

ODOT Pavement Design Manual
Section 400 - Flexible Pavement Design

SUM EAST AVE (TALLMADGE) PH1
PID 112869

Design: JES 8/10/2021
 Check: DSM 8/10/2021

Name of Road

Number of lanes	3
Functional Classification	04 Minor Arterial (Urban)
2025 Traffic	15,770 ADT
2045 Traffic	19,050 ADT
24 Hour Truck %	4 %
Design Period	20 years
Open to Traffic	30
Subgrade CBR	5

Step 1: 18-kip Equivalent Single Axle Loading (ESAL)

40 ADT =

17,410 ADT

Directional Distribution, D	50 %	<i>used Design Designation D</i>
Lane Factor	80 %	(Fig. 202-1)
B:C Ratio	1 :1	(Fig. 202-1)
ESAL Conversion B Trucks	1.04	(Fig. 202-1)
ESAL Conversion C Trucks	0.41	(Fig. 202-1)

ESAL from B Trucks	145
ESAL from C Trucks	57
Total Daily ESAL's	202 ESAL/day

Design Period ESAL's **1.5E+06 ESAL's**

Step 2: Subgrade Resilient Modulus (Mr)

(Sec. 203.1)

Mr= 1200*CBR

Mr= 6,000 psi

Step 3: Composite Modulus of Subgrade Reaction (kc)

(Fig. 402-2 and 402-3)

Reliability	90 %	(Fig. 201-1)
Overall Standard Deviation	0.49	(Fig. 201-1)
18-kip ESAL	1.5E+06 ESAL's	(Step 1)
Subgrade Resilient Modulus (Mr)	6,000 psi	(Step 2)
Design Serviceability Loss (PSI)	2.0	(Fig. 201-1)

Design Structural Number (SN)

4.1 (Fig. 402-3)

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Step 4: Typical Section

(Fig. 401-1)

Opening Day Heavy Traffic

630.8 ADTT
630.8 <1500

Heavy mix not required per
Proposal Note 416.

	Thickness	Coefficient	SN
Item 441 - 1.5" Asphalt Concrete Surface Course, (448) Type 1, PG70-22M	1.5	0.43	0.645
Item 441 - 1.75" Asphalt Concrete Intermediate Course, (448) Type 2	1.75	0.43	0.75
Item 301 - 6" Asphalt Concrete Base, PG64-22	6	0.36	2.16
Item 304 - 6" Aggregate Base	6	0.14	0.84
			4.4
Design SN	4.1	<	4.4 Total SN
			Design is Acceptable

Serviceability & Reliability

201-1
July 2016
Reference Section
201 & 204

SERVICEABILITY FACTORS		
	Rigid	Flexible
Initial Serviceability	4.2	4.5
Terminal Serviceability	2.5	2.5
Design Serviceability Loss	1.7	2.0

RELIABILITY LEVELS (%)		
Functional Classification	Urban*	Rural*
Interstate and Freeway (01, 02)	95	90
Principle Arterial, Minor Arterial (03, 04)	90	85
Collectors (05, 06)	90	85
Local (07)	80	80

* The designer must determine if the location is urban or rural in character. The ODOT Highway Functional Classification System Concepts, Procedures and Instructions document available from the Office of Program Management should be used as a guide.

OVERALL STANDARD DEVIATION	
Flexible Pavement	0.49
Rigid Pavement	0.39

Traffic Factors

202-1

July 2016

**Reference Section
202**

RATIO OF B:C COMMERCIAL VEHICLES

Functional Classification	B:C Ratio	
	Urban*	Rural*
Interstate (01)	4:1	7:1
Other Freeway or Expressway (02)	3:1	
Principal Arterial (03)	2:1	5:1
All Other (04, 05, 06, 07)	1:1	2:1

ESAL CONVERSION FACTORS

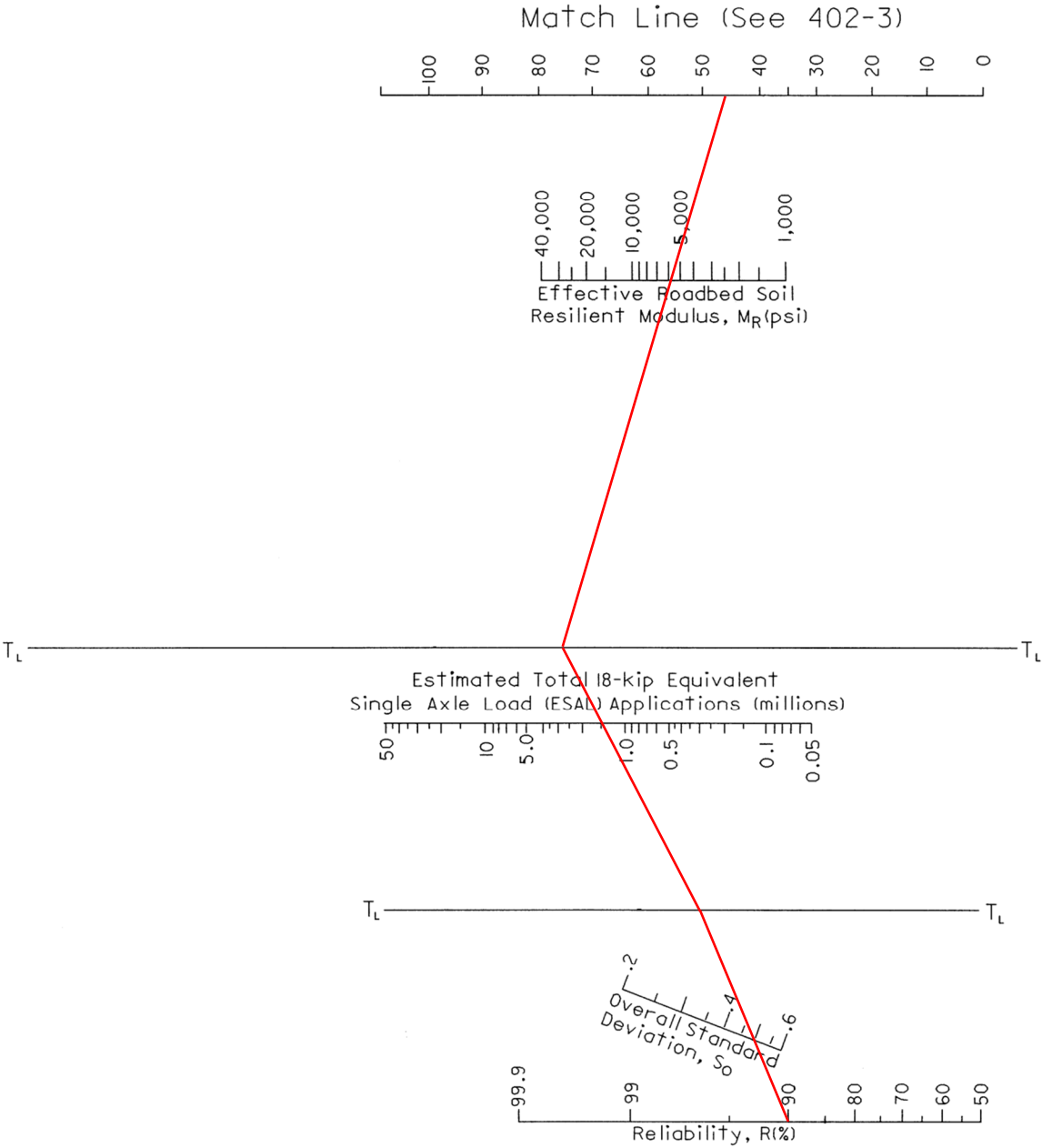
Functional Classification	Rigid		Flexible	
	B	C	B	C
Interstate (01), rural*	1.53	0.37	0.98	0.29
Principal Arterial (03), rural*	1.67	0.44	1.06	0.33
All Other (04, 05, 06, 07), rural*	1.26	0.76	0.79	0.48
Interstate (01), urban*	1.46	0.46	0.93	0.34
Expressway & Freeway (02), urban*	1.38	0.72	0.90	0.47
All Other (03, 04, 05, 06, 07), urban*	1.64	0.53	1.04	0.41

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DESIGN LANE FACTORS

Number of Lanes per Direction	Lane Factor (LF) (%)	Directional Distribution (D) for two-way traffic (%)
1 - Lane	100	50
2 - Lanes	95	50
3 - Lanes	80	50
4 (or more) - Lanes	70	50

Flexible Pavement Design Chart Segment 1	402-2 July 2008
	Reference Section & Figure 402, 402-1(step 3)



Flexible Pavement Design Chart Segment 2

402-3

July 2008

Reference Section & Figure
402, 402-1(step 3)

