Cost-Effective Analysis Procedure

State of Alaska, Department of Transportation & Public Facilities

(Ver 2.0 revised 12/99; updated 5/19, 2/21, 2/15/23)

PROJECT: Work Zone Test Case

OPTION: 1 yr

DATE: 2/15/2023 1:50 PM

..\Severity_Indices\1996RDG-AppA Severities mph_ft.pdf (Link for DOTPF internal use)

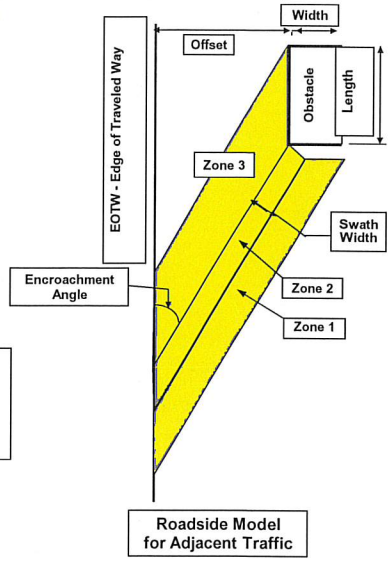
TRAFFIC INPUT			Resulting Design Year ADT
Average Daily Traffic (ADT)	15000	veh/day	15,000
Traffic Growth Factor	0	%	
Speed	40	mph	
Grade (+ = uphill ,- = downhill)	0	%	
Degree of Curve (+= inside, -= outside)	0	degrees	
No. of Lanes Each Direction	1	lanes	
Lane Width	12	ft	
Swath Width	12	ft	
Highway Type	U	U,D, or O	
Median or Roadside Analysis?	R	M or R	
Adjacent Lane User Factor	1.00		
Opposing Lane User Factor	1.00		

Input

U = Undivided Roadway
D = Divided Roaday
O = One-Way Roadway

R = Roadside Analysis
(obstacle right of adjacent traffic)

M = Median Analysis
(obstacle left of adjacent traffic)

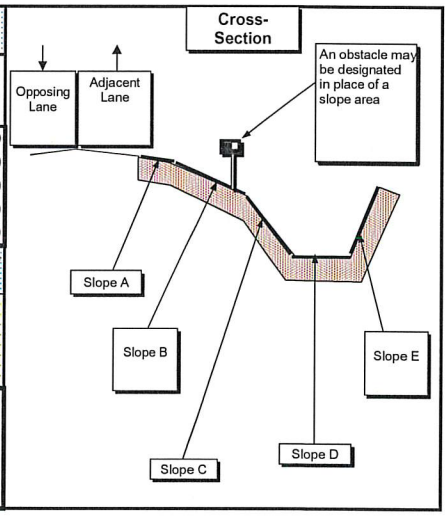


Roadside Model for Adjacent Traffic

ECONOMIC INPUT		
Period (n)	1	years
Interest Rate (i)	3	%

F = Fill Slope (downhill *)
C = Cut Slope (uphill *)
O = Obstacle
* from the edge-of-traveled-way

ROADSIDE MODEL INPUT	Fill	Culvert	Water	Slope D or Obstacle	Slope E or Obstacle
Fill,Cut, or Obstacle (F,C, or O)	O	O	O	O	O
Slope Rate (X where X:1 ft/ft)	0	0	0	0	0
Offset to Slope/Obstacle (ft)	0	0	0	0	0
Slope/Obstacle Width (ft)	2	0	0	0	0
Slope/Obstacle Length (ft)	1000	0	0	0	0
Effective Offset (computed)	0	0	0	0	0



SEVERITY INDEX INPUT	Fill	Culvert	Water	Slope D or Obstacle	Slope E or Obstacle
Upstream Side	4.3	0	0	0	0
Upstream Corner	4.3	0	0	0	0
Face	2	0	0	0	0
Downstream Corner	4.3	0	0	0	0
Downstream Side	4.3	0	0	0	0

ACCIDENT PREDICTION OUTPUT	Slope A or Obstacle	Slope B or Obstacle	Slope C or Obstacle	Slope D or Obstacle	Slope E or Obstacle	Total Impacts at Outer Edge of Model
Initial Impacts Per Year	0.9001	0.0000	0.0000	0.0000	0.0000	**0.9001 impacts per year**
Impacts Over Project Life	0.8739	0.0000	0.0000	0.0000	0.0000	**0.8739 impacts over project life**
						0.9001 predicted work zone impacts

PROJECT COST INPUT	
INSTALLATION COSTS	
Design Costs	$0
Right-of-Way Cost	$0
Utilities Costs	$0
Construction Costs	$8,000
TOTAL INSTALLATION COSTS	$8,000
ANNUAL MAINTENANCE	$0
SALVAGE VALUE (Present)	$0
DAMAGE COSTS PER ACCIDENT	
Upstream Side	$0
Upstream Corner	$0
Face	$0
Downstream Corner	$0
Downstream Side	$0

PROJECT COSTS OUTPUT	Present Worth		Annual Costs
Installation	$8,000		$8,240
Routine Maintenance	$0		$0
Salvage Value (Future)	$0		$0
Adjacent Accidents	$36,376		$37,467
Opposing Accidents	$9,050		$9,322
Repairs due to Adjacent Accidents	$0		$0
Repairs due to Opposite Accidents	$0		$0
SUBTOTALS		*Work zone=*	
Net Costs to Public	$45,426	*Public x %*	$46,789
Net Costs to Department	$8,000	*+Dept install*	$8,240
		1	
TOTAL COSTS (Rounded)	$53,000	*$55,029*	$55,000
	Project Life	*Partial Year*	Per Year

BACKGROUND ROADSIDE MODEL COMPUTATIONS

PROJECT: **Work Zone Test Case**
OPTION: **1 yr**

DATE: **2/15/2023**
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COMPUTED COST FACTORS		
Capitol Recovery Factor	1.03000	A/P
Sinking Fund Factor	1.00000	A/F
Single Payment Compound Amount Factor	1.03000	F/P
Economic Factor	0.97087	Kc

WILLINGNESS-TO-PAY COSTS	Severity Code	USDOT VSL (2008$)	GDP Implicit Price Deflator	2022 WTP Costs
Fatality	K	[redacted]	[redacted]	$11,600,000
Incapacitating Injury	A	[redacted]	[redacted]	$800,000
Nonincapacitating Injury	B	[redacted]	[redacted]	$160,000
Possible Injury	C	[redacted]	[redacted]	$85,000
Property Damage Only	O	[redacted]	[redacted]	$8,900

ASSOCIATED ACCIDENT COSTS	Slope A or Obstacle	Slope B or Obstacle	Slope C or Obstacle	Slope D or Obstacle	Slope E or Obstacle
Upstream Side	$657,170	$0	$0	$0	$0
Upstream Corner	$657,170	$0	$0	$0	$0
Face	$36,219	$0	$0	$0	$0
Downstream Corner	$657,170	$0	$0	$0	$0
Downstream Side	$657,170	$0	$0	$0	$0

ENCROACHMENT RATE	Adjacent Traffic	Opposing Traffic
Encroachment Angle (degr)	17.2	17.2
Baseline Encr. Frequency	3.75	3.75
Curve Adjustment Factor	1.00	1.00
Grade Adjustment Factor	1.00	1.00
Multilane Adjustment Factor	1.00	1.00
User Factor	1.00	1.00
Total Encroachments	3.75	3.75

Adjacent Traffic

	Zone Length A	Zone Length B	Zone Length C	Zone Length D	Zone Length E
Zone 1	6	0	0	0	0
Zone 2	41	41	41	41	41
Zone 3	1000	0	0	0	0
Total	1047	41	41	41	41

	Encroachment Frequency A	Encroachment Frequency B	Encroachment Frequency C	Encroachment Frequency D	Encroachment Frequency E
Zone 1	0.0046	0.0000	0.0000	0.0000	0.0000
Zone 2	0.0288	0.0288	0.0288	0.0288	0.0288
Zone 3	0.7102	0.0000	0.0000	0.0000	0.0000
Total	0.7436	0.0288	0.0288	0.0288	0.0288

	Lateral Extent Probability A	Lateral Extent Probability B	Lateral Extent Probability C	Lateral Extent Probability D	Lateral Extent Probability E
Zone 1	0.2480	0.0000	0.0000	0.0000	0.0000
Zone 2	0.5805	0.0000	0.0000	0.0000	0.0000
Zone 3	1.0000	0.0000	0.0000	0.0000	0.0000
Total					

	Collision Frequency (impacts/ yr)A	Collision Frequency (impacts/ yr)B	Collision Frequency (impacts/ yr)C	Collision Frequency (impacts/ yr)D	Collision Frequency (impacts/ yr)E
Zone 1	0.0011	0.0000	0.0000	0.0000	0.0000
Zone 2	0.0167	0.0000	0.0000	0.0000	0.0000
Zone 3	0.7102	0.0000	0.0000	0.0000	0.0000
Total	0.7281	0.0000	0.0000	0.0000	0.0000

	Accident Costs per year A	Accident Costs per year B	Accident Costs per year C	Accident Costs per year D	Accident Costs per year E
Zone 1	$748	$0	$0	$0	$0
Zone 2	$10,996	$0	$0	$0	$0
Zone 3	$25,724	$0	$0	$0	$0
Total	$37,467	$0	$0	$0	$0

Opposing Traffic

	Zone Length A	Zone Length B	Zone Length C	Zone Length D	Zone Length E
Zone 1	6	0	0	0	0
Zone 2	41	41	41	41	41
Zone 3	1000	0	0	0	0
Total	1047	41	41	41	41

	Encroachment Frequency A	Encroachment Frequency B	Encroachment Frequency C	Encroachment Frequency D	Encroachment Frequency E
Zone 1	0.0046	0.0000	0.0000	0.0000	0.0000
Zone 2	0.0288	0.0288	0.0288	0.0288	0.0288
Zone 3	0.7102	0.0000	0.0000	0.0000	0.0000
Total	0.7436	0.0288	0.0288	0.0288	0.0288

	Lateral Extent Probability A	Lateral Extent Probability B	Lateral Extent Probability C	Lateral Extent Probability D	Lateral Extent Probability E
Zone 1	0.0794	0.0000	0.0000	0.0000	0.0000
Zone 2	0.1601	0.0000	0.0000	0.0000	0.0000
Zone 3	0.2352	0.0000	0.0000	0.0000	0.0000
Total					

	Collision Frequency (impacts/ yr)A	Collision Frequency (impacts/ yr)B	Collision Frequency (impacts/ yr)C	Collision Frequency (impacts/ yr)D	Collision Frequency (impacts/ yr)E
Zone 1	0.0004	0.0000	0.0000	0.0000	0.0000
Zone 2	0.0046	0.0000	0.0000	0.0000	0.0000
Zone 3	0.1670	0.0000	0.0000	0.0000	0.0000
Total	0.1720	0.0000	0.0000	0.0000	0.0000

	Accident Costs per year A	Accident Costs per year B	Accident Costs per year C	Accident Costs per year D	Accident Costs per year E
Zone 1	$239	$0	$0	$0	$0
Zone 2	$3,032	$0	$0	$0	$0
Zone 3	$6,050	$0	$0	$0	$0
Total	$9,322	$0	$0	$0	$0

Adjacent Traffic	Total Initial Accident Costs First Year
Zone 1	$748
Zone 2	$10,996
Zone 3	$25,724
Total	$37,467

Opposing Traffic	Total Initial Accident Costs First Year
Zone 1	$239
Zone 2	$3,032
Zone 3	$6,050
Total	$9,322

ROADSIDE ZONE GENERAL CHARACTERISTICS			
Totals	Adjacent Traffic	Opposing Traffic	Total
Impacts per year	0.7281	0.1720	0.9001
Impacts over Project Life	0.7069	0.1670	0.8739
Initial Accident Costs per year	$37,467	$9,322	$46,789

Interpolated 30 MPH values ad odd Offsets, based on ROADSIDE 30 mph Fortran printout of Lateral Extent probabilties

Corrected Lookup to Line A61 for 31-40 MPH

			Off set	30 mph	40 mph	50 mph		
AdjZone1	Zone 1 Subroutine		0	1	1	1		
=RESULT(1)	to compute lateral e		1	0.7948	0.8479	0.8853		
=ARGUMENT("Speed",1)	Probabilites		2	0.5895	0.6958	0.7706		
=ARGUMENT("Offset",1)			3	0.5017	0.6176	0.6943		
=ARGUMENT("Width",1)	recognizing inputs		4	0.4139	0.5393	0.618	0.6916	0.757
=ARGUMENT("Length",1)			5	0.3568	0.4861	0.5706	0.6406	0.7074
=ARGUMENT("EncAngle",1)			6	0.2997	0.4328	0.5232	0.5895	0.6578
=ARGUMENT("SwathWidth",1)			7	0.2607	0.3917	0.4868	0.5527	0.619
=ARGUMENT("HwyType",2)			8	0.2216	0.3505	0.4503	0.5158	0.5801
=ARGUMENT("NoLanes",1)			9	0.194	0.3184	0.4189	0.4864	0.549
EncAngle=EncAngle*PI()/180	Convert to Radians		10	0.1663	0.2863	0.3875	0.4569	0.5179
x=0			11	0.1457	0.2608	0.3607	0.4319	0.492
z=0			12	0.1251	0.2352	0.3338	0.4068	0.4661
=FOR("Count",1,Width,1)			13	0.11	0.2148	0.3108	0.3848	0.4434
z=z+1			14	0.0948	0.1943	0.2878	0.3628	0.4207
=IF(AND(Speed>30,Speed<=40),GOTO(A24))	Choose computatior		15	0.0833	0.1775	0.2685	0.3435	0.4005
=IF(AND(Speed>40,Speed<=50),GOTO(A27))	based upon Speed		16	0.0717	0.1607	0.2491	0.3242	0.3803
=IF(AND(Speed>50,Speed<=60),GOTO(A30))			17	0.0631	0.1469	0.2324	0.3069	0.3625
=IF(Speed>60,GOTO(A33))			18	0.0545	0.1331	0.2157	0.2895	0.3446
=VLOOKUP(Offset+SwathWidth*COS(EncAngle)+(z-1),D2:I102,2)	AASHTO Zone1 For		19	0.0478	0.1216	0.2013	0.2741	0.3287
x=x+A21	for each speed		20	0.0411	0.1101	0.1869	0.2586	0.3128
=GOTO(A35)			21	0.0361	0.1006	0.1745	0.2448	0.2986
=VLOOKUP(Offset+SwathWidth*COS(EncAngle)+(z-1),D2:I102,3)			22	0.031	0.0911	0.162	0.2309	0.2843
x=x+A24			23	0.0272	0.0833	0.151	0.2185	0.2716
=GOTO(A35)			24	0.0233	0.0754	0.14	0.206	0.2589
=VLOOKUP(Offset+SwathWidth*COS(EncAngle)+(z-1),D2:I102,4)			25	0.0204	0.0687	0.1305	0.1948	0.2474
x=x+A27			26	0.0174	0.062	0.121	0.1836	0.2358
=GOTO(A35)			27	0.0152	0.0566	0.1128	0.1735	0.2253
=VLOOKUP(Offset+SwathWidth*COS(EncAngle)+(z-1),D2:I102,5)			28	0.013	0.0511	0.1045	0.1634	0.2148
x=x+A30			29	0.0113	0.0465	0.0973	0.1543	0.2052
=GOTO(A35)			30	0.0096	0.0419	0.09	0.1452	0.1955
=VLOOKUP(Offset+SwathWidth*COS(EncAngle)+(z-1),D2:I102,6)			31	0.0083	0.0381	0.0836	0.137	0.1867
x=x+A33			32	0.007	0.0342	0.0772	0.1288	0.1779
=NEXT()			33	0.0061	0.031	0.0718	0.1215	0.1697
=IF((Width=0),0,+x/Width)			34	0.0051	0.0278	0.0663	0.1141	0.1615
=RETURN(A36)			35	0.0044	0.0252	0.0615	0.1075	0.154
			36	0.0037	0.0226	0.0567	0.1009	0.1464
AdjZone2			37	0.0032	0.0204	0.0525	0.095	0.1394
=RESULT(1)			38	0.0026	0.0182	0.0483	0.089	0.1324
=ARGUMENT("Speed",1)			39	0.0022	0.0164	0.0447	0.0837	0.126
=ARGUMENT("Offset",1)			40	0.0018	0.0145	0.041	0.0784	0.1196
=ARGUMENT("Width",1)			41	0.0016	0.013	0.0379	0.0737	0.1137
=ARGUMENT("Length",1)			42	0.0013	0.0116	0.0347	0.069	0.1078
=ARGUMENT("EncAngle",1)			43	0.0011	0.0104	0.032	0.0648	0.1024
=ARGUMENT("SwathWidth",1)			44	0.0009	0.0091	0.0292	0.0605	0.0969
=ARGUMENT("HwyType",2)			45	0.00075	0.0081	0.0269	0.0567	0.092
=ARGUMENT("NoLanes",1)			46	0.0006	0.0071	0.0245	0.0529	0.087
EncAngle=EncAngle*PI()/180	Convert to Radians		47	0.0005	0.0063	0.0225	0.0495	0.0825
x=0			48	0.0004	0.0055	0.0204	0.0461	0.078
z=0			49	0.0003	0.0049	0.0187	0.0431	0.0739
=FOR("Count",1,SwathWidth,1)			50	0.0002	0.0043	0.0169	0.0401	0.0698
z=z+1			51	0.00015	0.0038	0.0154	0.0375	0.0661
=IF(AND(Speed>30,Speed<=40),GOTO(A61))			52	0.0001	0.0033	0.014	0.0349	0.0623
=IF(AND(Speed>40,Speed<=50),GOTO(A64))			53	0.0001	0.0029	0.0128	0.0325	0.0589
=IF(AND(Speed>50,Speed<=60),GOTO(A67))			54	0.0001	0.0024	0.0115	0.0301	0.0555
=IF(Speed>60,GOTO(A70))			55	0	0.0021	0.0104	0.028	0.0525
=VLOOKUP(Offset +(z-1)*COS(EncAngle),D2:I102,2)	AASHTO Zone 2 Fo		56	0	0.0018	0.0093	0.0259	0.0494
x=x+A58	for each speed		57	0	0.0016	0.0084	0.0241	0.0466
=GOTO(A72)			58	0	0.0013	0.0075	0.0222	0.0438
=VLOOKUP(Offset +(z-1)*COS(EncAngle),D2:I102,3)			59	0	0.0011	0.0068	0.0206	0.0413
x=x+A61			60	0	0.0009	0.006	0.019	0.0388
=GOTO(A72)			61	0	0.0008	0.0054	0.0176	0.0366
=VLOOKUP(Offset +(z-1)*COS(EncAngle),D2:I102,4)			62	0	0.0007	0.0048	0.0162	0.0343
x=x+A64			63	0	0.0006	0.0043	0.015	0.0323
=GOTO(A72)			64	0	0.0005	0.0038	0.0138	0.0302
=VLOOKUP(Offset +(z-1)*COS(EncAngle),D2:I102,5)			65	0	0.0004	0.0034	0.0127	0.0284
x=x+A67			66	0	0.0003	0.0029	0.0116	0.0265
=GOTO(A72)			67	0	0.0003	0.0026	0.0107	0.0249
=VLOOKUP(Offset +(z-1)*COS(EncAngle),D2:I102,6)			68	0	0.0002	0.0022	0.0098	0.0232
x=x+A70			69	0	0.0002	0.002	0.009	0.0217
=NEXT()			70	0	0.0001	0.0017	0.0081	0.0202
=IF((Width=0),0,+x/SwathWidth)			71	0	0.0001	0.0015	0.0075	0.0189
=RETURN(A73)			72	0	0.0001	0.0012	0.0068	0.0176
			73	0	0.0001	0.0011	0.0062	0.0165
AdjZone3			74	0	0	0.0009	0.0056	0.0153
=RESULT(1)			75	0	0	0.0008	0.0051	0.0143
=ARGUMENT("Speed",1)			76	0	0	0.0007	0.0046	0.0132
=ARGUMENT("Offset",1)			77	0	0	0.0006	0.0042	0.0123
=ARGUMENT("Width",1)			78	0	0	0.0005	0.0038	0.0114
=ARGUMENT("Length",1)			79	0	0	0.0004	0.0034	0.0106
=ARGUMENT("EncAngle",1)			80	0	0	0.0003	0.003	0.0097
=ARGUMENT("SwathWidth",1)			81	0	0	0.0003	0.0027	0.009
=ARGUMENT("HwyType",2)			82	0	0	0.0002	0.0024	0.0083
=ARGUMENT("NoLanes",1)			83	0	0	0.0002	0.0022	0.0077
EncAngle=EncAngle*PI()/180	Convert to Radians		84	0	0	0.0001	0.0019	0.007
=IF(AND(Speed>30,Speed<=40),GOTO(A93))			85	0	0	0.0001	0.0017	0.0065
=IF(AND(Speed>40,Speed<=50),GOTO(A95))			86	0	0	0.0001	0.0015	0.006
=IF(AND(Speed>50,Speed<=60),GOTO(A97))			87	0	0	0.0001	0.0014	0.0055
=IF(Speed>60,GOTO(A99))			88	0	0	0.0001	0.0012	0.005
=IF((Length=0),0,VLOOKUP(Offset,D2:I102,2))	AASHTO Zone 3 Fo		89	0	0	0.0001	0.0011	0.0046
=RETURN(A91)	for each speed		90	0	0	0	0.0009	0.0042
=IF((Length=0),0,VLOOKUP(Offset,D2:I102,3))			91	0	0	0	0.0008	0.0038
=RETURN(A93)			92	0	0	0	0.0007	0.0034
=IF((Length=0),0,VLOOKUP(Offset,D2:I102,4))			93	0	0	0	0.0006	0.0031
=RETURN(A95)			94	0	0	0	0.0005	0.0028
=IF((Length=0),0,VLOOKUP(Offset,D2:I102,5))			95	0	0	0	0.0004	0.0026
=RETURN(A97)			96	0	0	0	0.0003	0.0023
=IF((Length=0),0,VLOOKUP(Offset,D2:I102,6))			97	0	0	0	0.0003	0.0021
=RETURN(A99)			98	0	0	0	0.0002	0.0018
			99	0	0	0	0.0002	0.0017
OppZone1	Same Process		100	0	0	0	0.0001	0.0015
=RESULT(1)	Opposite Direction							
=ARGUMENT("Speed",1)								
=ARGUMENT("Offset",1)								
=ARGUMENT("Width",1)								
=ARGUMENT("Length",1)								

=ARGUMENT("EncAngle",1)								
=ARGUMENT("SwathWidth",1)								
=ARGUMENT("HwyType",2)								
=ARGUMENT("NoLanes",1)								
=ARGUMENT("LaneWidth",1)								
EncAngle=EncAngle*PI()/180	Convert to Radians							
=IF(NoLanes=4,GOTO(A119))	Increase offset to h							
=IF(NoLanes=3,GOTO(A121))	if from opposing dire							
=IF(NoLanes=2,GOTO(A123))								
OppOffset=Offset+LaneWidth								
=GOTO(A124)								
OppOffset=Offset+LaneWidth*4								
=GOTO(A124)								
OppOffset=Offset+LaneWidth*3								
=GOTO(A124)								
OppOffset=Offset+LaneWidth*2								
x=0								
z=0								
=FOR("Count",1,Width,1)								
z=z+1								
=IF(AND(Speed>30,Speed<=40),GOTO(A135))								
=IF(AND(Speed>40,Speed<=50),GOTO(A138))								
=IF(AND(Speed>50,Speed<=60),GOTO(A141))								
=IF(Speed>60,GOTO(A144))								
=VLOOKUP(OppOffset+SwathWidth*COS(EncAngle)+(z-1),D2:I102,2)								
x=x+A132								
=GOTO(A146)								
=VLOOKUP(OppOffset+SwathWidth*COS(EncAngle)+(z-1),D2:I102,3)								
x=x+A135								
=GOTO(A146)								
=VLOOKUP(OppOffset+SwathWidth*COS(EncAngle)+(z-1),D2:I102,4)								
x=x+A138								
=GOTO(A146)								
=VLOOKUP(OppOffset+SwathWidth*COS(EncAngle)+(z-1),D2:I102,5)								
x=x+A141								
=GOTO(A146)								
=VLOOKUP(OppOffset+SwathWidth*COS(EncAngle)+(z-1),D2:I102,6)								
x=x+A144								
=NEXT()								
=IF((Width=0),0,+x/Width)								
=RETURN(A147)								
OppZone2								
=RESULT(1)								
=ARGUMENT("Speed",1)								
=ARGUMENT("Offset",1)								
=ARGUMENT("Width",1)								
=ARGUMENT("Length",1)								
=ARGUMENT("EncAngle",1)								
=ARGUMENT("SwathWidth",1)								
=ARGUMENT("HwyType",2)								
=ARGUMENT("NoLanes",1)								
=ARGUMENT("LaneWidth",1)								
EncAngle=EncAngle*PI()/180	Convert to Radians							
=IF(NoLanes=4,GOTO(A167))								
=IF(NoLanes=3,GOTO(A169))								
=IF(NoLanes=2,GOTO(A171))								
OppOffset=Offset+LaneWidth								
=GOTO(A172)								
OppOffset=Offset+LaneWidth*4								
=GOTO(A172)								
OppOffset=Offset+LaneWidth*3								
=GOTO(A172)								
OppOffset=Offset+LaneWidth*2								
x=0								
z=0								
=FOR("Count",1,SwathWidth,1)								
z=z+1								
=IF(AND(Speed>30,Speed<=40),GOTO(A183))								
=IF(AND(Speed>40,Speed<=50),GOTO(A186))								
=IF(AND(Speed>50,Speed<=60),GOTO(A189))								
=IF(Speed>60,GOTO(A192))								
=VLOOKUP(OppOffset +(z-1)*COS(EncAngle),D2:I102,2)								
x=x+A180								
=GOTO(A194)								
=VLOOKUP(OppOffset +(z-1)*COS(EncAngle),D2:I102,3)								
x=x+A183								
=GOTO(A194)								
=VLOOKUP(OppOffset +(z-1)*COS(EncAngle),D2:I102,4)								
x=x+A186								
=GOTO(A194)								
=VLOOKUP(OppOffset +(z-1)*COS(EncAngle),D2:I102,5)								
x=x+A189								
=GOTO(A194)								
=VLOOKUP(OppOffset +(z-1)*COS(EncAngle),D2:I102,6)								
x=x+A192								
=NEXT()								
=IF((Width=0),0,+x/SwathWidth)								
=RETURN(A195)								
OppZone3								
=RESULT(1)								
=ARGUMENT("Speed",1)								
=ARGUMENT("Offset",1)								
=ARGUMENT("Width",1)								
=ARGUMENT("Length",1)								
=ARGUMENT("EncAngle",1)								
=ARGUMENT("SwathWidth",1)								
=ARGUMENT("HwyType",2)								
=ARGUMENT("NoLanes",1)								
=ARGUMENT("LaneWidth",1)								
EncAngle=EncAngle*PI()/180	Convert to Radians							
=IF(NoLanes=4,GOTO(A215))								
=IF(NoLanes=3,GOTO(A217))								
=IF(NoLanes=2,GOTO(A219))								
OppOffset=Offset+LaneWidth								
=GOTO(A220)								

Corrected Lookup to Line A183 for 31-40 MPH

OppOffset=Offset+LaneWidth*4								
=GOTO(A220)								
OppOffset=Offset+LaneWidth*3								
=GOTO(A220)								
OppOffset=Offset+LaneWidth*2								
=IF(AND(Speed>30,Speed<=40),GOTO(A226))								
=IF(AND(Speed>40,Speed<=50),GOTO(A228))								
=IF(AND(Speed>50,Speed<=60),GOTO(A230))								
=IF(Speed>60,GOTO(A232))								
=IF((Length=0),0,VLOOKUP(OppOffset,D2:I102,2))								
=RETURN(A224)								
=IF((Length=0),0,VLOOKUP(OppOffset,D2:I102,3))								
=RETURN(A226)								
=IF((Length=0),0,VLOOKUP(OppOffset,D2:I102,4))								
=RETURN(A228)								
=IF((Length=0),0,VLOOKUP(OppOffset,D2:I102,5))								
=RETURN(A230)								
=IF((Length=0),0,VLOOKUP(OppOffset,D2:I102,6))								
=RETURN(A232)								
EconomicFactor								
=RESULT(1)								
=ARGUMENT("TGF",1)								
=ARGUMENT("i",1)								
=ARGUMENT("n",1)								
x=0								
z=0								
=FOR("Count",1,n,1)						Median Four Lane A		
z=z+1			**Average Daily Traf**	30 mph	40 mph	50 mph	60 mph	70 mph
x=x+(1+TGF/100)^(z-0.5)*(1+i/100)^(-z)								
=NEXT()			**12000**		0.39	0.47	0.53	0.57
=x			**24000**		0.43	0.5	0.56	0.6
=RETURN(A246)			**36000**		0.49	0.55	0.6	0.64
			48000		0.55	0.61	0.65	0.68
Multilane			**60000**		0.62	0.67	0.7	0.73
=ARGUMENT("HwyType",2)								
=ARGUMENT("NoLanes",1)						Median Six Lane An		
=ARGUMENT("Analysis",2)			**Average Daily Traf**	30 mph	40 mph	50 mph	60 mph	70 mph
=ARGUMENT("Speed",1)								
=ARGUMENT("ADT",1)			**24000**		0.35	0.42	0.48	0.52
			48000		0.43	0.49	0.54	0.58
z=1			**72000**		0.46	0.52	0.56	0.6
x=1			**96000**		0.48	0.53	0.58	0.61
=IF(NoLanes<=1,GOTO(A349))			**120000**		0.48	0.53	0.57	0.61
=IF(Analysis="X",GOTO(A349))								
=IF(Analysis="M",GOTO(A307))								
=IF(NoLanes>=3,GOTO(A283))								
=IF(ADT<=18000,12000,0)	4 lane roadside look							
=IF(AND(ADT>18000,ADT<=30000),24000,0)								
=IF(AND(ADT>30000,ADT<=42000),36000,0)								
=IF(AND(ADT>42000,ADT<=54000),48000,0)								
=IF(ADT>54000,60000,0)								
z=MAX(A262:A266)								
=IF(Speed>60,GOTO(A280))								
=IF(Speed>50,GOTO(A278))								
=IF(Speed>40,GOTO(A276))								
=IF(Speed<=40,GOTO(A274))								
x=VLOOKUP(z,K245:P249,2)								
=GOTO(A349)								
x=VLOOKUP(z,K245:P249,3)								
=GOTO(A349)								
x=VLOOKUP(z,K245:P249,4)								
=GOTO(A349)								
x=VLOOKUP(z,K245:P249,5)								
=GOTO(A349)								
x=VLOOKUP(z,K245:P249,6)								
=GOTO(A349)								
=IF(ADT<=36000,24000,0)	6 lane roadside look							
=IF(AND(ADT>36000,ADT<=60000),48000,0)								
=IF(AND(ADT>60000,ADT<=84000),72000,0)								
=IF(AND(ADT>84000,ADT<=108000),96000,0)								
=IF(ADT>108000,120000,0)								
z=MAX(A283:A287)								
=IF(Speed>60,GOTO(A301))								
=IF(Speed>50,GOTO(A299))								
=IF(Speed>40,GOTO(A297))								
=IF(Speed<=40,GOTO(A295))								
x=VLOOKUP(z,K254:P258,2)								
=GOTO(A349)								
x=VLOOKUP(z,K254:P258,3)								
=GOTO(A349)								
x=VLOOKUP(z,K254:P258,4)								
=GOTO(A349)								
x=VLOOKUP(z,K254:P258,5)								
=GOTO(A349)								
x=VLOOKUP(z,K254:P258,6)								
=GOTO(A349)								
=IF(NoLanes>=3,GOTO(A329))								
=IF(ADT<=18000,12000,0)	4 lane median looku							
=IF(AND(ADT>18000,ADT<=30000),24000,0)								
=IF(AND(ADT>30000,ADT<=42000),36000,0)								
=IF(AND(ADT>42000,ADT<=54000),48000,0)								
=IF(ADT>54000,60000,0)								
z=MAX(A308:A312)								
=IF(Speed>60,GOTO(A326))								
=IF(Speed>50,GOTO(A324))								
=IF(Speed>40,GOTO(A322))								
=IF(Speed<=40,GOTO(A320))								
x=VLOOKUP(z,D245:I249,2)								
=GOTO(A349)								
x=VLOOKUP(z,D245:I249,3)								
=GOTO(A349)								

x=VLOOKUP(z,D245:I249,4)								
=GOTO(A349)								
x=VLOOKUP(z,D245:I249,5)								
=GOTO(A349)								
x=VLOOKUP(z,D245:I249,6)								
=GOTO(A349)								
=IF(ADT<=36000,24000,0)	6 lane median looku							
=IF(AND(ADT>36000,ADT<=60000),48000,0)								
=IF(AND(ADT>60000,ADT<=84000),72000,0)								
=IF(AND(ADT>84000,ADT<=108000),96000,0)								
=IF(ADT>108000,120000,0)								
z=MAX(A329:A333)								
=IF(Speed>60,GOTO(A347))								
=IF(Speed>50,GOTO(A345))								
=IF(Speed>40,GOTO(A343))								
=IF(Speed<=40,GOTO(A341))								
x=VLOOKUP(z,D254:I258,2)								
=GOTO(A349)								
x=VLOOKUP(z,D254:I258,3)								
=GOTO(A349)								
x=VLOOKUP(z,D254:I258,4)								
=GOTO(A349)								
x=VLOOKUP(z,D254:I258,5)								
=GOTO(A349)								
x=VLOOKUP(z,D254:I258,6)								
=GOTO(A349)								
=x								
=RETURN(A349)								
						Slope Factors		
					Slope	Fill	Cut	
					1	0	1.4	
SlopeFactors					2	0	1.4	
=RESULT(1)					3	0	1.4	
=ARGUMENT("Type",2)					4	0.8	1.2	
=ARGUMENT("Rate",1)					5	0.8	1.2	
=ARGUMENT("EffOffset",1)					6	1	1	
=ARGUMENT("NextOffset",1)					10	1	1	
=ARGUMENT("OrigWidth",1)								
=ARGUMENT("OrigOffset",1)								
x=1								
z=1								
=IF(OR(Type="F",Type="C"),x=1,GOTO(A370))								
=IF(Type="O",GOTO(A370))								
=IF(Type="F",GOTO(A369))								
x=VLOOKUP(Rate,E353:G359,3)								
=GOTO(A370)								
x=VLOOKUP(Rate,E353:G359,2)								
z=IF(NextOffset=0,OrigOffset,IF((OrigWidth=0),0,((x*NextOffset)+EffOffset)))								
=z								
=RETURN(A371)								
		1989						
		AASHTO						
		Roadside	Design	Guide				
		Table A.2						
		SEVERITY	PDO(1)	PDO(2)	SLIGHT	MODERATE	SEVERE	FATALITY
		INDEX			INJURY	INJURY	INJURY	
		0	0	0	0	0	0	0
Sitable	Recognize Severity	0.5	100	0	0	0	0	0
	Recognize Severity	1	66.7	23.7	7.3	2.3	0	0
UpstreamSide		2	0	71	22	7	0	0
=ARGUMENT("SI",1)		3	0	43	34	21	1	1
=ARGUMENT("KCost",1)		4	0	30	30	32	5	3
=ARGUMENT("ACost",1)		5	0	15	22	45	10	8
=ARGUMENT("BCost",1)		6	0	7	16	39	20	18
=ARGUMENT("CCost",1)	Compute Costs for	7	0	2	10	28	30	30
=ARGUMENT("OCost",1)		8	0	0	4	19	27	50
CostZero=+(D$385*OCost+E$385*OCost+F$385*CCost+G$385*BCost+H$385*/		9	0	0	0	7	18	75
CostOneHalf=+(D$386*OCost+E$386*OCost+F$386*CCost+G$386*BCost+H$3		10	0	0	0	0	0	100
CostOne=+(D$387*OCost+E$387*OCost+F$387*CCost+G$387*BCost+H$387*/								
CostTwo=+(D$388*OCost+E$388*OCost+F$388*CCost+G$388*BCost+H$388*/								
CostThree=+(D$389*OCost+E$389*OCost+F$389*CCost+G$389*BCost+H$389								
Costfour=+(D$390*OCost+E$390*OCost+F$390*CCost+G$390*BCost+H$390*A								
CostFive=+(D$391*OCost+E$391*OCost+F$391*CCost+G$391*BCost+H$391*/	Returns result to wo							
CostSix=+(D$392*OCost+E$392*OCost+F$392*CCost+G$392*BCost+H$392*AI								
CostSeven=+(D$393*OCost+E$393*OCost+F$393*CCost+G$393*BCost+H$393								
CostEight=+(D$394*OCost+E$394*OCost+F$394*CCost+G$394*BCost+H$394*								
CostNine=+(D$395*OCost+E$395*OCost+F$395*CCost+G$395*BCost+H$395*/	Proportion Cost for							
CostTen=+(D$396*OCost+E$396*OCost+F$396*CCost+G$396*BCost+H$396*A								
=IF(AND(SI>=0,SI<0.5),CostZero+SI*2*(CostOneHalf-CostZero))								
=IF(AND(SI>=0.5,SI<1),CostOneHalf+(SI-0.5)*2*(CostOne-CostOneHalf),0)								
=IF(AND(SI>=1,SI<2),CostOne+(SI-1)*(CostTwo-CostOne),0)								
=IF(AND(SI>=2,SI<3),CostTwo+(SI-2)*(CostThree-CostTwo),0)								
=IF(AND(SI>=3,SI<4),CostThree+(SI-3)*(Costfour-CostThree),0)								
=IF(AND(SI>=4,SI<5),Costfour+(SI-4)*(CostFive-Costfour),0)								
=IF(AND(SI>=5,SI<6),CostFive+(SI-5)*(CostSix-CostFive),0)								
=IF(AND(SI>=6,SI<7),CostSix+(SI-6)*(CostSeven-CostSix),0)								
=IF(AND(SI>=7,SI<8),CostSeven+(SI-7)*(CostEight-CostSeven),0)								
=IF(AND(SI>=8,SI<9),CostEight+(SI-8)*(CostNine-CostEight),0)								
=IF(AND(SI>=9,SI<10),CostNine+(SI-9)*(CostTen-CostNine),0)	Recognize the only I							
=IF(SI>=10,CostTen,0)	Return value to Cost							
=MAX(A407:A418)								
=RETURN((A419))								

Cost-Effective Analysis Procedure (Ver 1.2 revised 12/99; updated 5/19, 2/21) **State of Alaska, Department of Transportation & Public Facilities**

PROJECT: Work Zone Test Case
OPTION: 3 months
DATE: 2/15/2023 1:53 PM

..\Severity_Indices\1996RDG-AppA Severities mph_ft.pdf
(Link for DOTPF internal use)

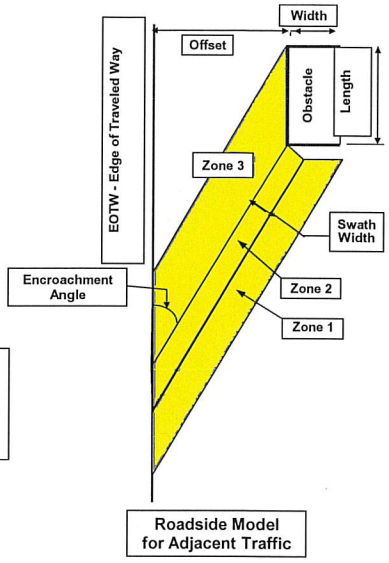
TRAFFIC INPUT			Resulting Design Year ADT
Average Daily Traffic (ADT)	15000	veh/day	15,000
Traffic Growth Factor	0	%	
Speed	40	mph	
Grade (+ = uphill ,- = downhill)	0	%	
Degree of Curve (+= inside, -= outside)	0	degrees	
No. of Lanes Each Direction	1	lanes	
Lane Width	12	ft	
Swath Width	12	ft	
Highway Type	U	U,D, or O	
Median or Roadside Analysis?	R	M or R	
Adjacent Lane User Factor	1.00		
Opposing Lane User Factor	1.00		

Input

U = Undivided Roadway
D = Divided Roaday
O = One-Way Roadway

R = Roadside Analysis
(obstacle right of adjacent traffic)

M = Median Analysis
(obstacle left of adjacent traffic)

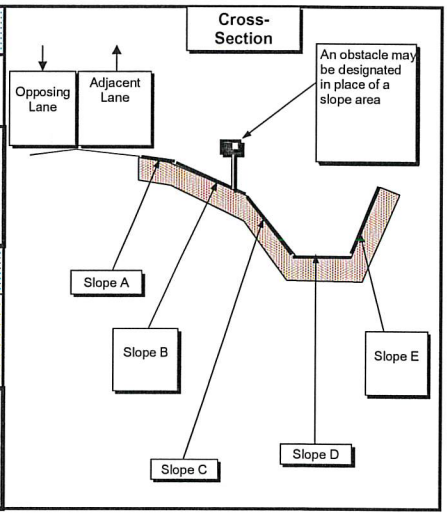


Roadside Model for Adjacent Traffic

ECONOMIC INPUT		
Period (n)	1	years
Interest Rate (i)	3	%

F = Fill Slope (downhill *)
C = Cut Slope (uphill *)
O = Obstacle
* from the edge-of-traveled-way

ROADSIDE MODEL INPUT	Fill	Culvert	Water	Slope D or Obstacle	Slope E or Obstacle
Fill,Cut, or Obstacle (F,C, or O)	O	O	O	O	O
Slope Rate (X where X:1 ft/ft)	0	0	0	0	0
Offset to Slope/Obstacle (ft)	0	0	0	0	0
Slope/Obstacle Width (ft)	2	0	0	0	0
Slope/Obstacle Length (ft)	1000	0	0	0	0
Effective Offset (computed)	0	0	0	0	0



SEVERITY INDEX INPUT	Fill	Culvert	Water	Slope D or Obstacle	Slope E or Obstacle
Upstream Side	4.3	0	0	0	0
Upstream Corner	4.3	0	0	0	0
Face	2	0	0	0	0
Downstream Corner	4.3	0	0	0	0
Downstream Side	4.3	0	0	0	0

ACCIDENT PREDICTION OUTPUT	Slope A or Obstacle	Slope B or Obstacle	Slope C or Obstacle	Slope D or Obstacle	Slope E or Obstacle	Total Impacts at Outer Edge of Model
Initial Impacts Per Year	0.9080	0.0000	0.0000	0.0000	0.0000	**0.9080 impacts per year**
Impacts Over Project Life	0.8816	0.0000	0.0000	0.0000	0.0000	**0.8816 impacts over project life**
						0.9080 predicted work zone impacts

PROJECT COST INPUT	
INSTALLATION COSTS	
Design Costs	$0
Right-of-Way Cost	$0
Utilities Costs	$0
Construction Costs	$8,000
TOTAL INSTALLATION COSTS	$8,000
ANNUAL MAINTENANCE	$0
SALVAGE VALUE (Present)	$0
DAMAGE COSTS PER ACCIDENT	
Upstream Side	$0
Upstream Corner	$0
Face	$0
Downstream Corner	$0
Downstream Side	$0

PROJECT COSTS OUTPUT	Present Worth		Annual Costs
Installation	$8,000		$8,240
Routine Maintenance	$0		$0
Salvage Value (Future)	$0		$0
Adjacent Accidents	$37,446		$38,569
Opposing Accidents	$13,028		$13,419
Repairs due to Adjacent Accidents	$0		$0
Repairs due to Opposite Accidents	$0		$0
SUBTOTALS		*Work zone=*	
Net Costs to Public	$50,474	*Public x %*	$51,988
Net Costs to Department	$8,000	*+Dept install*	$8,240
		1	
TOTAL COSTS (Rounded)	$58,000	*$60,228*	$60,000
	Project Life	*Partial Year*	Per Year

BACKGROUND ROADSIDE MODEL COMPUTATIONS

PROJECT: Work Zone Test Case
OPTION: 3 months

DATE: 2/15/2023
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COMPUTED COST FACTORS		
Capitol Recovery Factor	1.03000	A/P
Sinking Fund Factor	1.00000	A/F
Single Payment Compound Amount Factor	1.03000	F/P
Economic Factor	0.97087	Ke

WILLINGNESS-TO-PAY COSTS	Severity Code	USDOT VSL (2008$)	GDP Implicit Price Deflator	2022 WTP Costs
Fatality	K	[illegible]	[illegible]	$11,600,000
Incapacitating Injury	A	[illegible]	[illegible]	$800,000
Nonincapacitating Injury	B	[illegible]	[illegible]	$160,000
Possible Injury	C	[illegible]	[illegible]	$85,000
Property Damage Only	O	[illegible]	[illegible]	$8,900

ASSOCIATED ACCIDENT COSTS	Slope A or Obstacle	Slope B or Obstacle	Slope C or Obstacle	Slope D or Obstacle	Slope E or Obstacle
Upstream Side	$657,170	$0	$0	$0	$0
Upstream Corner	$657,170	$0	$0	$0	$0
Face	$36,219	$0	$0	$0	$0
Downstream Corner	$657,170	$0	$0	$0	$0
Downstream Side	$657,170	$0	$0	$0	$0

ENCROACHMENT RATE	Adjacent Traffic	Opposing Traffic
Encroachment Angle (degr)	17.2	17.2
Baseline Encr. Frequency	3.75	3.75
Curve Adjustment Factor	1.00	1.00
Grade Adjustment Factor	1.00	1.00
Multilane Adjustment Factor	1.00	1.00
User Factor	1.00	1.00
Total Encroachments	3.75	3.75

Adjacent Traffic

	Zone Length A	Zone Length B	Zone Length C	Zone Length D	Zone Length E
Zone 1	6	0	0	0	0
Zone 2	41	41	41	41	41
Zone 3	1000	0	0	0	0
Total	1047	41	41	41	41

	Encroachment Frequency A	Encroachment Frequency B	Encroachment Frequency C	Encroachment Frequency D	Encroachment Frequency E
Zone 1	0.0046	0.0000	0.0000	0.0000	0.0000
Zone 2	0.0288	0.0288	0.0288	0.0288	0.0288
Zone 3	0.7102	0.0000	0.0000	0.0000	0.0000
Total	0.7436	0.0288	0.0288	0.0288	0.0288

	Lateral Extent Probability A	Lateral Extent Probability B	Lateral Extent Probability C	Lateral Extent Probability D	Lateral Extent Probability E
Zone 1	0.2480	0.0000	0.0000	0.0000	0.0000
Zone 2	0.6387	0.0000	0.0000	0.0000	0.0000
Zone 3	1.0000	0.0000	0.0000	0.0000	0.0000
Total					

	Collision Frequency (Impacts/ yr)A	Collision Frequency (Impacts/ yr)B	Collision Frequency (Impacts/ yr)C	Collision Frequency (Impacts/ yr)D	Collision Frequency (Impacts/ yr)E
Zone 1	0.0011	0.0000	0.0000	0.0000	0.0000
Zone 2	0.0184	0.0000	0.0000	0.0000	0.0000
Zone 3	0.7102	0.0000	0.0000	0.0000	0.0000
Total	0.7298	0.0000	0.0000	0.0000	0.0000

	Accident Costs per year A	Accident Costs per year B	Accident Costs per year C	Accident Costs per year D	Accident Costs per year E
Zone 1	$748	$0	$0	$0	$0
Zone 2	$12,098	$0	$0	$0	$0
Zone 3	$25,724	$0	$0	$0	$0
Total	$38,569	$0	$0	$0	$0

Opposing Traffic

	Zone Length A	Zone Length B	Zone Length C	Zone Length D	Zone Length E
Zone 1	6	0	0	0	0
Zone 2	41	41	41	41	41
Zone 3	1000	0	0	0	0
Total	1047	41	41	41	41

	Encroachment Frequency A	Encroachment Frequency B	Encroachment Frequency C	Encroachment Frequency D	Encroachment Frequency E
Zone 1	0.0046	0.0000	0.0000	0.0000	0.0000
Zone 2	0.0288	0.0288	0.0288	0.0288	0.0288
Zone 3	0.7102	0.0000	0.0000	0.0000	0.0000
Total	0.7436	0.0288	0.0288	0.0288	0.0288

	Lateral Extent Probability A	Lateral Extent Probability B	Lateral Extent Probability C	Lateral Extent Probability D	Lateral Extent Probability E
Zone 1	0.0794	0.0000	0.0000	0.0000	0.0000
Zone 2	0.3764	0.0000	0.0000	0.0000	0.0000
Zone 3	0.2352	0.0000	0.0000	0.0000	0.0000
Total					

	Collision Frequency (Impacts/ yr)A	Collision Frequency (Impacts/ yr)B	Collision Frequency (Impacts/ yr)C	Collision Frequency (Impacts/ yr)D	Collision Frequency (Impacts/ yr)E
Zone 1	0.0004	0.0000	0.0000	0.0000	0.0000
Zone 2	0.0108	0.0000	0.0000	0.0000	0.0000
Zone 3	0.1670	0.0000	0.0000	0.0000	0.0000
Total	0.1783	0.0000	0.0000	0.0000	0.0000

	Accident Costs per year A	Accident Costs per year B	Accident Costs per year C	Accident Costs per year D	Accident Costs per year E
Zone 1	$239	$0	$0	$0	$0
Zone 2	$7,130	$0	$0	$0	$0
Zone 3	$6,050	$0	$0	$0	$0
Total	$13,419	$0	$0	$0	$0

Adjacent Traffic	Total Initial Accident Costs First Year
Zone 1	$748
Zone 2	$12,098
Zone 3	$25,724
Total	$38,569

Opposing Traffic	Total Initial Accident Costs First Year
Zone 1	$239
Zone 2	$7,130
Zone 3	$6,050
Total	$13,419

ROADSIDE ZONE GENERAL CHARACTERISTICS			
Totals	Adjacent Traffic	Opposing Traffic	Total
Impacts per year	0.7298	0.1783	0.9080
Impacts over Project Life	0.7085	0.1731	0.8816
Initial Accident Costs per year	$38,569	$13,419	$51,989

Error: Odd offsets don't "lookup" properly in Macros using the formulas to interpolate

			Off set	30 mph	40 mph	50 mph	60 mph	70 mph
AdjZone1	Zone 1 Subroutine		0	1	1	1	1	1
=RESULT(1)	to compute lateral e		1	=+(E2+E4)/2	0.8479	0.8853	0.9175	0.9419
=ARGUMENT("Speed",1)	Probabilites		2	0.5895	0.6958	0.7706	0.835	0.8838
=ARGUMENT("Offset",1)			3	=+(E4+E6)/2	0.6176	0.6943	0.7633	0.8204
=ARGUMENT("Width",1)	recognizing inputs		4	0.4139	0.5393	0.618	0.6916	0.757
=ARGUMENT("Length",1)			5	=+(E6+E8)/2	0.4861	0.5706	0.6406	0.7074
=ARGUMENT("EncAngle",1)			6	0.2997	0.4328	0.5232	0.5895	0.6578
=ARGUMENT("SwathWidth",1)			7	=+(E8+E10)/2	0.3917	0.4868	0.5527	0.619
=ARGUMENT("HwyType",2)			8	0.2216	0.3505	0.4503	0.5158	0.5801
=ARGUMENT("NoLanes",1)			9	=+(E10+E12)/2	0.3184	0.4189	0.4864	0.549
EncAngle=EncAngle*PI()/180	Convert to Radians		10	0.1663	0.2863	0.3875	0.4569	0.5179
x=0			11	=+(E12+E14)/2	0.2608	0.3607	0.4319	0.492
z=0			12	0.1251	0.2352	0.3338	0.4068	0.4661
=FOR("Count",1,Width,1)			13	=+(E14+E16)/2	0.2148	0.3108	0.3848	0.4434
z=z+1			14	0.0948	0.1943	0.2878	0.3628	0.4207
=IF(AND(Speed>30,Speed<=40),GOTO(A24))	Choose computation		15	=+(E16+E18)/2	0.1775	0.2685	0.3435	0.4005
=IF(AND(Speed>40,Speed<=50),GOTO(A27))	based upon Speed		16	0.0717	0.1607	0.2491	0.3242	0.3803
=IF(AND(Speed>50,Speed<=60),GOTO(A30))			17	=+(E18+E20)/2	0.1469	0.2324	0.3069	0.3625
=IF(Speed>60,GOTO(A33))			18	0.0545	0.1331	0.2157	0.2895	0.3446
=VLOOKUP(Offset+SwathWidth*COS(EncAngle)+(z-1),D2:I102,2)	AASHTO Zone1 For		19	=+(E20+E22)/2	0.1216	0.2013	0.2741	0.3287
x=x+A21	for each speed		20	0.0411	0.1101	0.1869	0.2586	0.3128
=GOTO(A35)			21	=+(E22+E24)/2	0.1006	0.1745	0.2448	0.2986
=VLOOKUP(Offset+SwathWidth*COS(EncAngle)+(z-1),D2:I102,3)			22	0.031	0.0911	0.162	0.2309	0.2843
x=x+A24			23	=+(E24+E26)/2	0.0833	0.161	0.2185	0.2716
=GOTO(A35)			24	0.0233	0.0754	0.14	0.206	0.2589
=VLOOKUP(Offset+SwathWidth*COS(EncAngle)+(z-1),D2:I102,4)			25	=+(E26+E28)/2	0.0687	0.1305	0.1948	0.2474
x=x+A27			26	0.0174	0.062	0.121	0.1836	0.2358
=GOTO(A35)			27	=+(E28+E30)/2	0.0566	0.1128	0.1735	0.2253
=VLOOKUP(Offset+SwathWidth*COS(EncAngle)+(z-1),D2:I102,5)			28	0.013	0.0511	0.1045	0.1634	0.2148
x=x+A30			29	=+(E30+E32)/2	0.0465	0.0973	0.1543	0.2052
=GOTO(A35)			30	0.0096	0.0419	0.09	0.1452	0.1955
=VLOOKUP(Offset+SwathWidth*COS(EncAngle)+(z-1),D2:I102,6)			31	=+(E32+E34)/2	0.0381	0.0836	0.137	0.1867
x=x+A33			32	0.007	0.0342	0.0772	0.1288	0.1779
=NEXT()			33	=+(E34+E36)/2	0.031	0.0718	0.1215	0.1697
=IF((Width=0),0,+x/Width)			34	0.0051	0.0278	0.0663	0.1141	0.1615
=RETURN(A36)			35	=+(E36+E38)/2	0.0252	0.0615	0.1075	0.154
			36	0.0037	0.0226	0.0567	0.1009	0.1464
AdjZone2	Same Process		37	=+(E38+E40)/2	0.0204	0.0525	0.095	0.1394
=RESULT(1)			38	0.0026	0.0182	0.0483	0.089	0.1324
=ARGUMENT("Speed",1)			39	=+(E40+E42)/2	0.0164	0.0447	0.0837	0.126
=ARGUMENT("Offset",1)			40	0.0018	0.0145	0.041	0.0784	0.1196
=ARGUMENT("Width",1)			41	=+(E42+E44)/2	0.013	0.0379	0.0737	0.1137
=ARGUMENT("Length",1)			42	0.0013	0.0116	0.0347	0.069	0.1078
=ARGUMENT("EncAngle",1)			43	=+(E44+E46)/2	0.0104	0.032	0.0648	0.1024
=ARGUMENT("SwathWidth",1)			44	0.0009	0.0091	0.0292	0.0605	0.0969
=ARGUMENT("HwyType",2)			45	=+(E46+E48)/2	0.0081	0.0269	0.0567	0.092
=ARGUMENT("NoLanes",1)			46	0.0006	0.0071	0.0245	0.0529	0.087
EncAngle=EncAngle*PI()/180	Convert to Radians		47	=+(E48+E50)/2	0.0063	0.0225	0.0495	0.0825
x=0			48	0.0004	0.0055	0.0204	0.0461	0.078
z=0			49	=+(E50+E52)/2	0.0049	0.0187	0.0431	0.0739
=FOR("Count",1,SwathWidt			50	0.0002	0.0043	0.0169	0.0401	0.0698
z=z+1			51	=+(E52+E54)/2	0.0038	0.0154	0.0375	0.0661
=IF(AND(Speed>30,Speed<=40),GOTO(A58))			52	0.0001	0.0033	0.014	0.0349	0.0623
=IF(AND(Speed>40,Speed<=50),GOTO(A64))			53	0.0001	0.0029	0.0128	0.0325	0.0589
=IF(AND(Speed>50,Speed<=60),GOTO(A67))			54	0.0001	0.0024	0.0115	0.0301	0.0555
=IF(Speed>60,GOTO(A70))			55	0	0.0021	0.0104	0.028	0.0525
=VLOOKUP(Offset +(z-1)*COS(EncAngle),D2:I102,2)	AASHTO Zone 2 Fo		56	0	0.0016	0.0093	0.0259	0.0494
x=x+A58	for each speed		57	0	0.0016	0.0084	0.0241	0.0466
=GOTO(A72)			58	0	0.0013	0.0075	0.0222	0.0438
=VLOOKUP(Offset +(z-1)*COS(EncAngle),D2:I102,3)			59	0	0.0011	0.0068	0.0206	0.0413
x=x+A61			60	0	0.0009	0.006	0.019	0.0388
=GOTO(A72)			61	0	0.0008	0.0054	0.0176	0.0366
=VLOOKUP(Offset +(z-1)*COS(EncAngle),D2:I102,4)			62	0	0.0007	0.0048	0.0162	0.0343
x=x+A64			63	0	0.0006	0.0043	0.015	0.0323
=GOTO(A72)			64	0	0.0005	0.0038	0.0138	0.0302
=VLOOKUP(Offset +(z-1)*COS(EncAngle),D2:I102,5)			65	0	0.0004	0.0034	0.0127	0.0284
x=x+A67			66	0	0.0003	0.0029	0.0116	0.0265
=GOTO(A72)			67	0	0.0003	0.0026	0.0107	0.0249
=VLOOKUP(Offset +(z-1)*COS(EncAngle),D2:I102,6)			68	0	0.0002	0.0022	0.0098	0.0232
x=x+A70			69	0	0.0002	0.002	0.009	0.0217
=NEXT()			70	0	0.0001	0.0017	0.0081	0.0202
=IF((Width=0),0,+x/SwathWidth)			71	0	0.0001	0.0015	0.0075	0.0189
=RETURN(A73)			72	0	0.0001	0.0012	0.0068	0.0176
			73	0	0.0001	0.0011	0.0062	0.0165
AdjZone3			74	0	0	0.0009	0.0056	0.0153
=RESULT(1)			75	0	0	0.0008	0.0051	0.0143
=ARGUMENT("Speed",1)			76	0	0	0.0007	0.0046	0.0132
=ARGUMENT("Offset",1)			77	0	0	0.0006	0.0042	0.0123
=ARGUMENT("Width",1)			78	0	0	0.0005	0.0038	0.0114
=ARGUMENT("Length",1)			79	0	0	0.0004	0.0034	0.0106
=ARGUMENT("EncAngle",1)			80	0	0	0.0003	0.003	0.0097
=ARGUMENT("SwathWidth",1)			81	0	0	0.0003	0.0027	0.009
=ARGUMENT("HwyType",2)			82	0	0	0.0002	0.0024	0.0083
=ARGUMENT("NoLanes",1)			83	0	0	0.0002	0.0022	0.0077
EncAngle=EncAngle*PI()/180	Convert to Radians		84	0	0	0.0001	0.0019	0.007
=IF(AND(Speed>30,Speed<=40),GOTO(A93))			85	0	0	0.0001	0.0017	0.0065
=IF(AND(Speed>40,Speed<=50),GOTO(A95))			86	0	0	0.0001	0.0015	0.006
=IF(AND(Speed>50,Speed<=60),GOTO(A97))			87	0	0	0.0001	0.0014	0.0055
=IF(Speed>60,GOTO(A99))			88	0	0	0.0001	0.0012	0.005
=IF((Length=0),0,VLOOKUP(Offset,D2:I102,2))	AASHTO Zone 3 Fo		89	0	0	0.0001	0.0011	0.0046
=RETURN(A91)	for each speed		90	0	0	0	0.0009	0.0042
=IF((Length=0),0,VLOOKUP(Offset,D2:I102,3))			91	0	0	0	0.0008	0.0038
=RETURN(A93)			92	0	0	0	0.0007	0.0034
=IF((Length=0),0,VLOOKUP(Offset,D2:I102,4))			93	0	0	0	0.0006	0.0031
=RETURN(A95)			94	0	0	0	0.0005	0.0028
=IF((Length=0),0,VLOOKUP(Offset,D2:I102,5))			95	0	0	0	0.0004	0.0026
=RETURN(A97)			96	0	0	0	0.0003	0.0023
=IF((Length=0),0,VLOOKUP(Offset,D2:I102,6))			97	0	0	0	0.0003	0.0021
=RETURN(A99)			98	0	0	0	0.0002	0.0018
			99	0	0	0	0.0002	0.0017
OppZone1	Same Process		100	0	0	0	0.0001	0.0015
=RESULT(1)	Opposite Direction							
=ARGUMENT("Speed",1)								
=ARGUMENT("Offset",1)								
=ARGUMENT("Width",1)								
=ARGUMENT("Length",1)								

GOTO line is incorrect, should be line A61. Line A58 is for 30 MPH.

=ARGUMENT("EncAngle",1)	
=ARGUMENT("SwathWidth",1)	
=ARGUMENT("HwyType",2)	
=ARGUMENT("NoLanes",1)	
=ARGUMENT("LaneWidth",1)	
EncAngle=EncAngle*PI()/180	Convert to Radians
=IF(NoLanes=4,GOTO(A119))	Increase offset to ha
=IF(NoLanes=3,GOTO(A121))	if from opposing dire
=IF(NoLanes=2,GOTO(A123))	
OppOffset=Offset+LaneWidth	
=GOTO(A124)	
OppOffset=Offset+LaneWidth*4	
=GOTO(A124)	
OppOffset=Offset+LaneWidth*3	
=GOTO(A124)	
OppOffset=Offset+LaneWidth*2	
x=0	
z=0	
=FOR("Count",1,Width,1)	
z=z+1	
=IF(AND(Speed>30,Speed<=40),GOTO(A135))	
=IF(AND(Speed>40,Speed<=50),GOTO(A138))	
=IF(AND(Speed>50,Speed<=60),GOTO(A141))	
=IF(Speed>60,GOTO(A144))	
=VLOOKUP(OppOffset+SwathWidth*COS(EncAngle)+(z-1),D2:I102,2)	
x=x+A132	
=GOTO(A146)	
=VLOOKUP(OppOffset+SwathWidth*COS(EncAngle)+(z-1),D2:I102,3)	
x=x+A135	
=GOTO(A146)	
=VLOOKUP(OppOffset+SwathWidth*COS(EncAngle)+(z-1),D2:I102,4)	
x=x+A138	
=GOTO(A146)	
=VLOOKUP(OppOffset+SwathWidth*COS(EncAngle)+(z-1),D2:I102,5)	
x=x+A141	
=GOTO(A146)	
=VLOOKUP(OppOffset+SwathWidth*COS(EncAngle)+(z-1),D2:I102,6)	
x=x+A144	
=NEXT()	
=IF((Width=0),0,+x/Width)	
=RETURN(A147)	
OppZone2	
=RESULT(1)	
=ARGUMENT("Speed",1)	
=ARGUMENT("Offset",1)	
=ARGUMENT("Width",1)	
=ARGUMENT("Length",1)	
=ARGUMENT("EncAngle",1)	
=ARGUMENT("SwathWidth",1)	
=ARGUMENT("HwyType",2)	
=ARGUMENT("NoLanes",1)	
=ARGUMENT("LaneWidth",1)	
EncAngle=EncAngle*PI()/180	Convert to Radians
=IF(NoLanes=4,GOTO(A167))	
=IF(NoLanes=3,GOTO(A169))	
=IF(NoLanes=2,GOTO(A171))	
OppOffset=Offset+LaneWidth	
=GOTO(A172)	
OppOffset=Offset+LaneWidth*4	
=GOTO(A172)	
OppOffset=Offset+LaneWidth*3	
=GOTO(A172)	
OppOffset=Offset+LaneWidth*2	
x=0	
z=0	
=FOR("Count",1,SwathWidth,1)	
z=z+1	
=IF(AND(Speed>30,Speed<=40),GOTO(A180))	
=IF(AND(Speed>40,Speed<=50),GOTO(A186))	
=IF(AND(Speed>50,Speed<=60),GOTO(A189))	
=IF(Speed>60,GOTO(A192))	
=VLOOKUP(OppOffset +(z-1)*COS(EncAngle),D2:I102,2)	
x=x+A180	
=GOTO(A194)	
=VLOOKUP(OppOffset +(z-1)*COS(EncAngle),D2:I102,3)	
x=x+A183	
=GOTO(A194)	
=VLOOKUP(OppOffset +(z-1)*COS(EncAngle),D2:I102,4)	
x=x+A186	
=GOTO(A194)	
=VLOOKUP(OppOffset +(z-1)*COS(EncAngle),D2:I102,5)	
x=x+A189	
=GOTO(A194)	
=VLOOKUP(OppOffset +(z-1)*COS(EncAngle),D2:I102,6)	
x=x+A192	
=NEXT()	
=IF((Width=0),0,+x/SwathWidth)	
=RETURN(A195)	
OppZone3	
=RESULT(1)	
=ARGUMENT("Speed",1)	
=ARGUMENT("Offset",1)	
=ARGUMENT("Width",1)	
=ARGUMENT("Length",1)	
=ARGUMENT("EncAngle",1)	
=ARGUMENT("SwathWidth",1)	
=ARGUMENT("HwyType",2)	
=ARGUMENT("NoLanes",1)	
=ARGUMENT("LaneWidth",1)	
EncAngle=EncAngle*PI()/180	Convert to Radians
=IF(NoLanes=4,GOTO(A215))	
=IF(NoLanes=3,GOTO(A217))	
=IF(NoLanes=2,GOTO(A219))	
OppOffset=Offset+LaneWidth	
=GOTO(A220)	

GOTO line is incorrect, should be line A183
Line A180 is for 30 MPH.

OppOffset=Offset+LaneWidth*4								
=GOTO(A220)								
OppOffset=Offset+LaneWidth*3								
=GOTO(A220)								
OppOffset=Offset+LaneWidth*2								
=IF(AND(Speed>30,Speed<=40),GOTO(A226))								
=IF(AND(Speed>40,Speed<=50),GOTO(A228))								
=IF(AND(Speed>50,Speed<=60),GOTO(A230))								
=IF(Speed>60,GOTO(A232))								
=IF((Length=0),0,VLOOKUP(OppOffset,D2:I102,2))								
=RETURN(A224)								
=IF((Length=0),0,VLOOKUP(OppOffset,D2:I102,3))								
=RETURN(A226)								
=IF((Length=0),0,VLOOKUP(OppOffset,D2:I102,4))								
=RETURN(A228)								
=IF((Length=0),0,VLOOKUP(OppOffset,D2:I102,5))								
=RETURN(A230)								
=IF((Length=0),0,VLOOKUP(OppOffset,D2:I102,6))								
=RETURN(A232)								
EconomicFactor								
=RESULT(1)								
=ARGUMENT("TGF",1)								
=ARGUMENT("i",1)								
=ARGUMENT("n",1)								
x=0								
z=0								
=FOR("Count",1,n,1)						Median Four Lane A		
z=z+1			**Average Daily Traf**	30 mph	40 mph	50 mph	60 mph	70 mph
x=x+(1+TGF/100)^(z-0.5)*(1+i/100)^(-z)								
=NEXT()			**12000**		0.39	0.47	0.53	0.57
=x			**24000**		0.43	0.5	0.56	0.6
=RETURN(A246)			**36000**		0.49	0.55	0.6	0.64
			48000		0.55	0.61	0.65	0.68
Multilane			**60000**		0.62	0.67	0.7	0.73
=ARGUMENT("HwyType",2)								
=ARGUMENT("NoLanes",1)						Median Six Lane An		
=ARGUMENT("Analysis",2)			**Average Daily Traf**	30 mph	40 mph	50 mph	60 mph	70 mph
=ARGUMENT("Speed",1)								
=ARGUMENT("ADT",1)			**24000**		0.35	0.42	0.48	0.52
			48000		0.43	0.49	0.54	0.58
z=1			**72000**		0.46	0.52	0.56	0.6
x=1			**96000**		0.48	0.53	0.58	0.61
=IF(NoLanes<=1,GOTO(A349))			**120000**		0.48	0.53	0.57	0.61
=IF(Analysis="X",GOTO(A349))								
=IF(Analysis="M",GOTO(A307))								
=IF(NoLanes>=3,GOTO(A283))								
=IF(ADT<=18000,12000,0)	4 lane roadside look							
=IF(AND(ADT>18000,ADT<=30000),24000,0)								
=IF(AND(ADT>30000,ADT<=42000),36000,0)								
=IF(AND(ADT>42000,ADT<=54000),48000,0)								
=IF(ADT>54000,60000,0)								
z=MAX(A262:A266)								
=IF(Speed>60,GOTO(A280))								
=IF(Speed>50,GOTO(A278))								
=IF(Speed>40,GOTO(A276))								
=IF(Speed<=40,GOTO(A274))								
x=VLOOKUP(z,K245:P249,2)								
=GOTO(A349)								
x=VLOOKUP(z,K245:P249,3)								
=GOTO(A349)								
x=VLOOKUP(z,K245:P249,4)								
=GOTO(A349)								
x=VLOOKUP(z,K245:P249,5)								
=GOTO(A349)								
x=VLOOKUP(z,K245:P249,6)								
=GOTO(A349)								
=IF(ADT<=36000,24000,0)	6 lane roadside look							
=IF(AND(ADT>36000,ADT<=60000),48000,0)								
=IF(AND(ADT>60000,ADT<=84000),72000,0)								
=IF(AND(ADT>84000,ADT<=108000),96000,0)								
=IF(ADT>108000,120000,0)								
z=MAX(A283:A287)								
=IF(Speed>60,GOTO(A301))								
=IF(Speed>50,GOTO(A299))								
=IF(Speed>40,GOTO(A297))								
=IF(Speed<=40,GOTO(A295))								
x=VLOOKUP(z,K254:P258,2)								
=GOTO(A349)								
x=VLOOKUP(z,K254:P258,3)								
=GOTO(A349)								
x=VLOOKUP(z,K254:P258,4)								
=GOTO(A349)								
x=VLOOKUP(z,K254:P258,5)								
=GOTO(A349)								
x=VLOOKUP(z,K254:P258,6)								
=GOTO(A349)								
=IF(NoLanes>=3,GOTO(A329))								
=IF(ADT<=18000,12000,0)	4 lane median looku							
=IF(AND(ADT>18000,ADT<=30000),24000,0)								
=IF(AND(ADT>30000,ADT<=42000),36000,0)								
=IF(AND(ADT>42000,ADT<=54000),48000,0)								
=IF(ADT>54000,60000,0)								
z=MAX(A308:A312)								
=IF(Speed>60,GOTO(A326))								
=IF(Speed>50,GOTO(A324))								
=IF(Speed>40,GOTO(A322))								
=IF(Speed<=40,GOTO(A320))								
x=VLOOKUP(z,D245:I249,2)								
=GOTO(A349)								
x=VLOOKUP(z,D245:I249,3)								
=GOTO(A349)								

x=VLOOKUP(z,D245:I249,4)								
=GOTO(A349)								
x=VLOOKUP(z,D245:I249,5)								
=GOTO(A349)								
x=VLOOKUP(z,D245:I249,6)								
=GOTO(A349)								
.								
=IF(ADT<=36000,24000,0)	6 lane median looku							
=IF(AND(ADT>36000,ADT<=60000),48000,0)								
=IF(AND(ADT>60000,ADT<=84000),72000,0)								
=IF(AND(ADT>84000,ADT<=108000),96000,0)								
=IF(ADT>108000,120000,0)								
z=MAX(A329:A333)								
=IF(Speed>60,GOTO(A347))								
=IF(Speed>50,GOTO(A345))								
=IF(Speed>40,GOTO(A343))								
=IF(Speed<=40,GOTO(A341))								
x=VLOOKUP(z,D254:I258,2)								
=GOTO(A349)								
x=VLOOKUP(z,D254:I258,3)								
=GOTO(A349)								
x=VLOOKUP(z,D254:I258,4)								
=GOTO(A349)								
x=VLOOKUP(z,D254:I258,5)								
=GOTO(A349)								
x=VLOOKUP(z,D254:I258,6)								
=GOTO(A349)								
=x								
=RETURN(A349)								
						Slope Factors		
					Slope	Fill	Cut	
					1	0	1.4	
SlopeFactors					2	0	1.4	
=RESULT(1)					3	0	1.4	
=ARGUMENT("Type",2)					4	0.8	1.2	
=ARGUMENT("Rate",1)					5	0.8	1.2	
=ARGUMENT("EffOffset",1)					6	1	1	
=ARGUMENT("NextOffset",1)					10	1	1	
=ARGUMENT("OrigWidth",1)								
=ARGUMENT("OrigOffset",1)								
x=1								
z=1								
=IF(OR(Type="F",Type="C"),x=1,GOTO(A370))								
=IF(Type="O",GOTO(A370))								
=IF(Type="F",GOTO(A369))								
x=VLOOKUP(Rate,E353:G359,3)								
=GOTO(A370)								
x=VLOOKUP(Rate,E353:G359,2)								
z=IF(NextOffset=0,OrigOffset,IF((OrigWidth=0),0,((x*NextOffset)+EffOffset)))								
=z								
=RETURN(A371)								
		1989						
		AASHTO						
		Roadside	**Design**	Guide				
		Table A.2						
		SEVERITY	PDO(1)	PDO(2)	SLIGHT	MODERATE	SEVERE	FATALITY
		INDEX			INJURY	INJURY	INJURY	
		0	**0**	0	0	0	0	0
Sitable	Recognize Severity	**0.5**	**100**	0	0	0	0	0
	Recognize Severity	**1**	**66.7**	23.7	7.3	2.3	0	0
UpstreamSide		**2**	**0**	71	22	7	0	0
=ARGUMENT("SI",1)		**3**	**0**	43	34	21	1	1
=ARGUMENT("KCost",1)		**4**	**0**	30	30	32	5	3
=ARGUMENT("ACost",1)		**5**	**0**	15	22	45	10	8
=ARGUMENT("BCost",1)		**6**	**0**	7	16	39	20	18
=ARGUMENT("CCost",1)	Compute Costs for	**7**	**0**	2	10	28	30	30
=ARGUMENT("OCost",1)		**8**	**0**	0	4	19	27	50
CostZero=+(D$385*OCost+E$385*OCost+F$385*CCost+G$385*BCost+H$385*		**9**	**0**	0	0	7	18	75
CostOneHalf=+(D$386*OCost+E$386*OCost+F$386*CCost+G$386*BCost+H$3		**10**	**0**	0	0	0	0	100
CostOne=+(D$387*OCost+E$387*OCost+F$387*CCost+G$387*BCost+H$387*/								
CostTwo=+(D$388*OCost+E$388*OCost+F$388*CCost+G$388*BCost+H$388*/								
CostThree=+(D$389*OCost+E$389*OCost+F$389*CCost+G$389*BCost+H$389								
Costfour=+(D$390*OCost+E$390*OCost+F$390*CCost+G$390*BCost+H$390*A								
CostFive=+(D$391*OCost+E$391*OCost+F$391*CCost+G$391*BCost+H$391*/	Returns result to wo							
CostSix=+(D$392*OCost+E$392*OCost+F$392*CCost+G$392*BCost+H$392*A								
CostSeven=+(D$393*OCost+E$393*OCost+F$393*CCost+G$393*BCost+H$393								
CostEight=+(D$394*OCost+E$394*OCost+F$394*CCost+G$394*BCost+H$394*								
CostNine=+(D$395*OCost+E$395*OCost+F$395*CCost+G$395*BCost+H$395*/	Proportion Cost for							
CostTen=+(D$396*OCost+E$396*OCost+F$396*CCost+G$396*BCost+H$396*A								
=IF(AND(SI>=0,SI<0.5),CostZero+SI*2*(CostOneHalf-CostZero))								
=IF(AND(SI>=0.5,SI<1),CostOneHalf+(SI-0.5)*2*(CostOne-CostOneHalf),0)								
=IF(AND(SI>=1,SI<2),CostOne+(SI-1)*(CostTwo-CostOne),0)								
=IF(AND(SI>=2,SI<3),CostTwo+(SI-2)*(CostThree-CostTwo),0)								
=IF(AND(SI>=3,SI<4),CostThree+(SI-3)*(Costfour-CostThree),0)								
=IF(AND(SI>=4,SI<5),Costfour+(SI-4)*(CostFive-Costfour),0)								
=IF(AND(SI>=5,SI<6),CostFive+(SI-5)*(CostSix-CostFive),0)								
=IF(AND(SI>=6,SI<7),CostSix+(SI-6)*(CostSeven-CostSix),0)								
=IF(AND(SI>=7,SI<8),CostSeven+(SI-7)*(CostEight-CostSeven),0)								
=IF(AND(SI>=8,SI<9),CostEight+(SI-8)*(CostNine-CostEight),0)								
=IF(AND(SI>=9,SI<10),CostNine+(SI-9)*(CostTen-CostNine),0)	Recognize the only I							
=IF(SI>=10,CostTen,0)	Return value to Cost							
=MAX(A407:A418)								
=RETURN((A419))								