptable Values	Preferred Values	Project Values	Comments
Design Element		Roadway Type	Roadway Type		
		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	
	inside lane(s)				
design lane width (ft)		11	12	12	
auxiliary-lane width (ft) (includes turn lanes)		10	12	12	
parking-lane width (ft)					
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%	
<a href="#">effective shoulder width and type (see Section 3C-4)</a>		<a href="#">See Shoulder Tables</a>	<a href="#">See Shoulder Tables</a>	10' effective (4' paved, 4' granular)	Assume 2' of outside 14' lane included
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	4%	
foreslope (see Roadway Typical Cross Sections)	adjacent to shoulder	3:1	10:1 for 4' then 6:1	10:1 for 4' then 6:1	
	beyond standard ditch depth and design clearzone	3:1	3.5:1	3.5:1	
	Curbed roadways	behind curbs, then not steeper	4% toward roadway for 12', then not steeper than 4:1	N/A	
normal outside ditch (depth x width) (ft)		--	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, contact the Soils Design Section for assistance with backslope benches.)		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	
transverse slopes	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	
<a href="#">Vertical clearance (ft)</a> <a href="#">(above lanes &amp; shoulders)(see Section 8A-2)</a>	Over primary	16	16.5	16.5	
	over non-primary	14	16.5 at interchange locations, 15 at all other locations	N/A	
	over railroad	23.3	23.3	N/A	
	sign truss	17	17.5	17.5	
Structural Capacity		contact Office of Bridges and Struct	--	N/A	
Level of Service		B	--	B	

Design Element		Acceptable Values		Preferred Values		Project Values				Comments	
		Roadway Type		Roadway Type		One lane					
		Ramps		Ramps		Exit Ramp		Entrance Ramp			Loops
		one lane	two lanes	Loops	one lane	Curve near free flow terminal	Curve near free flow terminal	Curve near free flow terminal	Curve near free flow terminal		
design speed (mph)						60	45	60	40	30	
full depth paved width (ft)	outside lane	<a href="#">See Ramp Tables</a>		<a href="#">See Ramp Tables</a>		16				18	
	inside lane(s)										
design lane width (ft)						16				18	
auxiliary-lane width (ft) (includes turn lanes)		10	10	12		12				N/A	
parking-lane width (ft)										N/A	
pavement cross-slope (%)		1.5% minimum, 3% maximum		2%		2%					
<a href="#">effective shoulder width and type (see Section 3C.4)</a>		<a href="#">See Ramp Tables</a>		<a href="#">See Ramp Tables</a>		4' granular (left), 6' granular (right)				4' paved (left), 6' paved (right)	
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		4%					
foreslope (see Roadway Typical Cross Sections)	adjacent to shoulder	4:1 for interstates, 3:1 for others		10:1 for 4' then 6:1		10:1 for 4' then 6:1					
	beyond standard ditch depth and design clearzone	3:1		3.5:1		3.5:1					
	Curbed roadways	not steeper than 3:1		Curbed roadways are not preferred		N/A					
normal outside ditch (depth x width) (ft)		--		5 x 10		5 x 10					
normal median ditch depth (ft)		--		--		--					
normal median width (ft) (if applicable)		--		--		--					
Backslope (For cut areas greater than 25 feet, contact the Soils Design Section for assistance with backslope benches.)		2.5:1		3:1		3:1					
bridge width—new (ft)		design lane widths + effective shoulder widths		design lane widths + effective shoulder widths		N/A					
bridge width—for Use as Constructed bridges (ft)		design lane widths + 2 ft offset each side				N/A					
transverse slopes	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					
<a href="#">Vertical clearance (ft)</a> <a href="#">(above lanes &amp; shoulders)(see Section 8A.2)</a>	Over primary	16		16.5		N/A					
	over non-primary	14		16.5 at interchange locations, 15 at all other locations		N/A					
	over railroad	23.3		23.3		N/A					
	sign truss	17		17.5		17.5					
Structural Capacity		Contact Office of Bridges and Structures		--		N/A					
Level of Service		--		--							

Project Number: NHS-030-6(87)--19-06

Route: 21st Ave (South)

Date of Information:

October 22, 2012

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

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

Project Number: NHS-030-6(87)--19-06

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

Date of Information:

October 23, 2012

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

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

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

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%	
<a href="#">effective shoulder width and type (see Section 3C-4)</a>		6	<a href="#">I.M.3.210 Design Aids For Rural Collectors (p.2)</a>
shoulder cross-slope (%)		4%	
foreslope (see Roadway Typical Cross Sections)	adjacent to shoulder	3:1	<a href="#">I.M.3.210 Design Aids For Rural Collectors (p.2)</a>
	beyond standard ditch depth and design clearzone	3:1	
normal outside ditch (depth x width) (ft)		5 x 10	
Backslope (For cut areas greater than 25 feet, contact the Soils Design Section for assistance with backslope benches.)		3:1	
bridge width—for Use as Constructed bridges (ft)		N/A	
transverse slopes	w/ drainage structures	8:1	
	w/o drainage structures	10:1	
	at sideroads	6:1	
<a href="#">Vertical clearance (ft) (above lanes &amp; shoulders)(see Section 8A-2)</a>	Over primary	N/A	
	over non-primary	N/A	
Structural Capacity		N/A	
Level of Service			

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

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

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

Project Number: NHS-030-6(87)--19-06

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

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

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

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													
last update: 7/29/2011													
Acceptable Values													
Preferred Values													
Design Element	Design Speed, mph (Preferred design speed is 5mph over posted speed limit and a minimum of 70mph for Interstates)				Design Speed, mph (Preferred design speed is 5mph over posted speed limit and a minimum of 70mph for Interstates)				Project Values			Comments	
	40	45	60	70	40	45	60	70	40	45	60		70
Stopping sight distance (ft) (see Section 6D-1)	305	360	570	730	305	360	570	730	Use Table Values				
Minimum horizontal curve radius (ft)	$e_{max} = 4\%$				$e_{max} = 6\%$								
	533	711	--	--	533	711	--	--					
	$e_{max} = 6\%$				$e_{max} = 8\%$								
Minimum vertical curve length (ft)	120	135	180	210	120	135	180	210					
Minimum rate of vertical curvature (K)	crest				crest								
	44	61	151	247	70	98	245	401					
Minimum gradient (%)	sag				sag								
	64	79	136	181	64	79	136	181					
Maximum gradient (%) on ramps	0.3% with a curb, 0.0% without a curb				0.5								
Maximum gradient (%) on roadways other than ramps	/ / / /				4%								
	Upgrades				Downgrades								
Clearzone	6	5	5	--	Equal to the maximum upgrade gradient.								
Clearzone	6	6	4	4	5	5	3	3					
Clearzone	See "Acceptable Clear Zone" table in Section 8A-2				See "Preferred Clear Zone" table in Section 8A-2				12	16	24	32	
Curb type	6" Standard	4" Sloped is maximum height for interstate routes			6" Standard	4" Sloped is maximum height for interstate routes, 6" Sloped for all other routes			N/A				
Curb type		6" Sloped for all other routes				6" Sloped for all other routes							

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

<b>Acceptable Shoulder widths for Expressways / Freeways (values shown in feet)</b>					
<b>Auxiliary Lanes (includes turn lanes)</b>		<b>4</b>			
		Outside		Median Side	
		Effective Shoulder	Paved	Effective Shoulder	Paved
<b>Expressways / Freeways</b>		<b>8</b>	<b>0</b>	<b>4</b>	<b>4</b>

<b>Acceptable Shoulder widths for Interstates (values shown in feet)</b>					
		Interstate			
		Outside		Median Side	
		Effective Shoulder	Paved	Effective Shoulder	Paved
<b>Auxiliary Lanes</b>		<b>6</b>	<b>6</b>	--	
<b>Interstates with 6 or more lanes</b>					
	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
<b>Interstates with 4 lanes</b>					
	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

Last Updated: 7/29/2011

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

<b>Preferred Effective Shoulder widths for Expressways / Freeways (values shown in feet)</b>				
<b>Auxiliary Lanes (includes turn lanes)</b>	6			
<b>Expressways / Freeways</b>	Outside		Median Side	
	Effective Shoulder	Paved	Effective Shoulder	Paved
	On non-NHS routes with an existing ADT > 3000	4	6	4
On non-NHS routes with an existing ADT < 3000	10	See Section 3C-4	6	4

Last Updated: 7/29/2011

Acceptable Lane and Shoulder Widths for Ramps with Paved Shoulders								
Design Element		Ramp Type						
		Diagonal		Loop	Semi-Directional		Directional	
		one lane	two lane		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 the direction of travel)	Left	4	4	4	4	4	1	1
	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		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) (in the direction of travel)	Left	4	4	--	--	--	--	--
	Right	6	6	--	--	--	--	--

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

Last Updated: 7/29/2011

<b>Preferred Pavement and Shoulder widths for Ramps (Interstate)</b>							
Design Element	Ramp Type						
	Diagonal		Loop	Semi-Directional		Directional	
	one lane	two lane		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 the direction of travel)	Left	4	4	4	4	4	4
	Right	6	6	6	6	8	8

<b>Preferred Pavement and Shoulder widths for Ramps (Expressways and Freeways)</b>								
Design Element	Ramp Type							
	Diagonal		Loop	Semi-Directional		Directional		
	one lane	two lane		one lane	two lane	one lane	two lane	
full depth paved width (ft)	16	--	Use paved shoulders and criteria from Interstate table	--	--	--	--	
design lane width (ft)	16	--		--	--	--	--	
Granular shoulder width (ft) (in the direction of travel)	Left	4		--	--	--	--	--
	Right	6		--	--	--	--	--

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