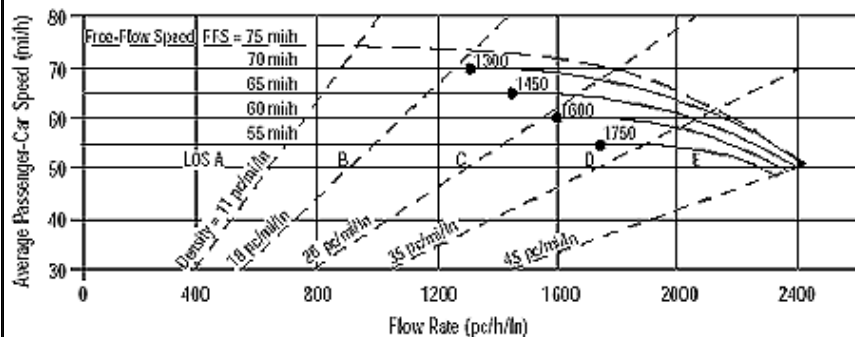


APPENDIX M

2030 WITH DOMINGUEZ ROAD (WITHOUT AND PLUS PROJECT)

FREEWAY SEGMENTS – HCS PLUS ANALYSIS

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information

Site Information

Analyst	Arthur Black	Highway/Direction of Travel	I-80 EB
Agency or Company	LSA	From/To	Atlantic St/Taylor Rd
Date Performed	8/18/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	

Project Description 2030 Without Project W - AM

Oper.(LOS) Des.(N) Planning Data

Flow Inputs

Volume, V	7719	veh/h	Peak-Hour Factor, PHF	0.90
AADT		veh/day	%Trucks and Buses, P _T	6
Peak-Hr Prop. of AADT, K			%RVs, P _R	0
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AADT x K x D		veh/h	Grade %	mi
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs

Calc Speed Adj and FFS

Lane Width	12.0	ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}	mi/h
Interchange Density	0.50	l/mi	f _{ID}	mi/h
Number of Lanes, N	5		f _N	mi/h
FFS (measured)	70.0	mi/h	FFS	70.0
Base free-flow Speed, BFFS		mi/h		

LOS and Performance Measures

Design (N)

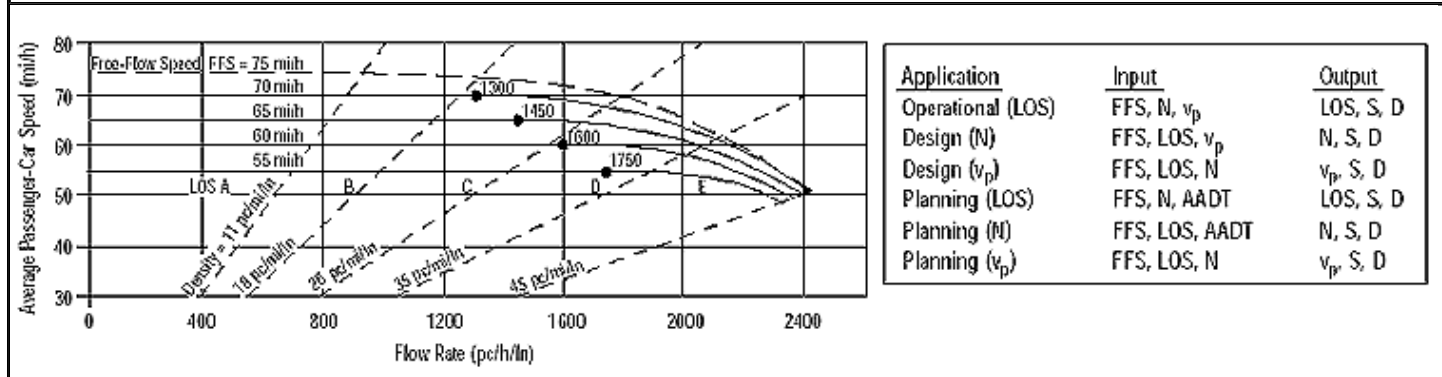
Operational (LOS)			Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1767	pc/h/ln	Design LOS	
S	68.2	mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	25.9	pc/mi/ln	S	mi/h
LOS	C		D = v _p / S	pc/mi/ln
			Required Number of Lanes, N	

Glossary

Factor Location

N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 EB
Agency or Company	LSA	From/To	Atlantic St/Taylor Rd
Date Performed	8/18/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 Without Project W - PM			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	7238	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 6
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

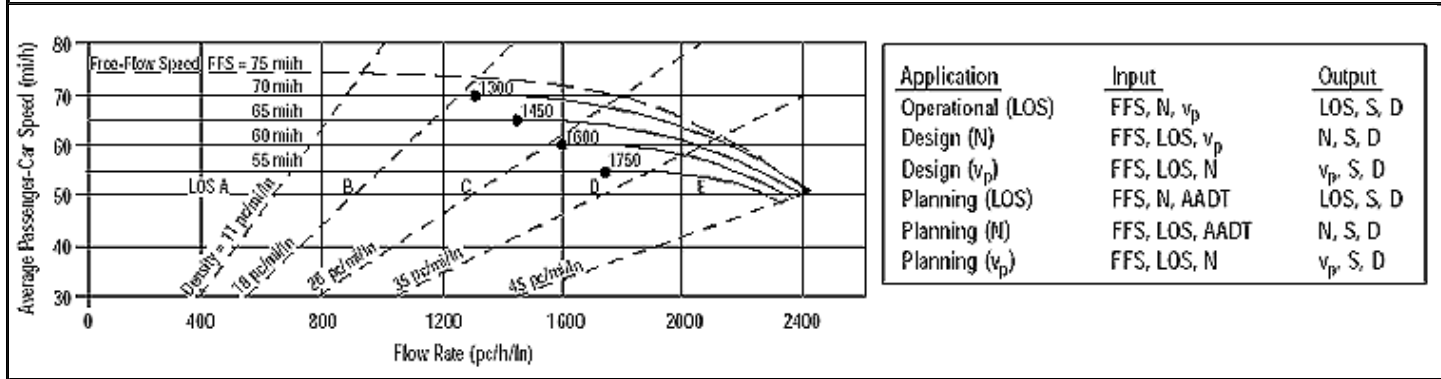
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	5	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1657 pc/h/ln	Design LOS	
S	69.1 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	24.0 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



General Information **Site Information**

Analyst	Arthur Black	Highway/Direction of Travel	I-80 WB
Agency or Company	LSA	From/To	Atlantic St/Taylor Rd
Date Performed	8/18/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	

Project Description 2030 Without Project W - AM

Oper.(LOS) Des.(N) Planning Data

Flow Inputs

Volume, V	6365	veh/h	Peak-Hour Factor, PHF	0.90
AADT		veh/day	%Trucks and Buses, P _T	6
Peak-Hr Prop. of AADT, K			%RVs, P _R	0
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AADT x K x D		veh/h	Grade % Length	mi
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs **Calc Speed Adj and FFS**

Lane Width	12.0	ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}	mi/h
Interchange Density	0.50	l/mi	f _{ID}	mi/h
Number of Lanes, N	5		f _N	mi/h
FFS (measured)	70.0	mi/h	FFS	70.0
Base free-flow Speed, BFFS		mi/h		

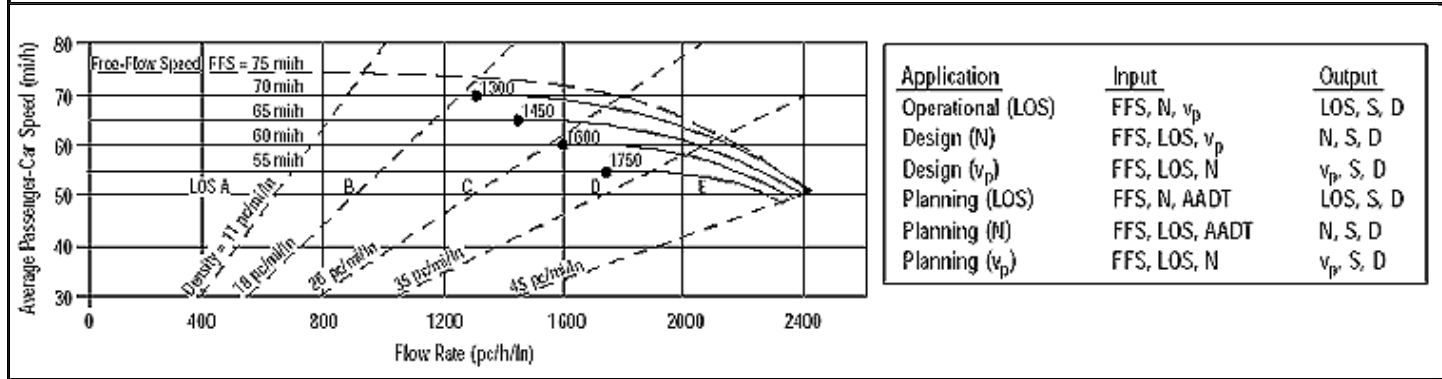
LOS and Performance Measures **Design (N)**

Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1457	Design LOS	
	pc/h/ln	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
S	69.9		mi/h
D = v _p / S	20.8	D = v _p / S	pc/mi/ln
LOS	C	Required Number of Lanes, N	

Glossary **Factor Location**

N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 WB
Agency or Company	LSA	From/To	Atlantic St/Taylor Rd
Date Performed	8/18/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 Without Project W - PM			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	8194	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 6
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

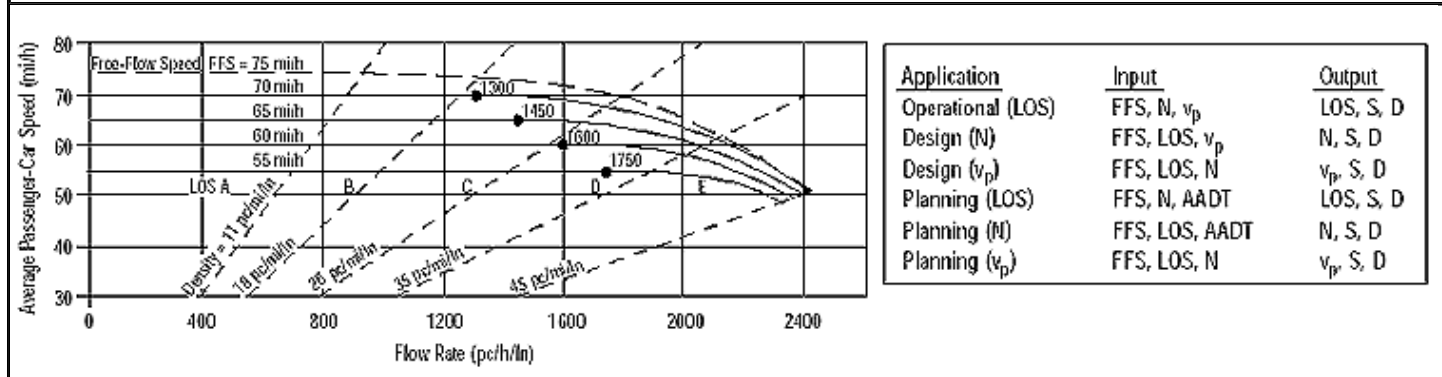
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	5	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1876 pc/h/ln	Design LOS	
S	66.9 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	28.0 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 EB
Agency or Company	LSA	From/To	Taylor Rd/Rte 65
Date Performed	8/18/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 Without Project W - AM			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	6431	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 6
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

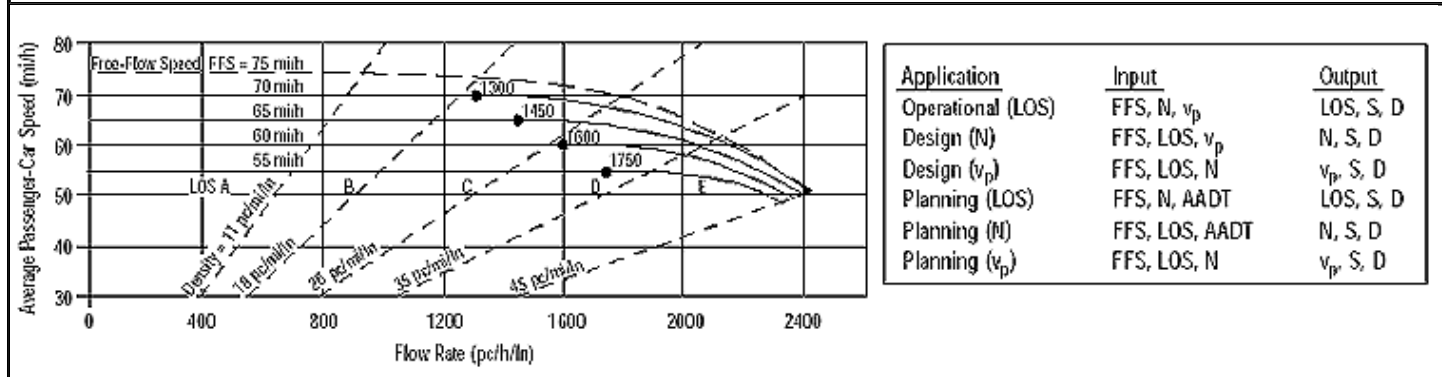
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	5	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1472 pc/h/ln	Design LOS	
S	69.9 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	21.1 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 EB
Agency or Company	LSA	From/To	Taylor Rd/Rte 65
Date Performed	8/18/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 Without Project W - PM			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	4898	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 6
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

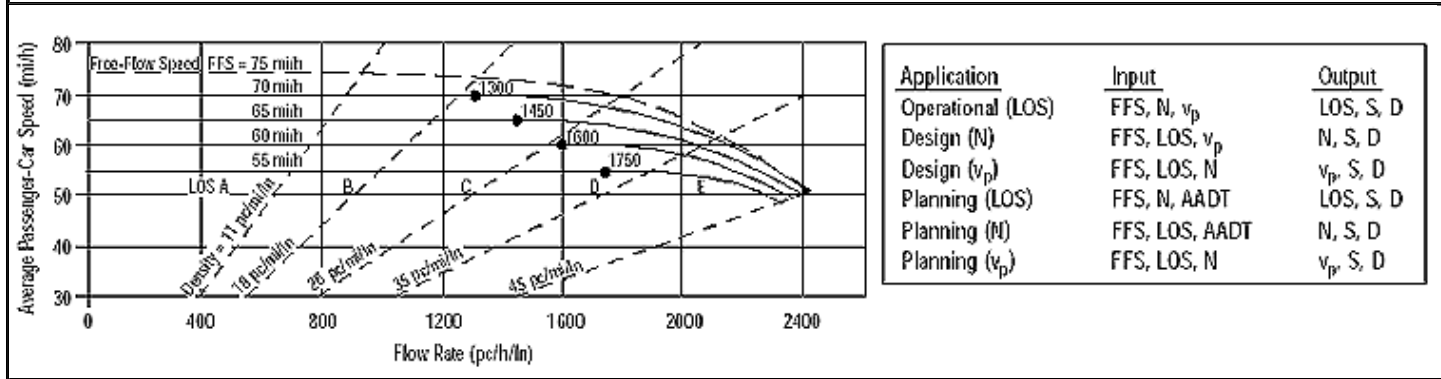
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	5	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS			

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1121 pc/h/ln	Design LOS	
S	70.0 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	16.0 pc/mi/ln	S	mi/h
LOS	B	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



General Information **Site Information**

Analyst	Arthur Black	Highway/Direction of Travel	I-80 WB
Agency or Company	LSA	From/To	Taylor Rd/Rte 65
Date Performed	8/18/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	

Project Description 2030 Without Project W - AM

Oper.(LOS) Des.(N) Planning Data

Flow Inputs

Volume, V	5126	veh/h	Peak-Hour Factor, PHF	0.90
AADT		veh/day	%Trucks and Buses, P _T	6
Peak-Hr Prop. of AADT, K			%RVs, P _R	0
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AADT x K x D		veh/h	Grade % Length	mi
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs **Calc Speed Adj and FFS**

Lane Width	12.0	ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}	mi/h
Interchange Density	0.50	l/mi	f _{ID}	mi/h
Number of Lanes, N	5		f _N	mi/h
FFS (measured)	70.0	mi/h	FFS	70.0
Base free-flow Speed, BFFS		mi/h		

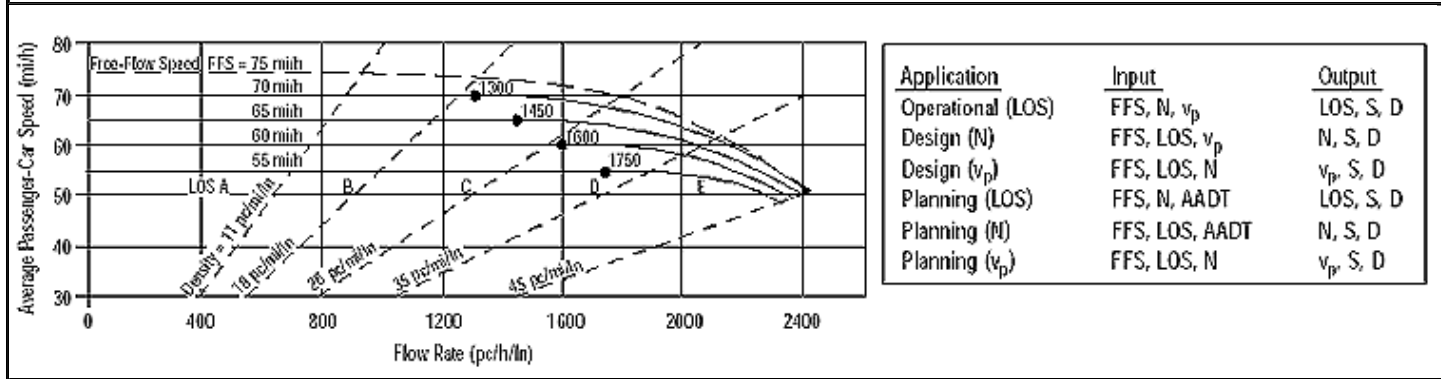
LOS and Performance Measures **Design (N)**

Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1173	Design LOS	
	pc/h/ln	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
S	70.0		mi/h
D = v _p / S	16.8	D = v _p / S	pc/mi/ln
LOS	B	Required Number of Lanes, N	

Glossary **Factor Location**

N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



General Information **Site Information**

Analyst	Arthur Black	Highway/Direction of Travel	I-80 WB
Agency or Company	LSA	From/To	Taylor Rd/Rte 65
Date Performed	8/18/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	

Project Description 2030 Without Project W - PM

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs

Volume, V	6696	veh/h	Peak-Hour Factor, PHF	0.90
AADT		veh/day	%Trucks and Buses, P _T	6
Peak-Hr Prop. of AADT, K			%RVs, P _R	0
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AADT x K x D		veh/h	Grade % Length	mi
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs **Calc Speed Adj and FFS**

Lane Width	12.0	ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}	mi/h
Interchange Density	0.50	l/mi	f _{ID}	mi/h
Number of Lanes, N	5		f _N	mi/h
FFS (measured)	70.0	mi/h	FFS	70.0
Base free-flow Speed, BFFS		mi/h		

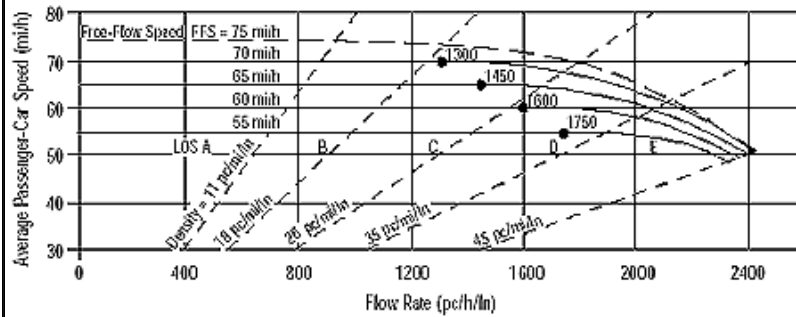
LOS and Performance Measures **Design (N)**

Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1533	Design LOS	
S	69.7	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	22.0	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary **Factor Location**

N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 EB
Agency or Company	LSA	From/To	Rte 65/Rocklin Rd
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 Without Project W - AM			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	4933	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 6
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

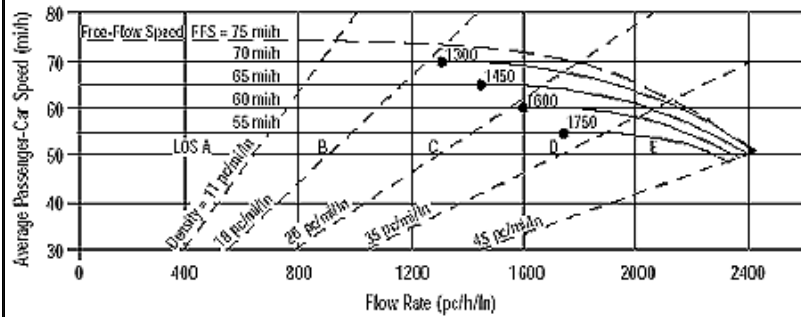
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1882 pc/h/ln	Design LOS	
S	66.8 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	28.2 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 EB
Agency or Company	LSA	From/To	Rte 65/Rocklin Rd
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 Without Project W - PM			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	5329	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 6
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

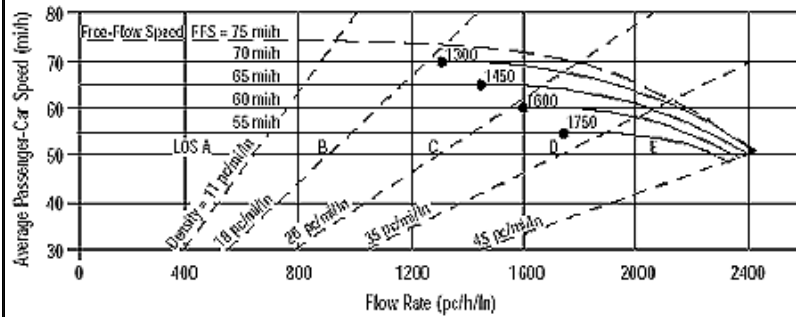
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2033 pc/h/ln	Design LOS	
S	64.2 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	31.7 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 WB
Agency or Company	LSA	From/To	Rte 65/Rocklin Rd
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 Without Project W - AM			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	5150	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
Driver type adjustment	1.00		Up/Down %

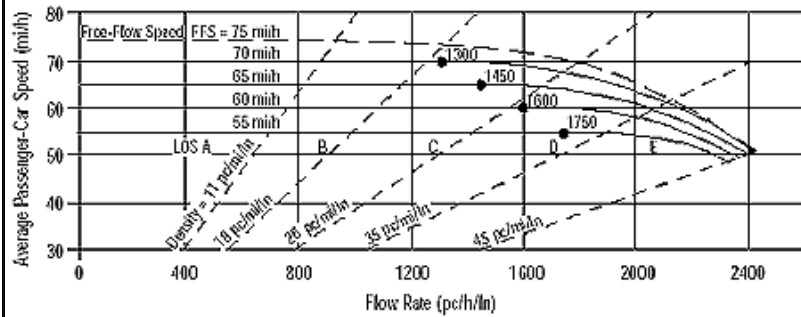
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1965 pc/h/ln	Design LOS	
S	65.5 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	30.0 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 WB
Agency or Company	LSA	From/To	Rte 65/Rocklin Rd
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 Without Project W - PM			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	5940	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 6
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

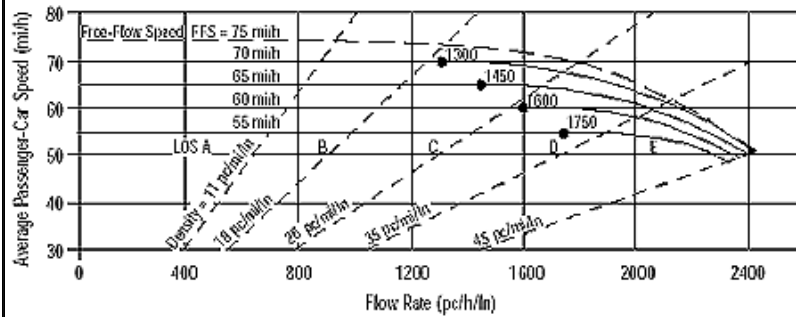
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2266 pc/h/ln	Design LOS	
S	58.1 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	39.0 pc/mi/ln	S	mi/h
LOS	E	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET																								
	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>			Application	Input	Output	Operational (LOS)	FFS, N, v _p	LOS, S, D	Design (N)	FFS, LOS, v _p	N, S, D	Design (v _p)	FFS, LOS, N	v _p , S, D	Planning (LOS)	FFS, N, AADT	LOS, S, D	Planning (N)	FFS, LOS, AADT	N, S, D	Planning (v _p)	FFS, LOS, N	v _p , S, D
Application	Input	Output																						
Operational (LOS)	FFS, N, v _p	LOS, S, D																						
Design (N)	FFS, LOS, v _p	N, S, D																						
Design (v _p)	FFS, LOS, N	v _p , S, D																						
Planning (LOS)	FFS, N, AADT	LOS, S, D																						
Planning (N)	FFS, LOS, AADT	N, S, D																						
Planning (v _p)	FFS, LOS, N	v _p , S, D																						
General Information		Site Information																						
Analyst	Arthur Black	Highway/Direction of Travel	I-80 EB																					
Agency or Company	LSA	From/To	Rocklin Rd/Sierra College Blvd																					
Date Performed	6/1/2010	Jurisdiction	Rocklin																					
Analysis Time Period		Analysis Year																						
Project Description 2030 Without Project W - AM																								
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																						
<input type="checkbox"/> Planning Data																								
Flow Inputs																								
Volume, V	4591	veh/h	Peak-Hour Factor, PHF																					
AADT		veh/day	%Trucks and Buses, P _T																					
Peak-Hr Prop. of AADT, K			%RVs, P _R																					
Peak-Hr Direction Prop, D			General Terrain:																					
DDHV = AADT x K x D		veh/h	Grade % Length																					
Driver type adjustment	1.00		Up/Down %																					
Calculate Flow Adjustments																								
f _p	1.00		E _R																					
E _T	1.5		f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]																					
Speed Inputs		Calc Speed Adj and FFS																						
Lane Width	12.0	ft	f _{LW}																					
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}																					
Interchange Density	0.50	l/mi	f _{ID}																					
Number of Lanes, N	3		f _N																					
FFS (measured)	70.0	mi/h	FFS																					
Base free-flow Speed, BFFS		mi/h																						
LOS and Performance Measures		Design (N)																						
Operational (LOS)		Design (N)																						
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1751	pc/h/ln	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)																					
S	68.4	mi/h	S																					
D = v _p / S	25.6	pc/mi/ln	D = v _p / S																					
LOS	C		Required Number of Lanes, N																					
Glossary		Factor Location																						
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4																					
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5																					
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6																					
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7																					
DDHV - Directional design hour volume																								

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 EB
Agency or Company	LSA	From/To	Rocklin Rd/Sierra College Blvd
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 Without Project W - PM			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	5404	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 6
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

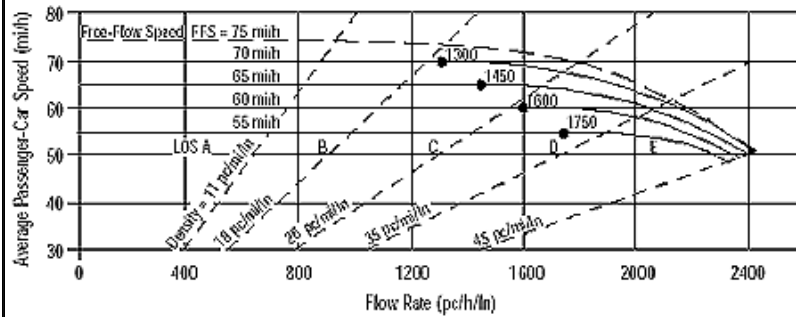
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2062 pc/h/ln	Design LOS	
S	63.6 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	32.4 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 WB
Agency or Company	LSA	From/To	Rocklin Rd/Sierra College Blvd
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 Without Project W - AM			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	5207	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 6
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

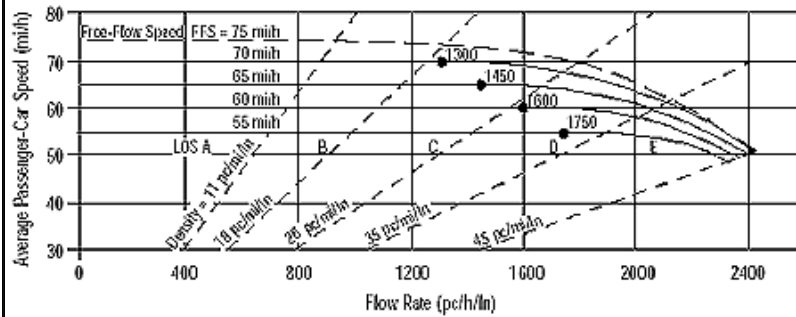
Calculate Flow Adjustments			
f _p	1.00		E _R 1.2
E _T	1.5		f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] 0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1986 pc/h/ln	Design LOS	
S	65.1 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	30.5 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 WB
Agency or Company	LSA	From/To	Rocklin Rd/Sierra College Blvd
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 Without Project W - PM			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	5633	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 6
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

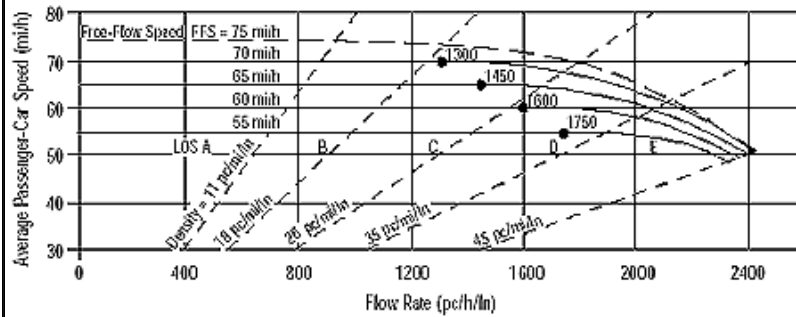
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2149 pc/h/ln	Design LOS	
S	61.5 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	34.9 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 EB
Agency or Company	LSA	From/To	Sierra College Blvd/Horseshoe
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 Without Project W - AM			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	3501	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 6
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

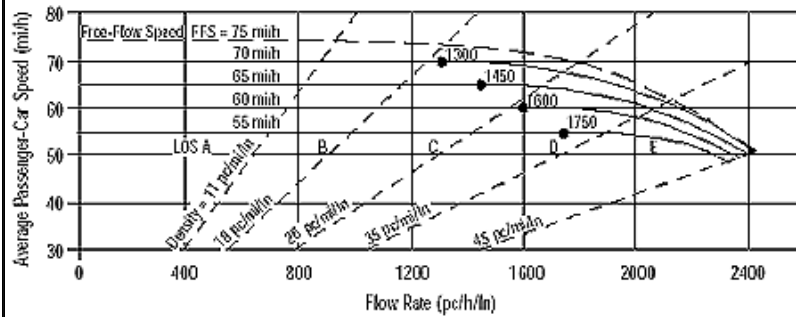
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1336 pc/h/ln	Design LOS	
S	70.0 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	19.1 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 EB
Agency or Company	LSA	From/To	Sierra College Blvd/Horseshoe
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 Without Project W - PM			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	5395	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 6
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

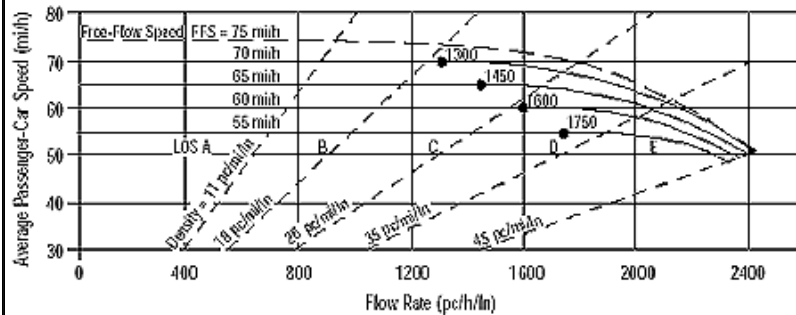
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2058 pc/h/ln	Design LOS	
S	63.7 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	32.3 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 WB
Agency or Company	LSA	From/To	Sierra College Blvd/Horseshoe
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	

Project Description 2030 Without Project W - AM

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	5028	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
Driver type adjustment	1.00		Up/Down %

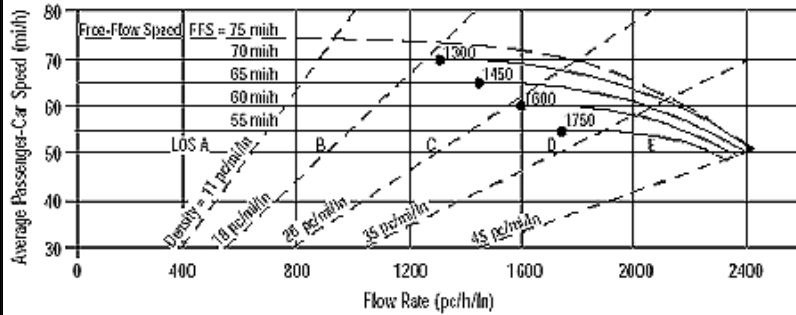
Calculate Flow Adjustments			
f _p	1.00		E _R
E _T	1.5		f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS			

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1918 pc/h/ln	Design LOS	
S	66.3 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	28.9 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 WB
Agency or Company	LSA	From/To	Sierra College Blvd/Horseshoe
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 Without Project W - PM			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	4790	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
Driver type adjustment	1.00		Up/Down %

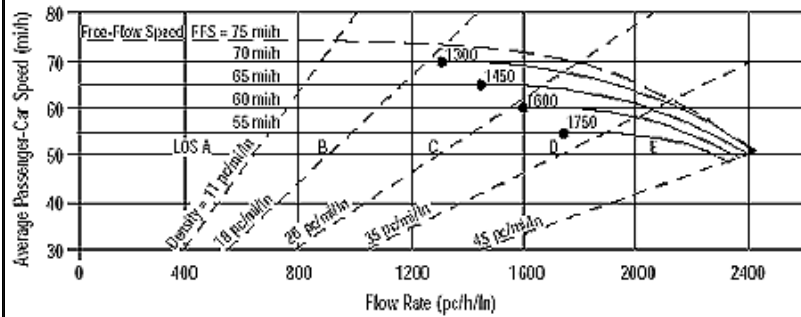
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1827 pc/h/ln	Design LOS	
S	67.5 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	27.1 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	Rte-65 NB
Agency or Company	LSA	From/To	I-80 to Harding Blvd
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 Without Project W - AM			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	6347	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 15
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

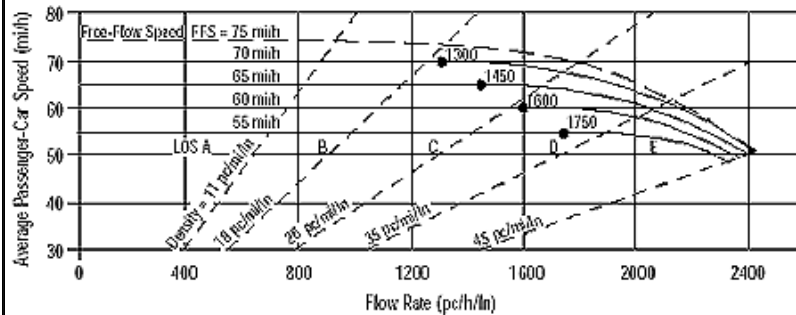
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.930

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2527 pc/h/ln	Design LOS	
S	mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	pc/mi/ln	S	mi/h
LOS	F	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	Rte-65 NB
Agency or Company	LSA	From/To	I-80 to Harding Blvd
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 Without Project W - PM			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	6117	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 15
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

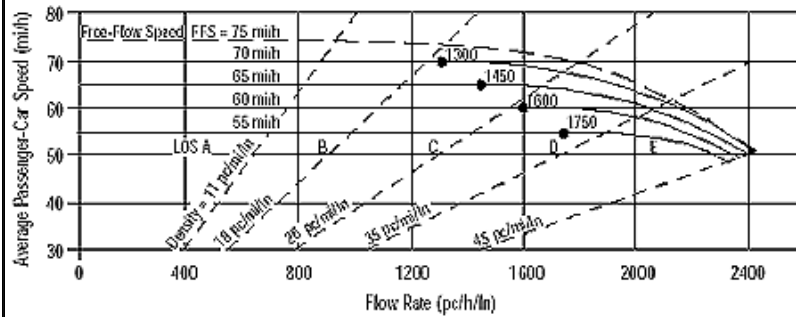
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.930

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2435 pc/h/ln	Design LOS	
S	mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	pc/mi/ln	S	mi/h
LOS	F	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	Rte-65 SB
Agency or Company	LSA	From/To	I-80 to Harding Blvd
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 Without Project W - AM			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	4772	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 15
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

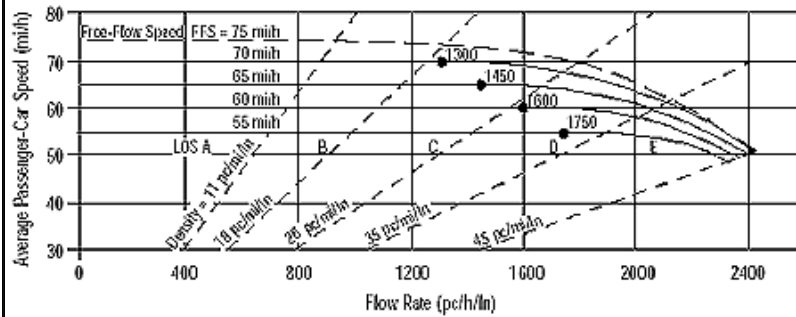
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.930

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1900 pc/h/ln	Design LOS	
S	66.6 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	28.5 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	Rte-65 SB
Agency or Company	LSA	From/To	I-80 to Harding Blvd
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 Without Project W - PM			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	5650	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 15
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

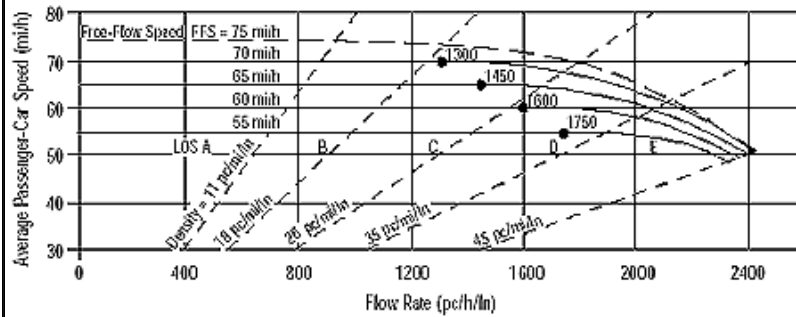
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.930

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2250 pc/h/ln	Design LOS	
S	58.6 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	38.4 pc/mi/ln	S	mi/h
LOS	E	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	Rte-65 NB
Agency or Company	LSA	From/To	Harding Blvd/Pleasant Grove
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 Without Project W - AM			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	5535	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 15
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

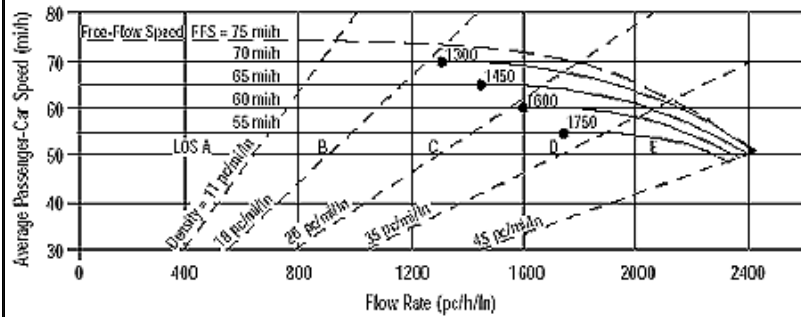
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.930

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2204 pc/h/ln	Design LOS	
S	60.0 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	36.7 pc/mi/ln	S	mi/h
LOS	E	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	Rte-65 NB
Agency or Company	LSA	From/To	Harding Blvd/Pleasant Grove
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 Without Project W - PM			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	5674	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 15
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

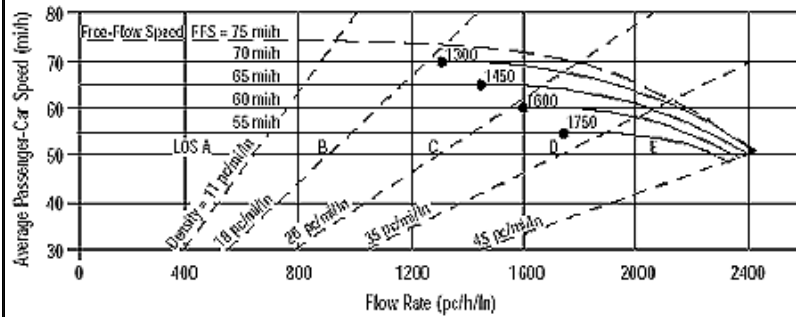
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.930

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2259 pc/h/ln	Design LOS	
S	58.3 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	38.7 pc/mi/ln	S	mi/h
LOS	E	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	Rte-65 SB
Agency or Company	LSA	From/To	Harding Blvd/Pleasant Grove
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 Without Project W - AM			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	4873	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 15
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

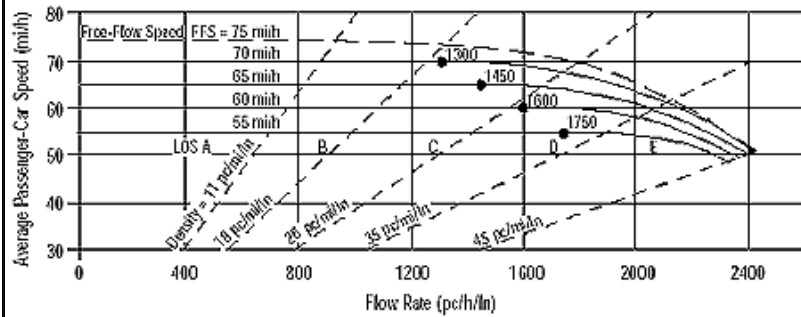
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.930

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1940 pc/h/ln	Design LOS	
S	65.9 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	29.4 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	Rte-65 SB
Agency or Company	LSA	From/To	Harding Blvd/Pleasant Grove
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 Without Project W - PM			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	5375	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 15
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

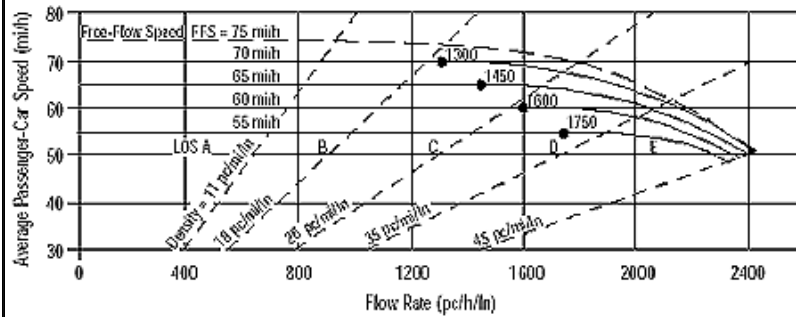
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.930

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2140 pc/h/ln	Design LOS	
S	61.7 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	34.7 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	Rte-65 NB
Agency or Company	LSA	From/To	Pleasant Grove/Blue Oaks
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 Without Project W - AM			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	4643	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 15
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

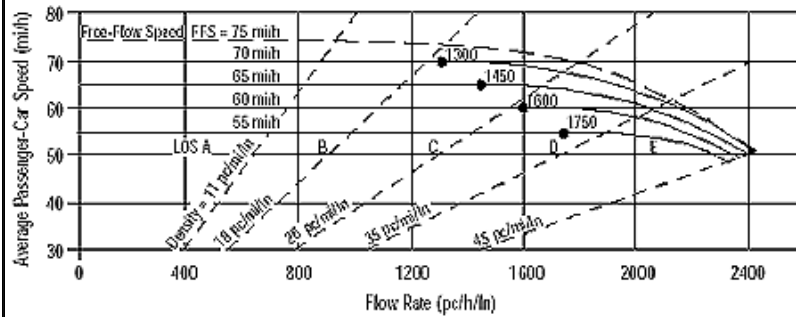
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.930

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1849 pc/h/ln	Design LOS	
S	67.3 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	27.5 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	Rte-65 NB
Agency or Company	LSA	From/To	Pleasant Grove/Blue Oaks
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 Without Project W - PM			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	5250	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 15
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

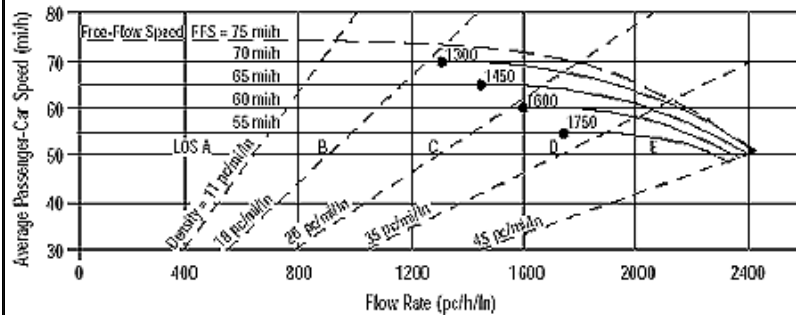
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.930

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2090 pc/h/ln	Design LOS	
S	63.0 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	33.2 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	Rte-65 SB
Agency or Company	LSA	From/To	Pleasant Grove/Blue Oaks
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 Without Project W - AM			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	4436	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 15
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

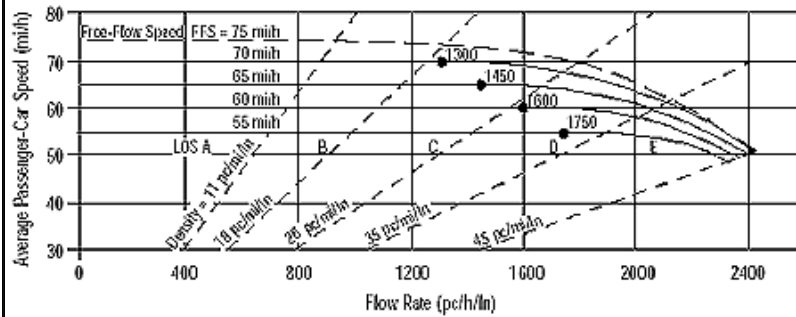
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.930

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1766 pc/h/ln	Design LOS	
S	68.2 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	25.9 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	Rte-65 SB
Agency or Company	LSA	From/To	Pleasant Grove/Blue Oaks
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 Without Project W - PM			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	4450	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 15
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

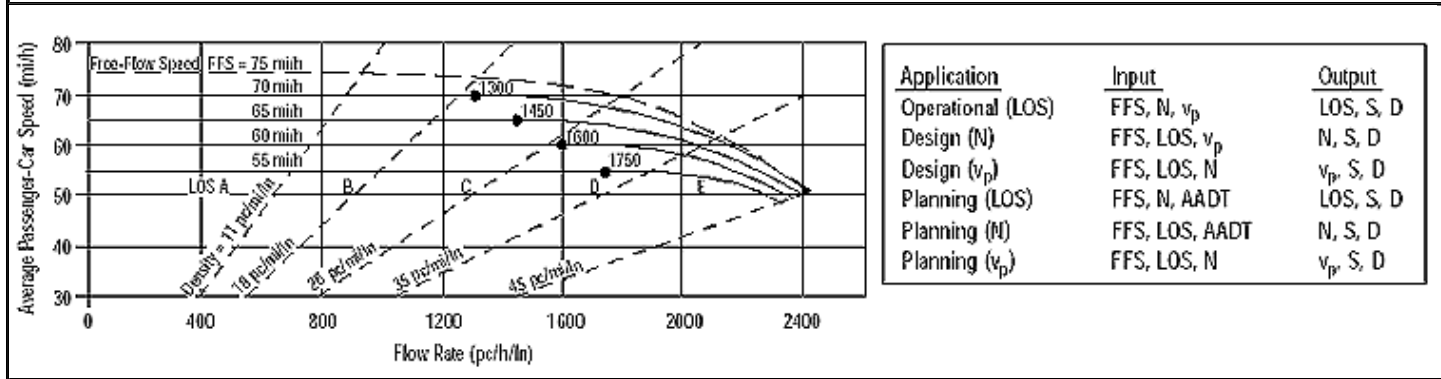
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.930

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1772 pc/h/ln	Design LOS	
S	68.2 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	26.0 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 EB
Agency or Company	LSA	From/To	Atlantic St/Taylor Rd
Date Performed	8/18/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - AM			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	7749	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
Driver type adjustment	1.00		Up/Down %

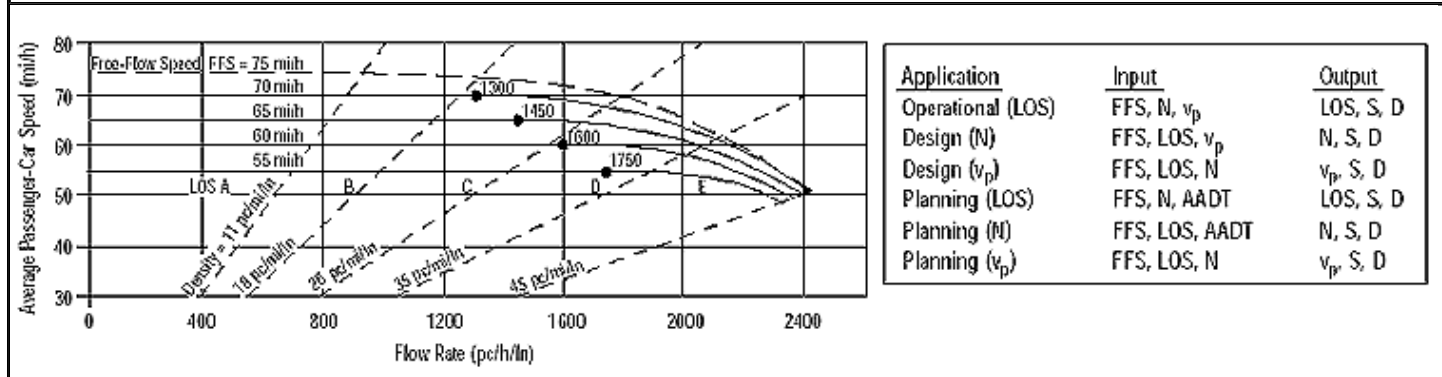
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	5	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1774 pc/h/ln	Design LOS	
S	68.1 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	
D = v _p / S	26.0 pc/mi/ln	S	
LOS	D	D = v _p / S	
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 EB
Agency or Company	LSA	From/To	Atlantic St/Taylor Rd
Date Performed	8/18/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - PM			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	7333	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 6
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

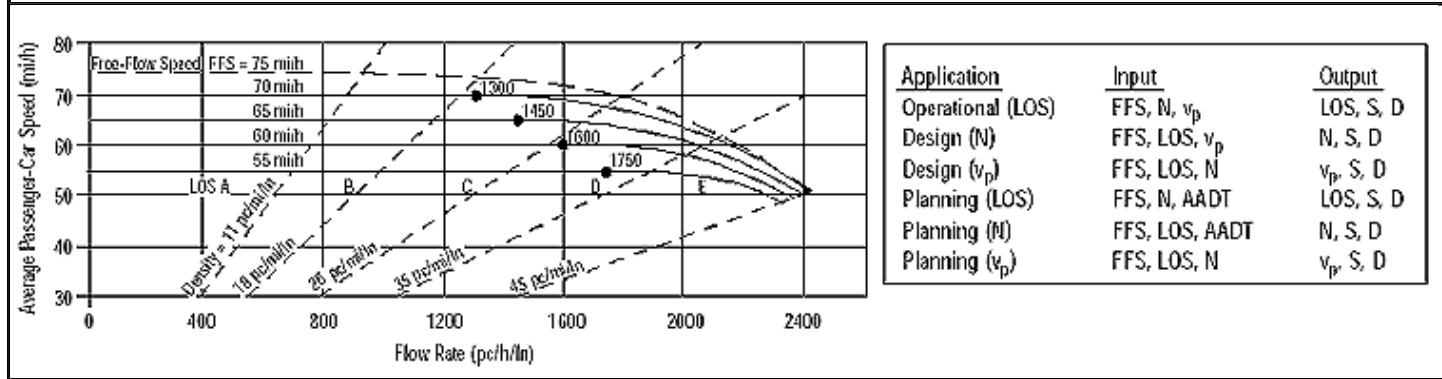
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	5	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1678 pc/h/ln	Design LOS	
S	69.0 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	24.3 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



General Information **Site Information**

Analyst	Arthur Black	Highway/Direction of Travel	I-80 WB
Agency or Company	LSA	From/To	Atlantic St/Taylor Rd
Date Performed	8/18/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	

Project Description 2030 With Project W - AM

Oper.(LOS) Des.(N) Planning Data

Flow Inputs

Volume, V	6405	veh/h	Peak-Hour Factor, PHF	0.90
AADT		veh/day	%Trucks and Buses, P _T	6
Peak-Hr Prop. of AADT, K			%RVs, P _R	0
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AADT x K x D		veh/h	Grade % Length	mi
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs **Calc Speed Adj and FFS**

Lane Width	12.0	ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}	mi/h
Interchange Density	0.50	l/mi	f _{ID}	mi/h
Number of Lanes, N	5		f _N	mi/h
FFS (measured)	70.0	mi/h	FFS	70.0
Base free-flow Speed, BFFS		mi/h		

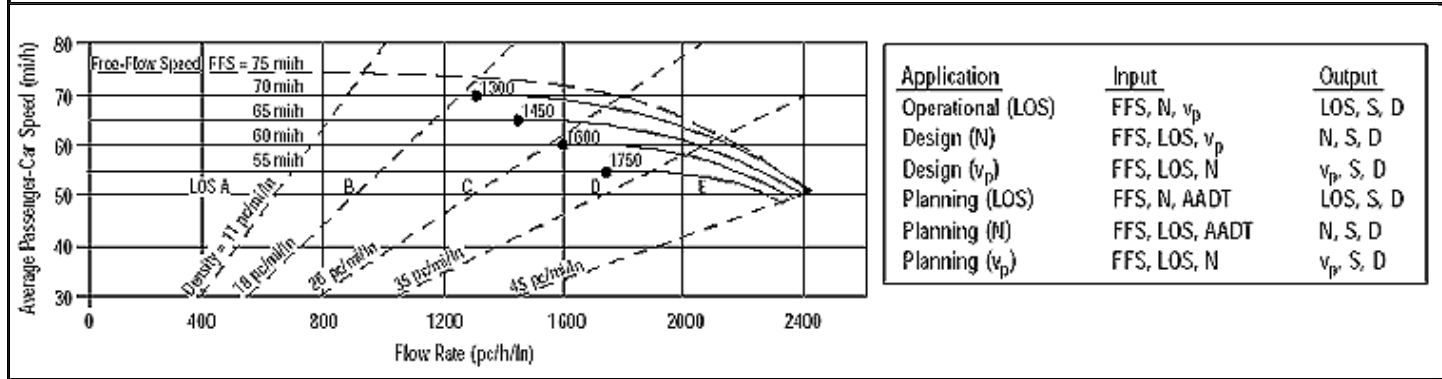
LOS and Performance Measures **Design (N)**

Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1466	Design LOS	
	pc/h/ln	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
S	69.9		mi/h
D = v _p / S	21.0	D = v _p / S	pc/mi/ln
LOS	C	Required Number of Lanes, N	

Glossary **Factor Location**

N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 WB
Agency or Company	LSA	From/To	Atlantic St/Taylor Rd
Date Performed	8/18/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - PM			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	8284	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 6
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

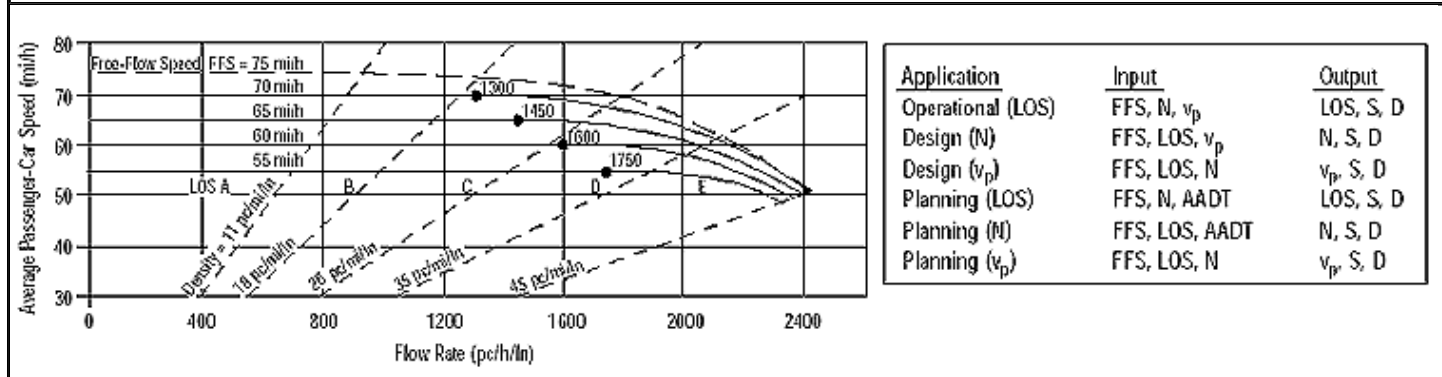
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	5	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1896 pc/h/ln	Design LOS	
S	66.6 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	28.5 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 EB
Agency or Company	LSA	From/To	Taylor Rd/Rte 65
Date Performed	8/18/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - AM			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	6476	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
Driver type adjustment	1.00		Up/Down %

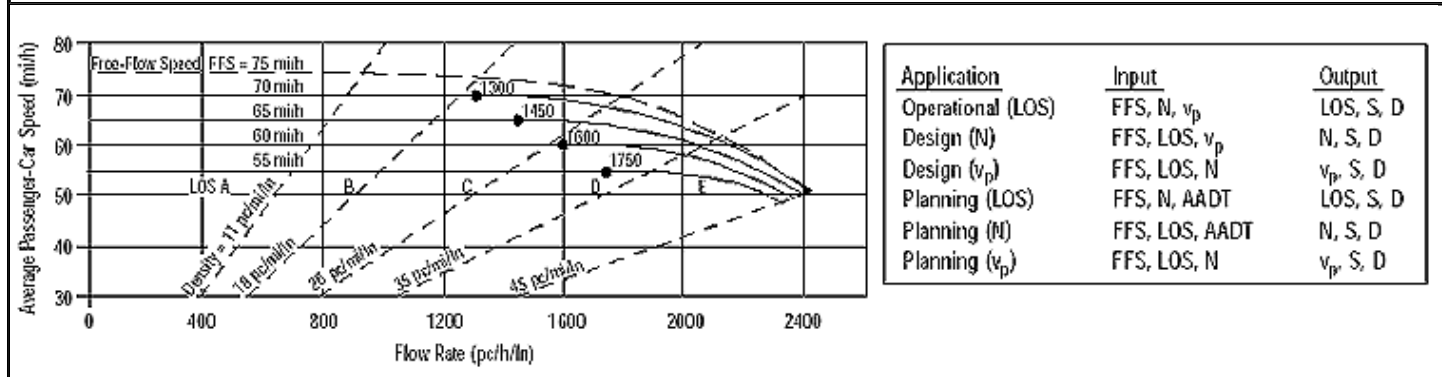
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	5	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1482 pc/h/ln	Design LOS	
S	69.8 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	21.2 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 EB
Agency or Company	LSA	From/To	Taylor Rd/Rte 65
Date Performed	8/18/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - PM			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	5041	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 6
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

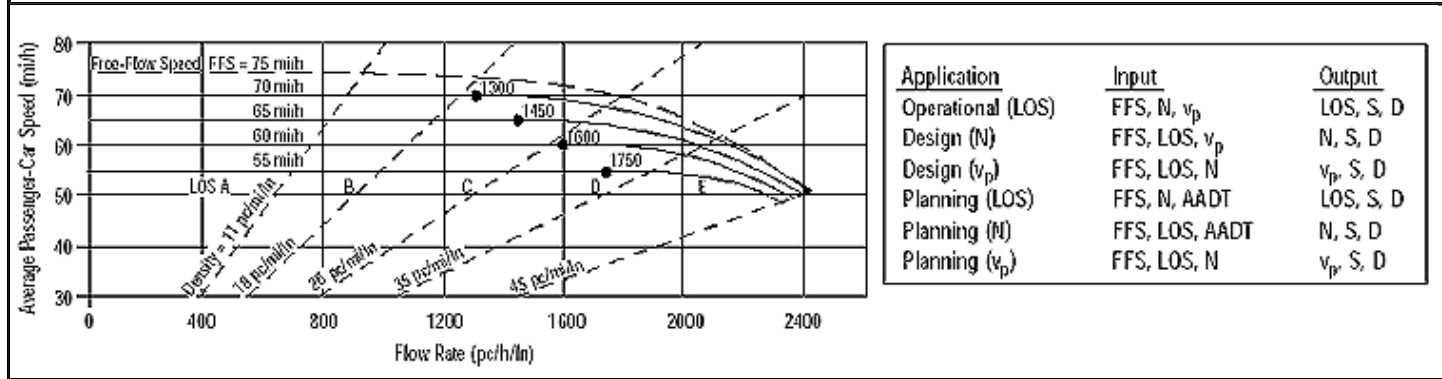
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	5	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1154 pc/h/ln	Design LOS	
S	70.0 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	16.5 pc/mi/ln	S	mi/h
LOS	B	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 WB
Agency or Company	LSA	From/To	Taylor Rd/Rte 65
Date Performed	8/18/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - AM			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	5185	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 6
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

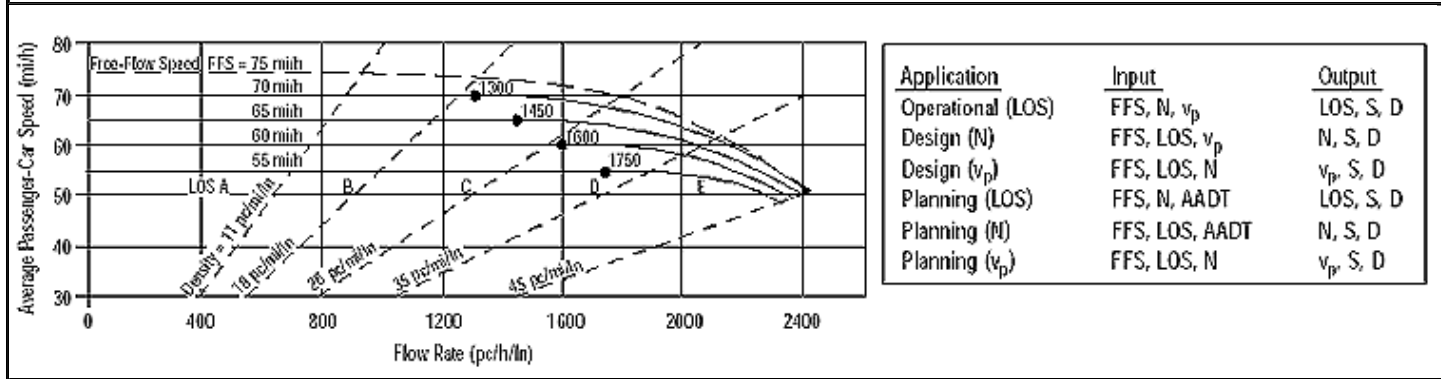
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	5	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1187 pc/h/ln	Design LOS	
S	70.0 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	17.0 pc/mi/ln	S	mi/h
LOS	B	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



General Information **Site Information**

Analyst	Arthur Black	Highway/Direction of Travel	I-80 WB
Agency or Company	LSA	From/To	Taylor Rd/Rte 65
Date Performed	8/18/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	

Project Description 2030 With Project W - PM

Oper.(LOS) Des.(N) Planning Data

Flow Inputs

Volume, V	6832	veh/h	Peak-Hour Factor, PHF	0.90
AADT		veh/day	%Trucks and Buses, P _T	6
Peak-Hr Prop. of AADT, K			%RVs, P _R	0
Peak-Hr Direction Prop, D			General Terrain:	Level
DDHV = AADT x K x D		veh/h	Grade % Length	mi
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs **Calc Speed Adj and FFS**

Lane Width	12.0	ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}	mi/h
Interchange Density	0.50	l/mi	f _{ID}	mi/h
Number of Lanes, N	5		f _N	mi/h
FFS (measured)	70.0	mi/h	FFS	70.0
Base free-flow Speed, BFFS		mi/h		

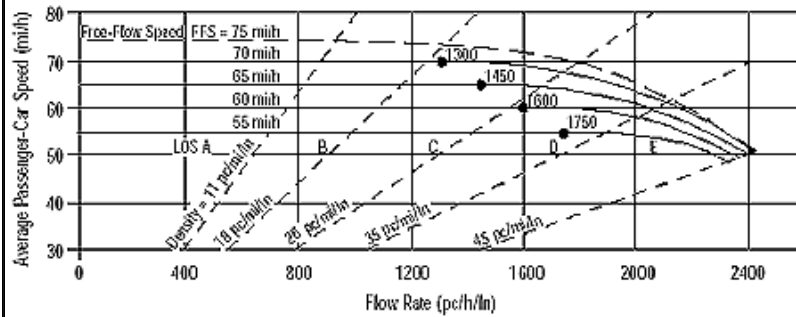
LOS and Performance Measures **Design (N)**

Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1564	Design LOS	
	pc/h/ln	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
S	69.6	S	mi/h
D = v _p / S	22.5	D = v _p / S	pc/mi/ln
LOS	C	Required Number of Lanes, N	

Glossary **Factor Location**

N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 EB
Agency or Company	LSA	From/To	Rte 65/Rocklin Rd
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - AM			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	5000	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 6
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

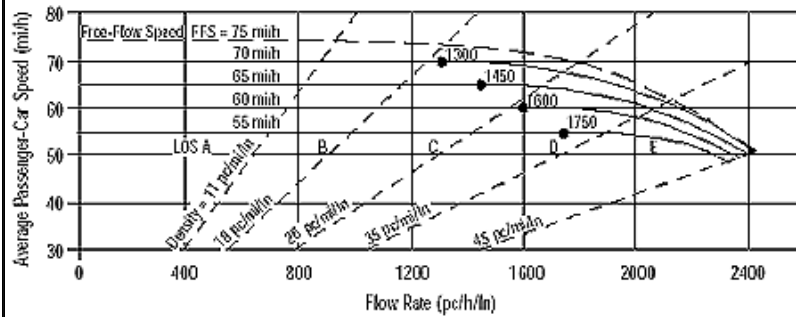
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1907 pc/h/ln	Design LOS	
S	66.4 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	28.7 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 EB
Agency or Company	LSA	From/To	Rte 65/Rocklin Rd
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - PM			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	5543	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 6
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

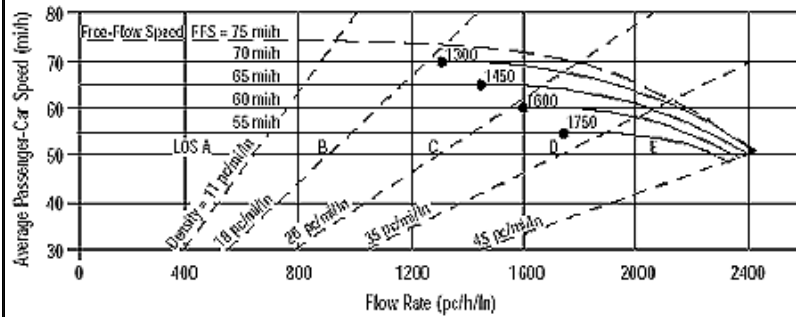
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2115 pc/h/ln	Design LOS	
S	62.4 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	33.9 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 WB
Agency or Company	LSA	From/To	Rte 65/Rocklin Rd
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - AM			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	5240	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 6
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

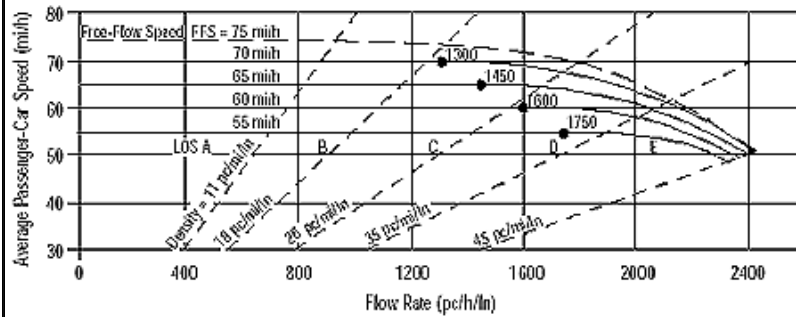
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1999 pc/h/ln	Design LOS	
S	64.9 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	30.8 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 WB
Agency or Company	LSA	From/To	Rte 65/Rocklin Rd
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - PM			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	6144	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 6
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

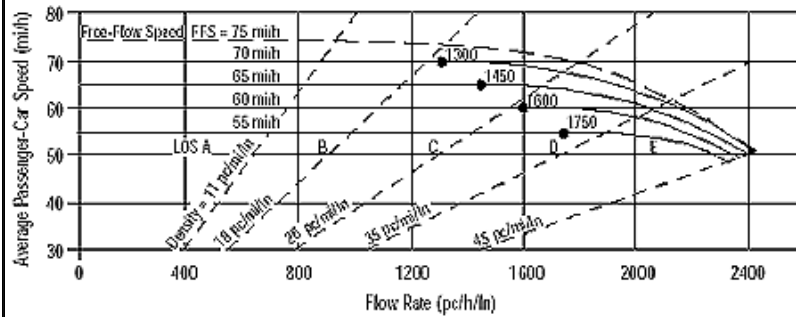
Calculate Flow Adjustments			
f _p	1.00		E _R 1.2
E _T	1.5		f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] 0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2344 pc/h/ln	Design LOS	
S	55.5 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	42.3 pc/mi/ln	S	mi/h
LOS	E	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 EB
Agency or Company	LSA	From/To	Rocklin Rd/Sierra College Blvd
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - AM			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	4679	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P_T 6
Peak-Hr Prop. of AADT, K			%RVs, P_R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

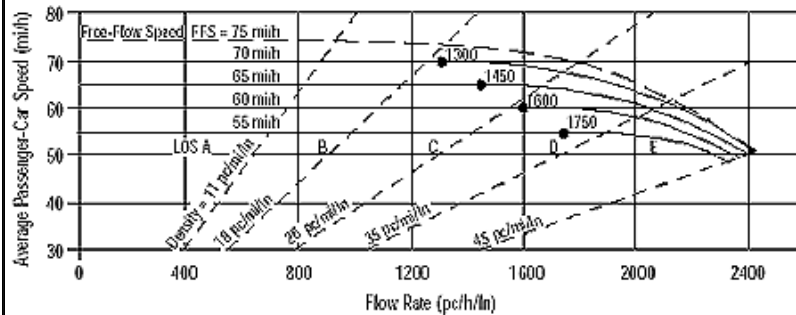
Calculate Flow Adjustments			
f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f_{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f_{LC}	mi/h
Interchange Density	0.50 l/mi	f_{ID}	mi/h
Number of Lanes, N	3	f_N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
$v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p)$	1785 pc/h/ln	Design LOS	
S	68.0 mi/h	$v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p)$	pc/h
$D = v_p / S$	26.2 pc/mi/ln	S	mi/h
LOS	D	$D = v_p / S$	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 EB
Agency or Company	LSA	From/To	Rocklin Rd/Sierra College Blvd
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - PM			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	5680	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 6
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

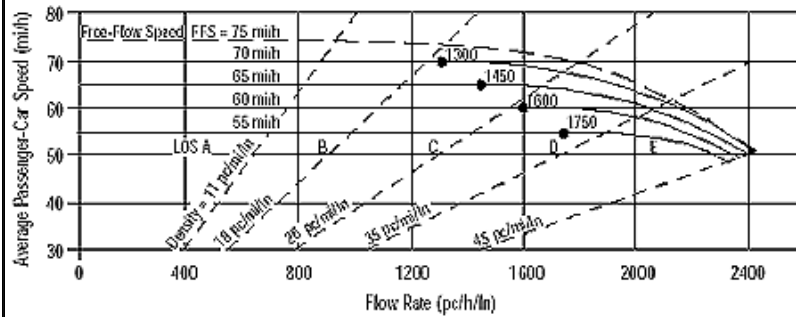
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2167 pc/h/ln	Design LOS	
S	61.0 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	35.5 pc/mi/ln	S	mi/h
LOS	E	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 WB
Agency or Company	LSA	From/To	Rocklin Rd/Sierra College Blvd
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - AM			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	5323	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 6
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

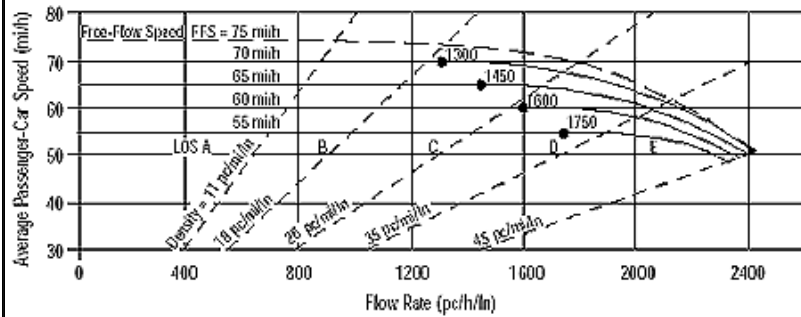
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2031 pc/h/ln	Design LOS	
S	64.2 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	31.6 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 WB
Agency or Company	LSA	From/To	Rocklin Rd/Sierra College Blvd
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - PM			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	5898	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 6
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

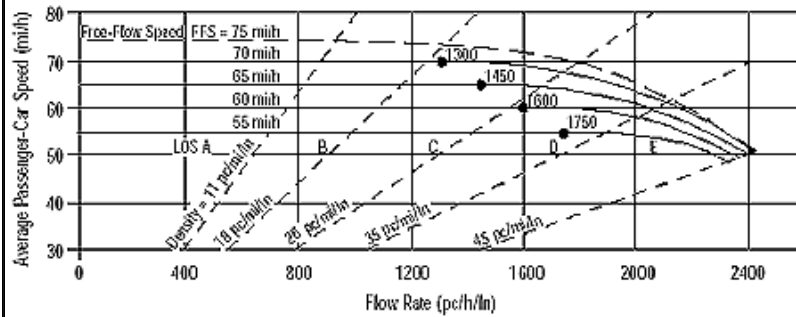
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2250 pc/h/ln	Design LOS	
S	58.6 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	38.4 pc/mi/ln	S	mi/h
LOS	E	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 EB
Agency or Company	LSA	From/To	Sierra College Blvd/Horseshoe
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - AM			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	3548	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 6
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

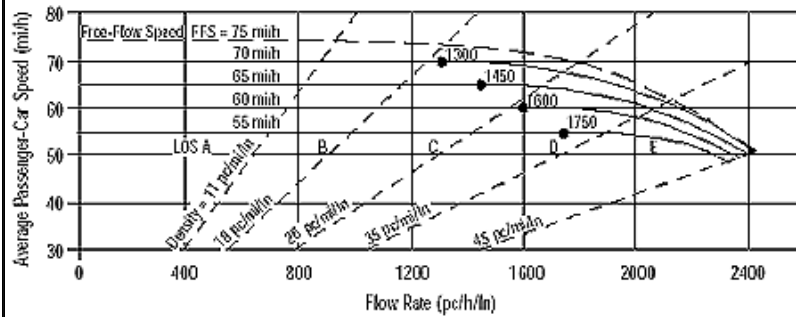
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1353 pc/h/ln	Design LOS	
S	70.0 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	19.3 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 EB
Agency or Company	LSA	From/To	Sierra College Blvd/Horseshoe
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - PM			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	5500	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 6
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

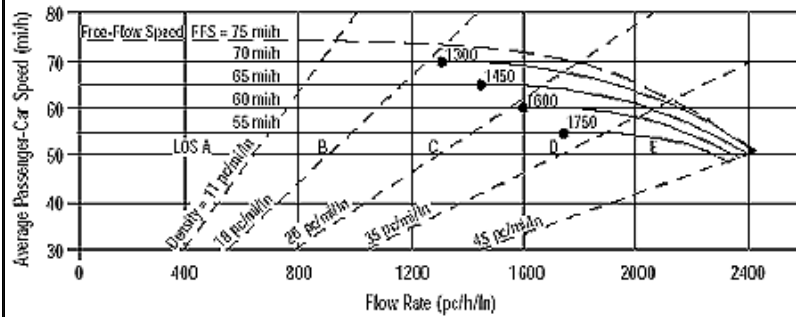
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2098 pc/h/ln	Design LOS	
S	62.8 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	33.4 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 WB
Agency or Company	LSA	From/To	Sierra College Blvd/Horseshoe
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - AM			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	5062	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 6
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

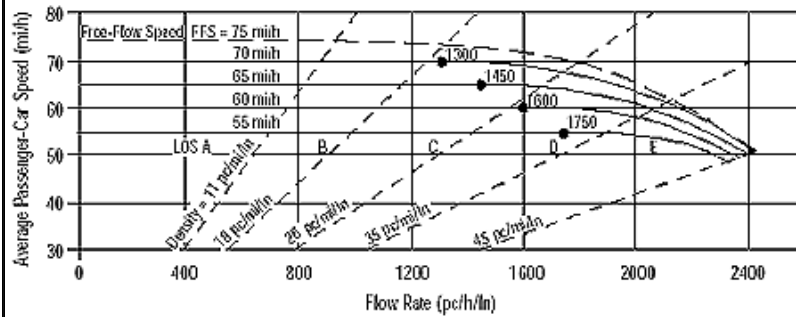
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1931 pc/h/ln	Design LOS	
S	66.1 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	29.2 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	I-80 WB
Agency or Company	LSA	From/To	Sierra College Blvd/Horseshoe
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - PM			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	4901	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 6
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

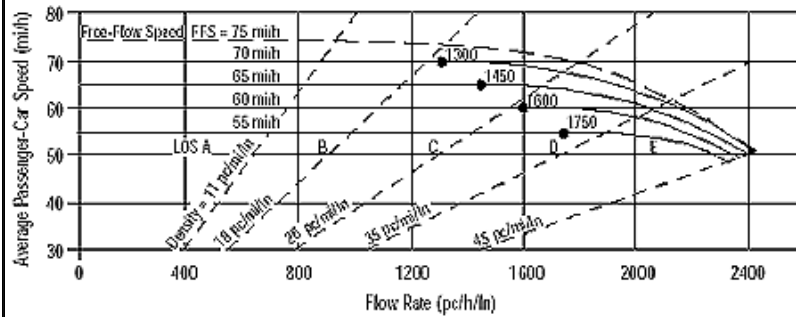
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1870 pc/h/ln	Design LOS	
S	67.0 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	27.9 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	Rte-65 NB
Agency or Company	LSA	From/To	I-80 to Harding Blvd
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - AM			

<input checked="" type="checkbox"/> Oper.(LOS)	<input type="checkbox"/> Des.(N)	<input type="checkbox"/> Planning Data
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Flow Inputs			
Volume, V	6370	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
Driver type adjustment	1.00		Up/Down %

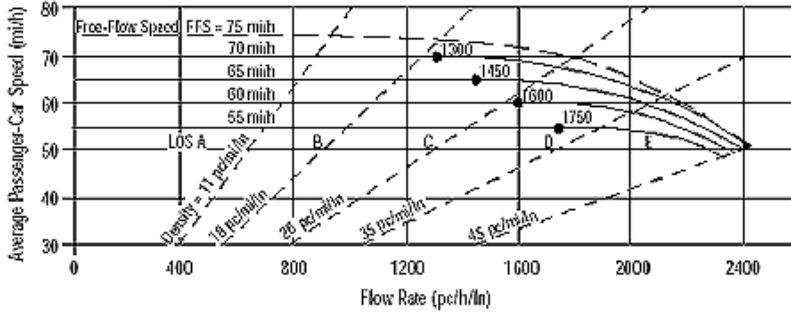
Calculate Flow Adjustments			
f _p	1.00		E _R
E _T	1.5		f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS			

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2536 pc/h/ln	Design LOS	
S	mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	pc/mi/ln	S	mi/h
LOS	F	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information

Analyst *Arthur Black*
 Agency or Company *LSA*
 Date Performed *6/1/2010*
 Analysis Time Period
 Project Description *2030 With Project W - PM*

Site Information

Highway/Direction of Travel *Rte-65 NB*
 From/To *I-80 to Harding Blvd*
 Jurisdiction *Rocklin*
 Analysis Year

Oper.(LOS) Des.(N) Planning Data

Flow Inputs

Volume, V	<i>6188</i>	veh/h	Peak-Hour Factor, PHF	<i>0.90</i>
AADT		veh/day	%Trucks and Buses, P _T	<i>15</i>
Peak-Hr Prop. of AADT, K			%RVs, P _R	<i>0</i>
Peak-Hr Direction Prop, D			General Terrain:	<i>Level</i>
DDHV = AADT x K x D		veh/h	Grade % Length	<i>mi</i>
Driver type adjustment	<i>1.00</i>		Up/Down %	

Calculate Flow Adjustments

f _p	<i>1.00</i>	E _R	<i>1.2</i>
E _T	<i>1.5</i>	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	<i>0.930</i>

Speed Inputs

Lane Width	<i>12.0</i>	ft
Rt-Shoulder Lat. Clearance	<i>6.0</i>	ft
Interchange Density	<i>0.50</i>	l/mi
Number of Lanes, N	<i>3</i>	
FFS (measured)	<i>70.0</i>	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f _{LW}		mi/h
f _{LC}		mi/h
f _{ID}		mi/h
f _N		mi/h
FFS	<i>70.0</i>	mi/h

LOS and Performance Measures

Operational (LOS)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	<i>2464</i> pc/h/ln
S	mi/h
D = v _p / S	pc/mi/ln
LOS	<i>F</i>

Design (N)

Design (N)	
Design LOS	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
S	mi/h
D = v _p / S	pc/mi/ln
Required Number of Lanes, N	

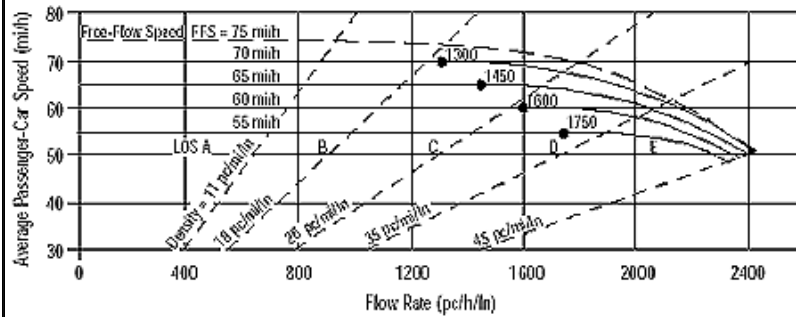
Glossary

N - Number of lanes S - Speed
 V - Hourly volume D - Density
 v_p - Flow rate FFS - Free-flow speed
 LOS - Level of service BFFS - Base free-flow speed
 DDHV - Directional design hour volume

Factor Location

E_R - Exhibits 23-8, 23-10 f_{LW} - Exhibit 23-4
 E_T - Exhibits 23-8, 23-10, 23-11 f_{LC} - Exhibit 23-5
 f_p - Page 23-12 f_N - Exhibit 23-6
 LOS, S, FFS, v_p - Exhibits 23-2, 23-3 f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	Rte-65 SB
Agency or Company	LSA	From/To	I-80 to Harding Blvd
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - AM			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	4802	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 15
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

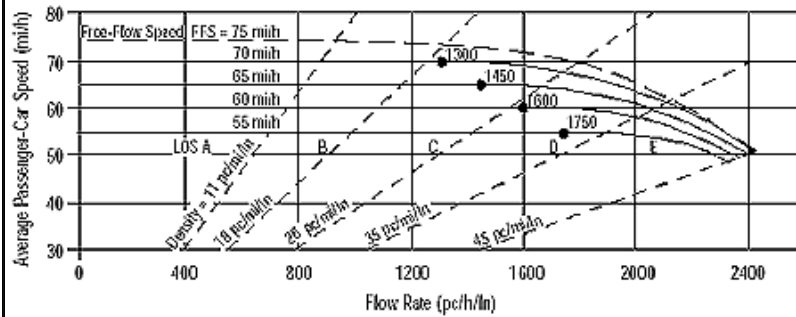
Calculate Flow Adjustments			
f _p	1.00		E _R 1.2
E _T	1.5		f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] 0.930

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1912 pc/h/ln	Design LOS	
S	66.4 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	28.8 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	Rte-65 SB
Agency or Company	LSA	From/To	I-80 to Harding Blvd
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - PM			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	5718	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 15
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

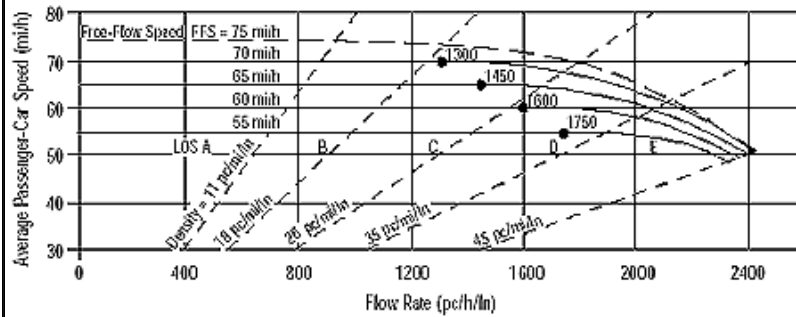
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.930

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2277 pc/h/ln	Design LOS	
S	57.8 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	39.4 pc/mi/ln	S	mi/h
LOS	E	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	Rte-65 NB
Agency or Company	LSA	From/To	Harding Blvd/Pleasant Grove
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - AM			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	5552	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 15
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

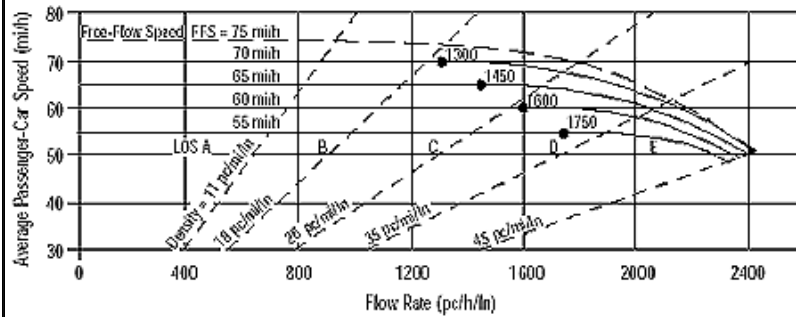
Calculate Flow Adjustments			
f _p	1.00		E _R 1.2
E _T	1.5		f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] 0.930

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2211 pc/h/ln	Design LOS	
S	59.8 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	37.0 pc/mi/ln	S	mi/h
LOS	E	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information

Analyst *Arthur Black*
 Agency or Company *LSA*
 Date Performed *6/1/2010*
 Analysis Time Period

Site Information

Highway/Direction of Travel *Rte-65 NB*
 From/To *Harding Blvd/Pleasant Grove*
 Jurisdiction *Rocklin*
 Analysis Year

Project Description *2030 With Project W - PM*

Oper.(LOS) Des.(N) Planning Data

Flow Inputs

Volume, V	<i>5729</i>	veh/h	Peak-Hour Factor, PHF	<i>0.90</i>
AADT		veh/day	%Trucks and Buses, P _T	<i>15</i>
Peak-Hr Prop. of AADT, K			%RVs, P _R	<i>0</i>
Peak-Hr Direction Prop, D			General Terrain:	<i>Level</i>
DDHV = AADT x K x D		veh/h	Grade % Length	<i>mi</i>
Driver type adjustment	<i>1.00</i>		Up/Down %	

Calculate Flow Adjustments

f _p	<i>1.00</i>	E _R	<i>1.2</i>
E _T	<i>1.5</i>	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	<i>0.930</i>

Speed Inputs

Lane Width	<i>12.0</i>	ft
Rt-Shoulder Lat. Clearance	<i>6.0</i>	ft
Interchange Density	<i>0.50</i>	l/mi
Number of Lanes, N	<i>3</i>	
FFS (measured)	<i>70.0</i>	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f _{LW}		mi/h
f _{LC}		mi/h
f _{ID}		mi/h
f _N		mi/h
FFS	<i>70.0</i>	mi/h

LOS and Performance Measures

Operational (LOS)		
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	<i>2281</i>	pc/h/ln
S	<i>57.6</i>	mi/h
D = v _p / S	<i>39.6</i>	pc/mi/ln
LOS	<i>E</i>	

Design (N)

Design (N)		
Design LOS		
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)		pc/h
S		mi/h
D = v _p / S		pc/mi/ln
Required Number of Lanes, N		

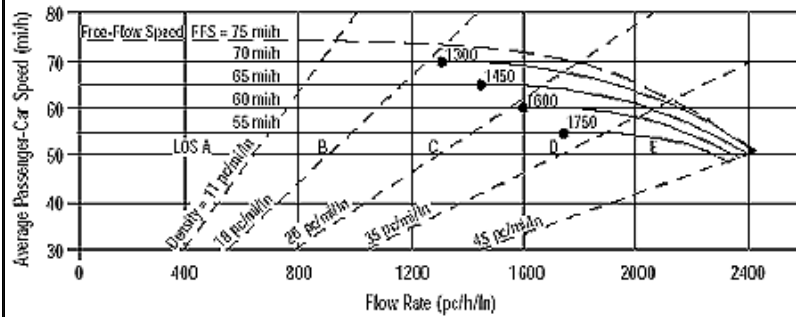
Glossary

N - Number of lanes S - Speed
 V - Hourly volume D - Density
 v_p - Flow rate FFS - Free-flow speed
 LOS - Level of service BFFS - Base free-flow speed
 DDHV - Directional design hour volume

Factor Location

E_R - Exhibits 23-8, 23-10 f_{LW} - Exhibit 23-4
 E_T - Exhibits 23-8, 23-10, 23-11 f_{LC} - Exhibit 23-5
 f_p - Page 23-12 f_N - Exhibit 23-6
 LOS, S, FFS, v_p - Exhibits 23-2, 23-3 f_{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	Rte-65 SB
Agency or Company	LSA	From/To	Harding Blvd/Pleasant Grove
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - AM			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	4897	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 15
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

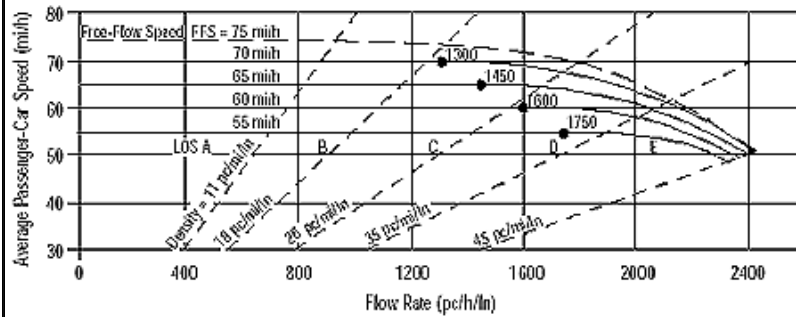
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.930

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1950 pc/h/ln	Design LOS	
S	65.8 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	29.7 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	Rte-65 SB
Agency or Company	LSA	From/To	Harding Blvd/Pleasant Grove
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - PM			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	5428	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 15
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

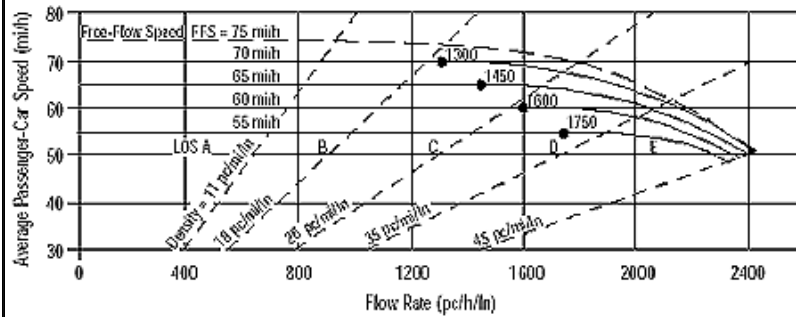
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.930

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2161 pc/h/ln	Design LOS	
S	61.2 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	35.3 pc/mi/ln	S	mi/h
LOS	E	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	Rte-65 NB
Agency or Company	LSA	From/To	Pleasant Grove/Blue Oaks
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - AM			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	4653	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 15
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

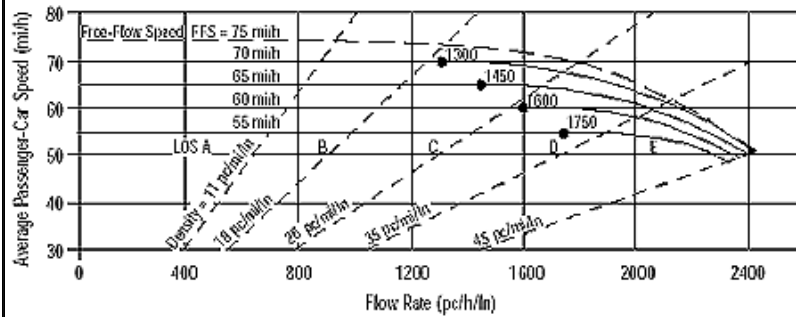
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.930

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1853 pc/h/ln	Design LOS	
S	67.2 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	27.6 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	Rte-65 NB
Agency or Company	LSA	From/To	Pleasant Grove/Blue Oaks
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - PM			

Oper.(LOS) Des.(N) Planning Data

Flow Inputs			
Volume, V	5282	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 15
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

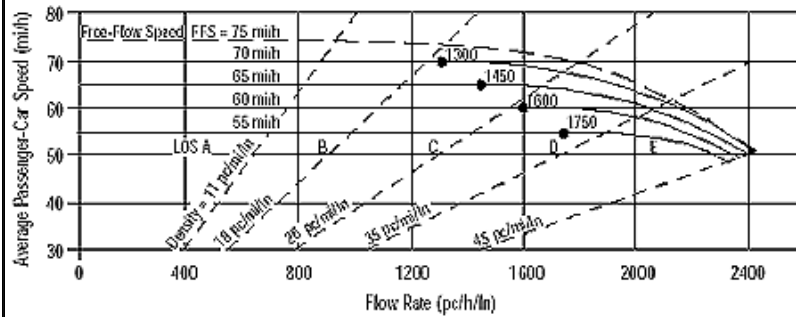
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.930

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	2103 pc/h/ln	Design LOS	
S	62.6 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	33.6 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	Rte-65 SB
Agency or Company	LSA	From/To	Pleasant Grove/Blue Oaks
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - AM			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	4449	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 15
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

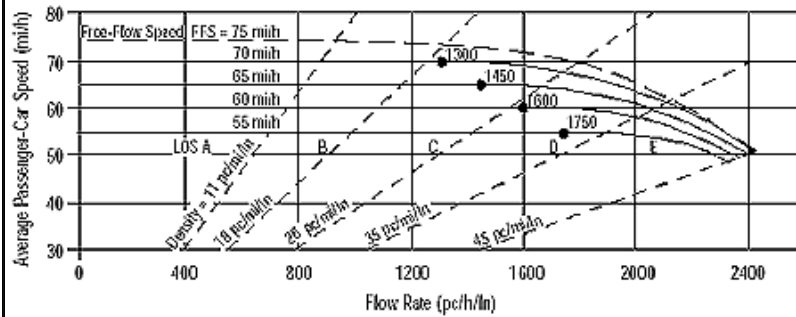
Calculate Flow Adjustments			
f _p	1.00		E _R 1.2
E _T	1.5		f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)] 0.930

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1771 pc/h/ln	Design LOS	
S	68.2 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	26.0 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	Arthur Black	Highway/Direction of Travel	Rte-65 SB
Agency or Company	LSA	From/To	Pleasant Grove/Blue Oaks
Date Performed	6/1/2010	Jurisdiction	Rocklin
Analysis Time Period		Analysis Year	
Project Description 2030 With Project W - PM			

Oper.(LOS)
 Des.(N)
 Planning Data

Flow Inputs			
Volume, V	4481	veh/h	Peak-Hour Factor, PHF 0.90
AADT		veh/day	%Trucks and Buses, P _T 15
Peak-Hr Prop. of AADT, K			%RVs, P _R 0
Peak-Hr Direction Prop, D			General Terrain: Level
DDHV = AADT x K x D		veh/h	Grade % Length mi
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.930

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	mi/h
Interchange Density	0.50 l/mi	f _{ID}	mi/h
Number of Lanes, N	3	f _N	mi/h
FFS (measured)	70.0 mi/h	FFS	70.0 mi/h
Base free-flow Speed, BFFS	mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1784 pc/h/ln	Design LOS	
S	68.0 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	26.2 pc/mi/ln	S	mi/h
LOS	D	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			