CONTEXT SENSITIVE ROADWAY SURFACING SELECTION GUIDE

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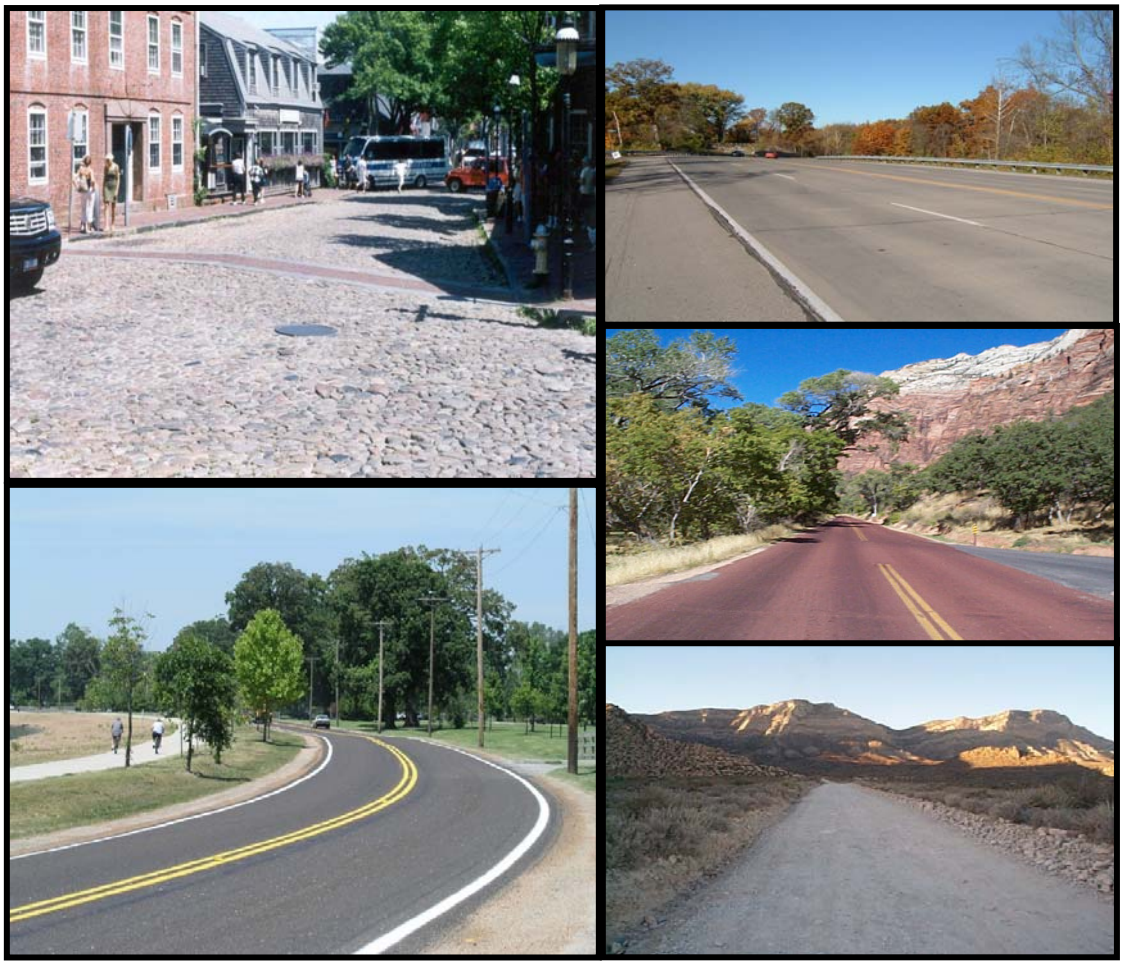

U.S. Department of Transportation
Federal Highway Administration

CTIP

Federal Lands Highway
Commitment to Excellence

Central Federal Lands Highway Division
12300 West Dakota Avenue
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FOREWORD

The Federal Lands Highway (FLH) Division of the Federal Highway Administration (FHWA) is the primary road-builder for the National Park Service, Forest Service, Fish and Wildlife Service, and several other government agencies. The roads constructed or rehabilitated by FLH are generally low to medium volume roads. FLH's customers, as well as communities, environmental organizations, and individual landowners, are increasingly concerned about the selection of roadway surfacing types – in particular the riding surface on proposed projects. Often the project stakeholders have difficulty agreeing on a preferred surfacing type because of biases of performance, aesthetics, or other issues.

A Guide has been prepared that documents the available options for roadway surfacings, and provides a decision-making process to allow consideration of functionality, performance, durability, safety, life-cycle costs, as well as aesthetics and environmental impacts. This Guide presents a review of FLH's Project Delivery Process (PDP) and a proposed roadway surfacing selection process that includes consideration of context sensitivity, to be used in conjunction with the PDP. A CD-ROM titled *Roadway Surfacing Options Photo Album* accompanies this Guide.

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16. Abstract

This Context Sensitive Roadway Surfacing Guide documents the available options for roadway surfacing, and provides a decision-making process to allow consideration of all conventional engineering design factors, such as, structural capacity, performance, durability, safety, life-cycle costs, but will also allow consideration of aesthetics, context compatibility, and environmental impacts. The Guide presents a review of FLH's Project Delivery Process (PDP) and a roadway surfacing selection process that includes consideration of context sensitivity, to be used in conjunction with the PDP. A CD-ROM titled *Roadway Surfacing Options Photo Album* accompanies the Guide.

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SI* (MODERN METRIC) CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH		
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
		AREA		
in^2	square inches	645.2	square millimeters	mm^2
ft^2	square feet	0.093	square meters	m^2
yd^2	square yard	0.836	square meters	m^2
ac	acres	0.405	hectares	ha
mi^2	square miles	2.59	square kilometers	km^2
		VOLUME		
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft^3	cubic feet	0.028	cubic meters	m^3
yd^3	cubic yards	0.765	cubic meters	m^3
		NOTE: volumes greater than 1000 L shall be shown in m^3		
		MASS		
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
		TEMPERATURE (exact degrees)		
°F	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	°C
		ILLUMINATION		
fc	foot-candles	10.76	lux	lx
fl	foot-Lamberts	3.426	candela/m^2	cd/m^2
		FORCE and PRESSURE or STRESS		
lbf	poundforce	4.45	newtons	N
lbf/in^2	poundforce per square inch	6.89	kilopascals	kPa

APPROXIMATE CONVERSIONS FROM SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH		
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
m	meters	1.09	yards	yd
km	kilometers	0.621	miles	mi
		AREA		
mm^2	square millimeters	0.0016	square inches	in^2
m^2	square meters	10.764	square feet	ft^2
m^2	square meters	1.195	square yards	yd^2
ha	hectares	2.47	acres	ac
km^2	square kilometers	0.386	square miles	mi^2
		VOLUME		
mL	milliliters	0.034	fluid ounces	fl oz
L	liters	0.264	gallons	gal
m^3	cubic meters	35.314	cubic feet	ft^3
m^3	cubic meters	1.307	cubic yards	yd^3
		MASS		
g	grams	0.035	ounces	oz
kg	kilograms	2.202	pounds	lb
Mg (or "t")	megagrams (or "metric ton")	1.103	short tons (2000 lb)	T
		TEMPERATURE (exact degrees)		
°C	Celsius	1.8C+32	Fahrenheit	°F
		ILLUMINATION		
lx	lux	0.0929	foot-candles	fc
cd/m^2	candela/m^2	0.2919	foot-Lamberts	fl
		FORCE and PRESSURE or STRESS		
N	newtons	0.225	poundforce	lbf
kPa	kilopascals	0.145	poundforce per square inch	lbf/in^2

*SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS

Acronym	Definition
3R	Rehabilitation, Restoration, and Resurfacing
4R	Rehabilitation, Restoration, Resurfacing, and Reconstruction
AADT	Average Annual Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
ASCE	American Society of Civil Engineers
BOD	Biological Oxygen Demand
CATX	Categorical Exclusion
CBR	California Bearing Ratio
CFLHD	Central Federal Lands Highway Division
CIR	Cold In-Place Recycling
CMAC	Cold Mix Asphalt Concrete
COTR	Contract Officer's Technical Representative
CSD	Context Sensitive Design
CSS	Context Sensitive Solutions
DEIS	Draft Environmental Impact Statement
DOT	Department of Transportation
EA	Environmental Assessment
EIS	Environmental Impact Statement
EFLHD	Eastern Federal Lands Highway Division
ESAL	Equivalent Single Axle Load
FDR	Full Depth Reclamation
FHWA	Federal Highway Administration
FLH	Federal Lands Highway
FONSI	Finding of No Significant Impact
HACP	Hot Asphalt Concrete Pavement
HIR	Hot In-Place Recycling
LCC	Life-Cycle Cost
NCHRP	National Cooperative Highway Research Program
NEPA	National Environmental Policy Act
NPS	National Park Service
OGFC	Open-Graded Friction Course
PCC	Portland Cement Concrete
PCCP	Portland Cement Concrete Pavement
PDP	Project Delivery Process
PG	Performance Grade
PS&E	Plans, Specifications, and Estimate
RAP	Reclaimed Asphalt Pavement
RCA	Reclaimed Concrete Aggregate
RCC	Roller Compacted Concrete
RMP	Resin Modified Pavement
ROD	Record of Decision
ROW	Right of Way
SCR	Special Contract Requirements

Acronym	Definition
SHPO	State Historic Preservation Officer
SLC	Structural Layer Coefficient
SMA	Stone Matrix/Mastic Asphalt
SN	Skid Number
SOW	Statement of Work
T&E	Threatened and Endangered
TRB	Transportation Research Board
USFS	United States Forest Service
WFLHD	Western Federal Lands Highway Division