



Appendix L

HCS 2035 Roadway Analysis Reports

SR 21 Corridor Study
Phase I Final Report

No Build

HCS

Roadway Analysis

2035

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co: Hussey, Gay, Bell & DeYoung
 Date: 3/20/2013
 Analysis Period: **AM**
 Highway: SR 21
 From/To: County Line/Berrien Rd
 Jurisdiction: Chatham County
 Analysis Year: **2035**
 Project ID: **No Build, Multilane 1**

INPUT DATA

Total AADT volume, AADT 57885 vpd
 Proportion AADT during peak hour, K 0.10
 Percent peak-hour traffic in heaviest direction, D 83 %
 Trucks 4 %
 Terrain type Level
 Base free-flow speed, BFFS 60.0 mph

ANALYSIS

DDHV = AADT x D x K
 DDHV = 57885 x 0.83 x 0.10 = 4901

Volume for : LOS
 4-lane highway = 4901 vph /2 lanes = 2450 vphpl F
 6-lane highway = 4901 vph /3 lanes = 1633 vphpl D

LEVEL OF SERVICE

Free-Flow Speed = 60 mph							Free-Flow Speed = 50 mph				
Terrain	LOS	Percent Trucks					Percent Trucks				
		0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co: Hussey, Gay, Bell & DeYoung
 Date: 3/20/2013
 Analysis Period: PM
 Highway: SR 21
 From/To: County Line/Berrien Rd
 Jurisdiction: Chatham County
 Analysis Year: 2035
 Project ID: No Build, Multilane 1

INPUT DATA

Total AADT volume, AADT 57885 vpd
 Proportion AADT during peak hour, K 0.10
 Percent peak-hour traffic in heaviest direction, D 69%
 Trucks 6 %
 Terrain type Level
 Base free-flow speed, BFFS 60.0 mph

ANALYSIS

DDHV = AADT x D x K
 DDHV = 57885 x 0.69 x 0.10 = 4074

Volume for : LOS
 4-lane highway = 4074 vph /2 lanes = 2037 vphpl F
 6-lane highway = 4074 vph /3 lanes = 1358 vphpl D

LEVEL OF SERVICE

Free-Flow Speed = 60 mph							Free-Flow Speed = 50 mph				
Terrain	LOS	Percent Trucks					Percent Trucks				
		0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

PLANNING ANALYSIS

Analyst:	Kelly Farabee
Agency/Co.:	Hussey, Gay, Bell & DeYoung
Date Performed:	3/20/2013
Analysis Time Period:	AM
Urban Street:	SR 21
Direction of Travel:	Southbound
Jurisdiction:	Chatham County
Analysis Year:	2035
Project ID:	No Build, Arterial 1

Traffic Characteristics

Annual average daily traffic, AADT	61185	vpd
Planning analysis hour factor, K	0.098	
Directional distribution factor, D	0.828	
Peak-hour factor, PHF	0.920	
Adjusted saturation flow rate	1900	pcphgpl
Percent turns from exclusive lanes	100	%

Roadway Characteristics

Number of through lanes one direction, N	2	
Free flow speed, FFS	45	mph
Urban class	2	
Section length	1.10	miles
Median	Yes	
Left-turn bays	Yes	

Signal Characteristics

Signalized intersections	4	
Arrival type, AT	4	
Signal type (k = 0.5 for planning)	Actuated	
Cycle length, C	150.0	sec
Effective green ratio, g/C	0.550	

Results

Annual average daily traffic, AADT	61185	vpd
Two-way hourly volume	5996	vph
Hourly directional volume	4964	vph
Through-volume 15-min. flow rate	0	v
Running time	111.7	sec
v/c ratio	0.00	
Through capacity	2090	vph
Progression factor, PF	0.682	
Uniform delay	15.2	sec
Filtering/metering factor, I	1.000	
Incremental delay	0.0	sec
Control delay	10.4	sec/v
Total travel speed, Sa	25.9	mph
Total urban street LOS	C	

HCS+: Urban Streets Release 5.4

PLANNING ANALYSIS

Analyst:	Kelly Farabee
Agency/Co.:	Hussey, Gay, Bell & DeYoung
Date Performed:	3/20/2013
Analysis Time Period:	PM
Urban Street:	State Route 21
Direction of Travel:	Northbound
Jurisdiction:	Chatham County
Analysis Year:	2035
Project ID:	No Build, Arterial 1

Traffic Characteristics

Annual average daily traffic, AADT	61185	vpd
Planning analysis hour factor, K	0.095	
Directional distribution factor, D	0.702	
Peak-hour factor, PHF	0.920	
Adjusted saturation flow rate	1900	pcphgpl
Percent turns from exclusive lanes	100	%

Roadway Characteristics

Number of through lanes one direction, N	2	
Free flow speed, FFS	45	mph
Urban class	2	
Section length	1.10	miles
Median	Yes	
Left-turn bays	Yes	

Signal Characteristics

Signalized intersections	4	
Arrival type, AT	4	
Signal type (k = 0.5 for planning)	Actuated	
Cycle length, C	150.0	sec
Effective green ratio, g/C	0.360	

Results

Annual average daily traffic, AADT	61185	vpd
Two-way hourly volume	5812	vph
Hourly directional volume	4080	vph
Through-volume 15-min. flow rate	0	v
Running time	111.7	sec
v/c ratio	0.00	
Through capacity	1367	vph
Progression factor, PF	0.935	
Uniform delay	30.7	sec
Filtering/metering factor, I	1.000	
Incremental delay	0.0	sec
Control delay	28.7	sec/v
Total travel speed, Sa	17.5	mph
Total urban street LOS	D	

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co: Hussey, Gay, Bell & DeYoung
 Date: 3/20/2013
 Analysis Period: **AM**
 Highway: SR 21
 From/To: Little Hearst/Jimmy DeLoach
 Jurisdiction: Chatham County
 Analysis Year: **2035**
 Project ID: **No Build, Multilane 2**

INPUT DATA

Total AADT volume, AADT 46980 vpd
 Proportion AADT during peak hour, K 0.07
 Percent peak-hour traffic in heaviest direction, D 75 %
 Trucks 5 %
 Terrain type Level
 Base free-flow speed, BFFS 60.0 mph

ANALYSIS

DDHV = AADT x D x K
 DDHV = 46980 x 0.75 x 0.07 = 2466

Volume for :
 4-lane highway = 2466 vph /2 lanes = 1233 vphpl LOS C
 6-lane highway = 2466 vph /3 lanes = 822 vphpl B

LEVEL OF SERVICE

Free-Flow Speed = 60 mph							Free-Flow Speed = 50 mph				
Terrain	LOS	Percent Trucks					Percent Trucks				
		0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co: Hussey, Gay, Bell & DeYoung
 Date: 3/20/2013
 Analysis Period: PM
 Highway: SR 21
 From/To: Little Hearst/Jimmy DeLoach
 Jurisdiction: Chatham County
 Analysis Year: 2035
 Project ID: No Build Multilane 2

INPUT DATA

Total AADT volume, AADT 46980 vpd
 Proportion AADT during peak hour, K 0.07
 Percent peak-hour traffic in heaviest direction, D 71 %
 Trucks 6 %
 Terrain type Level
 Base free-flow speed, BFFS 60.0 mph

ANALYSIS

DDHV = AADT x D x K
 DDHV = 46980 x 0.71 x 0.07 = 2335

Volume for : LOS
 4-lane highway = 2335 vph /2 lanes = 1167 vphpl C
 6-lane highway = 2335 vph /3 lanes = 778 vphpl B

LEVEL OF SERVICE

Free-Flow Speed = 60 mph							Free-Flow Speed = 50 mph				
Terrain	LOS	Percent Trucks					Percent Trucks				
		0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Urban Streets Release 5.4

PLANNING ANALYSIS

Analyst:	Kelly Farabee
Agency/Co.:	Hussey, Gay, Bell & DeYoung
Date Performed:	3/20/2013
Analysis Time Period:	AM
Urban Street:	SR 21
Direction of Travel:	Southbound
Jurisdiction:	Chatham County
Analysis Year:	2035
Project ID:	No Build Arterial 2

Traffic Characteristics

Annual average daily traffic, AADT	32217	vpd
Planning analysis hour factor, K	0.073	
Directional distribution factor, D	0.635	
Peak-hour factor, PHF	0.920	
Adjusted saturation flow rate	1900	pcphgpl
Percent turns from exclusive lanes	100	%

Roadway Characteristics

Number of through lanes one direction, N	2	
Free flow speed, FFS	50	mph
Urban class	1	
Section length	2.85	miles
Median	Yes	
Left-turn bays	Yes	

Signal Characteristics

Signalized intersections	3	
Arrival type, AT	3	
Signal type (k = 0.5 for planning)	Actuated	
Cycle length, C	145.0	sec
Effective green ratio, g/C	0.330	

Results

Annual average daily traffic, AADT	32217	vpd
Two-way hourly volume	2351	vph
Hourly directional volume	1492	vph
Through-volume 15-min. flow rate	0	v
Running time	206.9	sec
v/c ratio	0.00	
Through capacity	1254	vph
Progression factor, PF	1.000	
Uniform delay	32.5	sec
Filtering/metering factor, I	1.000	
Incremental delay	0.0	sec
Control delay	32.5	sec/v
Total travel speed, Sa	33.7	mph
Total urban street LOS	C	

HCS+: Urban Streets Release 5.4

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co.: Hussey, Gay, Bell & DeYoung
 Date Performed: 3/20/2013
 Analysis Time Period: **PM**
 Urban Street: SR 21
 Direction of Travel: Northbound
 Jurisdiction: Chatham County
 Analysis Year: **2035**
 Project ID: **No Build Arterial 2**

Traffic Characteristics

Annual average daily traffic, AADT 32217 vpd
 Planning analysis hour factor, K 0.073
 Directional distribution factor, D 0.769
 Peak-hour factor, PHF 0.920
 Adjusted saturation flow rate 1900 pcphgpl
 Percent turns from exclusive lanes 100 %

Roadway Characteristics

Number of through lanes one direction, N 2
 Free flow speed, FFS 50 mph
 Urban class 1
 Section length 2.85 miles
 Median Yes
 Left-turn bays Yes

Signal Characteristics

Signalized intersections 3
 Arrival type, AT 3
 Signal type (k = 0.5 for planning) Actuated
 Cycle length, C 145.0 sec
 Effective green ratio, g/C 0.380

Results

Annual average daily traffic, AADT 32217 vpd
 Two-way hourly volume 2351 vph
 Hourly directional volume 1807 vph
 Through-volume 15-min. flow rate 0 v
 Running time 206.9 sec
 v/c ratio 0.00
 Through capacity 1443 vph
 Progression factor, PF 1.000
 Uniform delay 27.9 sec
 Filtering/metering factor, I 1.000
 Incremental delay 0.0 sec
 Control delay 27.9 sec/v
 Total travel speed, Sa 35.3 mph
 Total urban street LOS B

PLANNING ANALYSIS

Analyst:	Kelly Farabee
Agency/Co.:	Hussey, Gay, Bell & DeYoung
Date Performed:	3/20/2013
Analysis Time Period:	AM
Urban Street:	SR 21
Direction of Travel:	Southbound
Jurisdiction:	Chatham County
Analysis Year:	2035
Project ID:	No Build, Arterial 3

Traffic Characteristics

Annual average daily traffic, AADT	49608	vpd
Planning analysis hour factor, K	0.074	
Directional distribution factor, D	0.536	
Peak-hour factor, PHF	0.920	
Adjusted saturation flow rate	1900	pcphgpl
Percent turns from exclusive lanes	50	%

Roadway Characteristics

Number of through lanes one direction, N	3	
Free flow speed, FFS	40	mph
Urban class	2	
Section length	1.80	miles
Median	Yes	
Left-turn bays	Yes	

Signal Characteristics

Signalized intersections	3	
Arrival type, AT	3	
Signal type (k = 0.5 for planning)	Actuated	
Cycle length, C	80.0	sec
Effective green ratio, g/C	0.530	

Results

Annual average daily traffic, AADT	49608	vpd
Two-way hourly volume	3670	vph
Hourly directional volume	1967	vph
Through-volume 15-min. flow rate	1069	v
Running time	166.3	sec
v/c ratio	0.35	
Through capacity	3020	vph
Progression factor, PF	1.000	
Uniform delay	10.9	sec
Filtering/metering factor, I	0.944	
Incremental delay	0.3	sec
Control delay	11.2	sec/v
Total travel speed, Sa	32.4	mph
Total urban street LOS	B	

HCS+: Urban Streets Release 5.4

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co.: Hussey, Gay, Bell & DeYoung
 Date Performed: 3/20/2013
 Analysis Time Period: **PM**
 Urban Street: SR 21
 Direction of Travel: Northbound
 Jurisdiction: Chatham County
 Analysis Year: **2035**
 Project ID: **No Build, Arterial 3**

Traffic Characteristics

Annual average daily traffic, AADT 49608 vpd
 Planning analysis hour factor, K 0.079
 Directional distribution factor, D 0.545
 Peak-hour factor, PHF 0.920
 Adjusted saturation flow rate 1900 pcphgpl
 Percent turns from exclusive lanes 50 %

Roadway Characteristics

Number of through lanes one direction, N 3
 Free flow speed, FFS 40 mph
 Urban class 2
 Section length 1.80 miles
 Median Yes
 Left-turn bays Yes

Signal Characteristics

Signalized intersections 3
 Arrival type, AT 3
 Signal type (k = 0.5 for planning) Actuated
 Cycle length, C 140.0 sec
 Effective green ratio, g/C 0.450

Results

Annual average daily traffic, AADT 49608 vpd
 Two-way hourly volume 3919 vph
 Hourly directional volume 2135 vph
 Through-volume 15-min. flow rate 1160 v
 Running time 166.3 sec
 v/c ratio 0.45
 Through capacity 2564 vph
 Progression factor, PF 1.000
 Uniform delay 26.6 sec
 Filtering/metering factor, I 0.891
 Incremental delay 0.5 sec
 Control delay 27.1 sec/v
 Total travel speed, Sa 26.2 mph
 Total urban street LOS C

ALT 3

HCS

Roadway Analysis

2035

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co: Hussey Gay Bell & DeYoung
 Date: 4/22/2013
 Analysis Period: AM
 Highway: SR 21
 From/To: County Line to SR 30
 Jurisdiction: Chatham County
 Analysis Year: 2035
 Project ID: Alternative 3, Multilane 1

INPUT DATA

Total AADT volume, AADT	44045	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	70	%
Trucks	4	%
Terrain type	Level	
Base free-flow speed, BFFS	50.0	mph

ANALYSIS

DDHV = AADT x D x K
 DDHV = 44045 x 0.70 x 0.10 = 3083

Volume for :		LOS
4-lane highway = 3083	vph/2 lanes = 1541	vphpl E
6-lane highway = 3083	vph/3 lanes = 1027	vphpl D

LEVEL OF SERVICE

Free-Flow Speed = 60 mph							Free-Flow Speed = 50 mph				
Terrain	LOS	Percent Trucks					Percent Trucks				
		0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with
 50 mi/h FFS has 25 access points/mi; lane width = 12 ft;
 shoulder width > 6 ft; divided highway; PHF = 0.88;
 all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4
PLANNING ANALYSIS

Analyst: Kelly Farabee
Agency/Co: Hussey Gay Bell & DeYoung
Date: 4/22/2013
Analysis Period: PM
Highway: SR 21
From/To: County Line to SR 30
Jurisdiction: Chatham County
Analysis Year: 2035
Project ID: Alternative 3, Multilane 1

INPUT DATA

Total AADT volume, AADT	44045	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	68	%
Trucks	6	%
Terrain type	Level	
Base free-flow speed, BFFS	50.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 44045 x 0.68 x 0.10 = 2995

Volume for :		LOS
4-lane highway = 2995	vph/2 lanes = 1497	vphpl E
6-lane highway = 2995	vph/3 lanes = 998	vphpl D

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
	LOS	0	5	10	15	20	0	5	10	15	20
Terrain Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Urban Streets Release 5.4

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co.: Hussey Gay Bell & DeYoung
 Date Performed: 4/22/2013
 Analysis Time Period: **AM**
 Urban Street: SR 21
 Direction of Travel: Southbound
 Jurisdiction: Chatham County
 Analysis Year: **2035**
 Project ID: **Alternative 3, Arterial 1**

Traffic Characteristics

Annual average daily traffic, AADT	33650	vpd
Planning analysis hour factor, K	0.098	
Directional distribution factor, D	0.876	
Peak-hour factor, PHF	0.920	
Adjusted saturation flow rate	1800	pcphgpl
Percent turns from exclusive lanes	100	%

Roadway Characteristics

Number of through lanes one direction, N	2	
Free flow speed, FFS	45	mph
Urban class	2	
Section length	1.10	miles
Median	Yes	
Left-turn bays	Yes	

Signal Characteristics

Signalized intersections	4	
Arrival type, AT	4	
Signal type (k = 0.5 for planning)	Actuated	
Cycle length, C	129.6	sec
Effective green ratio, g/C	0.620	

Results

Annual average daily traffic, AADT	33650	vpd
Two-way hourly volume	3297	vph
Hourly directional volume	2888	vph
Through-volume 15-min. flow rate	0	v
Running time	111.7	sec
v/c ratio	0.00	
Through capacity	2232	vph
Progression factor, PF	0.525	
Uniform delay	9.4	sec
Filtering/metering factor, I	1.000	
Incremental delay	0.0	sec
Control delay	4.9	sec/v
Total travel speed, Sa	30.2	mph
Total urban street LOS	B	

HCS+: Urban Streets Release 5.4

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co.: Hussey Gay Bell & DeYoung
 Date Performed: 4/22/2013
 Analysis Time Period: **PM**
 Urban Street: SR 21
 Direction of Travel: Northbound
 Jurisdiction: Chatham County
 Analysis Year: **2035**
 Project ID: **Alternative 3, Arterials 1**

Traffic Characteristics

Annual average daily traffic, AADT	33650	vpd
Planning analysis hour factor, K	0.095	
Directional distribution factor, D	0.697	
Peak-hour factor, PHF	0.920	
Adjusted saturation flow rate	1800	pcphgpl
Percent turns from exclusive lanes	100	%

Roadway Characteristics

Number of through lanes one direction, N	3	
Free flow speed, FFS	45	mph
Urban class	2	
Section length	1.10	miles
Median	Yes	
Left-turn bays	Yes	

Signal Characteristics

Signalized intersections	4	
Arrival type, AT	4	
Signal type (k = 0.5 for planning)	Actuated	
Cycle length, C	130.0	sec
Effective green ratio, g/C	0.610	

Results

Annual average daily traffic, AADT	33650	vpd
Two-way hourly volume	3196	vph
Hourly directional volume	2227	vph
Through-volume 15-min. flow rate	0	v
Running time	111.7	sec
v/c ratio	0.00	
Through capacity	3294	vph
Progression factor, PF	0.551	
Uniform delay	9.9	sec
Filtering/metering factor, I	1.000	
Incremental delay	0.0	sec
Control delay	5.4	sec/v
Total travel speed, Sa	29.7	mph
Total urban street LOS	B	

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co: Hussey Gay Bell & DeYoung
 Date: 4/22/2013
 Analysis Period: AM
 Highway: SR 21
 From/To: Hendley Rd to JDL Parkway
 Jurisdiction: Chatham County
 Analysis Year: 2035
 Project ID: Alternative 3, Multilane 2

INPUT DATA

Total AADT volume, AADT	18570	vpd
Proportion AADT during peak hour, K	0.07	
Percent peak-hour traffic in heaviest direction, D	78	%
Trucks	5	%
Terrain type	Level	
Base free-flow speed, BFFS	60.0	mph

ANALYSIS

DDHV = AADT x D x K
 DDHV = 18570 x 0.78 x 0.07 = 1014

Volume for :		LOS
4-lane highway = 1014	vph/2 lanes = 507	vphpl A
6-lane highway = 1014	vph/3 lanes = 338	vphpl A

LEVEL OF SERVICE

Free-Flow Speed = 60 mph							Free-Flow Speed = 50 mph				
Terrain	LOS	Percent Trucks					Percent Trucks				
		0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with
 50 mi/h FFS has 25 access points/mi; lane width = 12 ft;
 shoulder width > 6 ft; divided highway; PHF = 0.88;
 all heavy vehicles are trucks and regular commuters

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co: Hussey Gay Bell & DeYoung
 Date: 4/22/2013
 Analysis Period: PM
 Highway: SR 21
 From/To: Hendley Rd to JDL Parkway
 Jurisdiction: Chatham County
 Analysis Year: 2035
 Project ID: **Alternative 3, Multilane 2**

INPUT DATA

Total AADT volume, AADT	18570	vpd
Proportion AADT during peak hour, K	0.07	
Percent peak-hour traffic in heaviest direction, D	69	%
Trucks	6	%
Terrain type	Level	
Base free-flow speed, BFFS	60.0	mph

ANALYSIS

$DDHV = AADT \times D \times K$
 $DDHV = 18570 \times 0.69 \times 0.07 = 897$

Volume for :		LOS
4-lane highway = 897	vph/2 lanes = 448	vphpl A
6-lane highway = 897	vph/3 lanes = 299	vphpl A

LEVEL OF SERVICE

Free-Flow Speed = 60 mph							Free-Flow Speed = 50 mph				
Terrain	LOS	Percent Trucks					Percent Trucks				
		0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with
 50 mi/h FFS has 25 access points/mi; lane width = 12 ft;
 shoulder width > 6 ft; divided highway; PHF = 0.88;
 all heavy vehicles are trucks and regular commuters

HCS+: Urban Streets Release 5.4

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co.: Hussey Gay Bell & DeYoung
 Date Performed: 4/22/2013
 Analysis Time Period: **AM**
 Urban Street: SR 21
 Direction of Travel: **Southbound**
 Jurisdiction: Chatham County
 Analysis Year: **2035**
 Project ID: **Alternative 3, Arterial 2**

Traffic Characteristics

Annual average daily traffic, AADT	23490	vpd
Planning analysis hour factor, K	0.073	
Directional distribution factor, D	0.776	
Peak-hour factor, PHF	0.920	
Adjusted saturation flow rate	1800	pcphgpl
Percent turns from exclusive lanes	100	%

Roadway Characteristics

Number of through lanes one direction, N	2	
Free flow speed, FFS	50	mph
Urban class	1	
Section length	2.85	miles
Median	Yes	
Left-turn bays	Yes	

Signal Characteristics

Signalized intersections	4	
Arrival type, AT	3	
Signal type (k = 0.5 for planning)	Actuated	
Cycle length, C	110.0	sec
Effective green ratio, g/C	0.240	

Results

Annual average daily traffic, AADT	23490	vpd
Two-way hourly volume	1714	vph
Hourly directional volume	1330	vph
Through-volume 15-min. flow rate	0	v
Running time	215.0	sec
v/c ratio	0.00	
Through capacity	863	vph
Progression factor, PF	1.000	
Uniform delay	31.8	sec
Filtering/metering factor, I	1.000	
Incremental delay	0.0	sec
Control delay	31.8	sec/v
Total travel speed, Sa	30.0	mph
Total urban street LOS	C	

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co.: Hussey Gay Bell & DeYoung
 Date Performed: 4/22/2013
 Analysis Time Period: **PM**
 Urban Street: SR 21
 Direction of Travel: **Northbound**
 Jurisdiction: Chatham County
 Analysis Year: **2035**
 Project ID: **Alternative 3, Arterial 2**

Traffic Characteristics

Annual average daily traffic, AADT 23490 vpd
 Planning analysis hour factor, K 0.073
 Directional distribution factor, D 0.764
 Peak-hour factor, PHF 0.920
 Adjusted saturation flow rate 1800 pcphgpl
 Percent turns from exclusive lanes 100 %

Roadway Characteristics

Number of through lanes one direction, N 2
 Free flow speed, FFS 50 mph
 Urban class 1
 Section length 2.85 miles
 Median Yes
 Left-turn bays Yes

Signal Characteristics

Signalized intersections 4
 Arrival type, AT 3
 Signal type (k = 0.5 for planning) Actuated
 Cycle length, C 120.0 sec
 Effective green ratio, g/C 0.240

Results

Annual average daily traffic, AADT 23490 vpd
 Two-way hourly volume 1714 vph
 Hourly directional volume 1309 vph
 Through-volume 15-min. flow rate 0 v
 Running time 215.0 sec
 v/c ratio 0.00
 Through capacity 863 vph
 Progression factor, PF 1.000
 Uniform delay 34.7 sec
 Filtering/metering factor, I 1.000
 Incremental delay 0.0 sec
 Control delay 34.7 sec/v
 Total travel speed, Sa 29.0 mph
 Total urban street LOS C

HCS+: Urban Streets Release 5.4

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co.: Hussey Gay Bell & DeYoung
 Date Performed: 4/22/2013
 Analysis Time Period: **AM**
 Urban Street: SR 21
 Direction of Travel: **Southbound**
 Jurisdiction: Chatham County
 Analysis Year: **2035**
 Project ID: **Alternative 3, Arterial 3**

Traffic Characteristics

Annual average daily traffic, AADT 19810 vpd
 Planning analysis hour factor, K 0.074
 Directional distribution factor, D 0.509
 Peak-hour factor, PHF 0.920
 Adjusted saturation flow rate 1800 pcphgpl
 Percent turns from exclusive lanes 50 %

Roadway Characteristics

Number of through lanes one direction, N 3
 Free flow speed, FFS 40 mph
 Urban class 2
 Section length 1.80 miles
 Median Yes
 Left-turn bays Yes

Signal Characteristics

Signalized intersections 3
 Arrival type, AT 3
 Signal type (k = 0.5 for planning) Actuated
 Cycle length, C 70.0 sec
 Effective green ratio, g/C 0.380

Results

Annual average daily traffic, AADT 19810 vpd
 Two-way hourly volume 1465 vph
 Hourly directional volume 745 vph
 Through-volume 15-min. flow rate 404 v
 Running time 166.3 sec
 v/c ratio 0.20
 Through capacity 2051 vph
 Progression factor, PF 1.000
 Uniform delay 14.5 sec
 Filtering/metering factor, I 0.988
 Incremental delay 0.2 sec
 Control delay 14.8 sec/v
 Total travel speed, Sa 30.8 mph
 Total urban street LOS B

HCS+: Urban Streets Release 5.4

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co.: Hussey Gay Bell & DeYoung
 Date Performed: 4/22/2013
 Analysis Time Period: **PM**
 Urban Street: SR 21
 Direction of Travel: **Northbound**
 Jurisdiction: Chatham County
 Analysis Year: **2035**
 Project ID: **Alternative 3, Arterial 3**

Traffic Characteristics

Annual average daily traffic, AADT	19810	vpd
Planning analysis hour factor, K	0.079	
Directional distribution factor, D	0.576	
Peak-hour factor, PHF	0.920	
Adjusted saturation flow rate	1800	pcphgpl
Percent turns from exclusive lanes	50	%

Roadway Characteristics

Number of through lanes one direction, N	3	
Free flow speed, FFS	40	mph
Urban class	2	
Section length	1.80	miles
Median	Yes	
Left-turn bays	Yes	

Signal Characteristics

Signalized intersections	3	
Arrival type, AT	3	
Signal type (k = 0.5 for planning)	Actuated	
Cycle length, C	60.0	sec
Effective green ratio, g/C	0.310	

Results

Annual average daily traffic, AADT	19810	vpd
Two-way hourly volume	1564	vph
Hourly directional volume	900	vph
Through-volume 15-min. flow rate	489	v
Running time	166.3	sec
v/c ratio	0.29	
Through capacity	1674	vph
Progression factor, PF	1.000	
Uniform delay	15.7	sec
Filtering/metering factor, I	0.966	
Incremental delay	0.4	sec
Control delay	16.1	sec/v
Total travel speed, Sa	30.2	mph
Total urban street LOS	B	

ALT 10

HCS

Roadway Analysis

2035

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co: Hussey Gay Bell & DeYoung
 Date: 8/1/2013
 Analysis Period: AM
 Highway: SR 21
 From/To: County Line to SR 30
 Jurisdiction: Chatham County
 Analysis Year: 2035
 Project ID: Alternative 10B, Multilane 1

INPUT DATA

Total AADT volume, AADT	43065	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	80	%
Trucks	4	%
Terrain type	Level	
Base free-flow speed, BFFS	50.0	mph

ANALYSIS

DDHV = AADT x D x K
 DDHV = 43065 x 0.80 x 0.10 = 3445

Volume for :		LOS
4-lane highway = 3445	vph/2 lanes = 1722	vphpl F
6-lane highway = 3445	vph/3 lanes = 1148	vphpl D

LEVEL OF SERVICE

Free-Flow Speed = 60 mph							Free-Flow Speed = 50 mph				
Terrain	LOS	Percent Trucks					Percent Trucks				
		0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with
 50 mi/h FFS has 25 access points/mi; lane width = 12 ft;
 shoulder width > 6 ft; divided highway; PHF = 0.88;
 all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co: Hussey Gay Bell & DeYoung
 Date: 8/1/2013
 Analysis Period: PM
 Highway: SR 21
 From/To: County Line to SR 30
 Jurisdiction: Chatham County
 Analysis Year: 2035
 Project ID: Alternative 10B, Multilane 1

INPUT DATA

Total AADT volume, AADT 43065 vpd
 Proportion AADT during peak hour, K 0.10
 Percent peak-hour traffic in heaviest direction, D 72 %
 Trucks 6 %
 Terrain type Level
 Base free-flow speed, BFFS 50.0 mph

ANALYSIS

DDHV = AADT x D x K
 DDHV = 43065 x 0.72 x 0.10 = 3101

Volume for : LOS
 4-lane highway = 3101 vph/2 lanes = 1550 vphpl E
 6-lane highway = 3101 vph/3 lanes = 1033 vphpl D

LEVEL OF SERVICE

Free-Flow Speed = 60 mph							Free-Flow Speed = 50 mph				
Terrain	LOS	Percent Trucks					Percent Trucks				
		0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Urban Streets Release 5.4

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co.: Hussey Gay Bell & DeYoung
 Date Performed: 8/1/2013
 Analysis Time Period: **AM**
 Urban Street: SR 21
 Direction of Travel: Southbound
 Jurisdiction: Chatham County
 Analysis Year: **2035**
 Project ID: **Alternative 10B, Arterial 1**

Traffic Characteristics

Annual average daily traffic, AADT	29040	vpd
Planning analysis hour factor, K	0.098	
Directional distribution factor, D	0.820	
Peak-hour factor, PHF	0.920	
Adjusted saturation flow rate	1800	pcphgpl
Percent turns from exclusive lanes	100	%

Roadway Characteristics

Number of through lanes one direction, N	2	
Free flow speed, FFS	45	mph
Urban class	2	
Section length	1.10	miles
Median	Yes	
Left-turn bays	Yes	

Signal Characteristics

Signalized intersections	4	
Arrival type, AT	4	
Signal type (k = 0.5 for planning)	Actuated	
Cycle length, C	146.1	sec
Effective green ratio, g/C	0.630	

Results

Annual average daily traffic, AADT	29040	vpd
Two-way hourly volume	2845	vph
Hourly directional volume	2332	vph
Through-volume 15-min. flow rate	0	v
Running time	111.7	sec
v/c ratio	0.00	
Through capacity	2267	vph
Progression factor, PF	0.498	
Uniform delay	10.0	sec
Filtering/metering factor, I	1.000	
Incremental delay	0.0	sec
Control delay	5.0	sec/v
Total travel speed, Sa	30.1	mph
Total urban street LOS	B	

HCS+: Urban Streets Release 5.4

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co.: Hussey Gay Bell & DeYoung
 Date Performed: 8/1/2013
 Analysis Time Period: **PM**
 Urban Street: SR 21
 Direction of Travel: Northbound
 Jurisdiction: Chatham County
 Analysis Year: **2035**
 Project ID: **Alternative 10B, Arterial 1**

Traffic Characteristics

Annual average daily traffic, AADT 29040 vpd
 Planning analysis hour factor, K 0.095
 Directional distribution factor, D 0.612
 Peak-hour factor, PHF 0.920
 Adjusted saturation flow rate 1800 pcphgpl
 Percent turns from exclusive lanes 100 %

Roadway Characteristics

Number of through lanes one direction, N 2
 Free flow speed, FFS 45 mph
 Urban class 2
 Section length 1.10 miles
 Median Yes
 Left-turn bays Yes

Signal Characteristics

Signalized intersections 4
 Arrival type, AT 4
 Signal type (k = 0.5 for planning) Actuated
 Cycle length, C 150.0 sec
 Effective green ratio, g/C 0.680

Results

Annual average daily traffic, AADT 29040 vpd
 Two-way hourly volume 2758 vph
 Hourly directional volume 1687 vph
 Through-volume 15-min. flow rate 0 v
 Running time 111.7 sec
 v/c ratio 0.00
 Through capacity 2448 vph
 Progression factor, PF 0.336
 Uniform delay 7.7 sec
 Filtering/metering factor, I 1.000
 Incremental delay 0.0 sec
 Control delay 2.6 sec/v
 Total travel speed, Sa 32.5 mph
 Total urban street LOS B

HCS+: Multilane Highways Release 5.4
PLANNING ANALYSIS

Analyst: Kelly Farabee
Agency/Co: Hussey Gay Bell & DeYoung
Date: 8/1/2013
Analysis Period: **AM**
Highway: SR 21
From/To: Hendley Road to JDL Parkway
Jurisdiction: Chatham County
Analysis Year: **2035**
Project ID: **Alternative 10B, Multilane 2**

INPUT DATA

Total AADT volume, AADT	21553	vpd
Proportion AADT during peak hour, K	0.07	
Percent peak-hour traffic in heaviest direction, D	76	%
Trucks	5	%
Terrain type	Level	
Base free-flow speed, BFFS	60.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 21553 x 0.76 x 0.07 = 1147

Volume for :		LOS
4-lane highway = 1147	vph/2 lanes = 573	vphpl B
6-lane highway = 1147	vph/3 lanes = 382	vphpl A

LEVEL OF SERVICE

Free-Flow Speed = 60 mph							Free-Flow Speed = 50 mph				
Terrain	LOS	Percent Trucks					Percent Trucks				
		0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst: Kelly Farabee
Agency/Co: Hussey Gay Bell & DeYoung
Date: 8/1/2013
Analysis Period: **PM**

Highway: SR 21
 From/To: Hendley Road to JDL Parkway
 Jurisdiction: Chatham County
 Analysis Year: 2035
 Project ID: **Alternative 10B, Multilane 2**

INPUT DATA

Total AADT volume, AADT	21553	vpd
Proportion AADT during peak hour, K	0.07	
Percent peak-hour traffic in heaviest direction, D	70	%
Trucks	6	%
Terrain type	Level	
Base free-flow speed, BFFS	60.0	mph

ANALYSIS

DDHV = AADT x D x K
 DDHV = 21553 x 0.70 x 0.07 = 1056

Volume for :		LOS
4-lane highway = 1056	vph/2 lanes = 528	vphpl A
6-lane highway = 1056	vph/3 lanes = 352	vphpl A

LEVEL OF SERVICE

Free-Flow Speed = 60 mph							Free-Flow Speed = 50 mph				
Terrain	LOS	Percent Trucks					Percent Trucks				
		0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co.: Hussey Gay Bell & DeYoung
 Date Performed: 8/1/2013
 Analysis Time Period: **AM**
 Urban Street: SR 21
 Direction of Travel: Southbound
 Jurisdiction: Chatham County
 Analysis Year: **2035**
 Project ID: **Alternative 10B, Arterial 2**

Traffic Characteristics

Annual average daily traffic, AADT	26083	vpd
Planning analysis hour factor, K	0.073	
Directional distribution factor, D	0.670	
Peak-hour factor, PHF	0.920	
Adjusted saturation flow rate	1800	pcphgpl
Percent turns from exclusive lanes	100	%

Roadway Characteristics

Number of through lanes one direction, N	2	
Free flow speed, FFS	50	mph
Urban class	1	
Section length	2.85	miles
Median	Yes	
Left-turn bays	Yes	

Signal Characteristics

Signalized intersections	4	
Arrival type, AT	3	
Signal type (k = 0.5 for planning)	Actuated	
Cycle length, C	88.6	sec
Effective green ratio, g/C	0.390	

Results

Annual average daily traffic, AADT	26083	vpd
Two-way hourly volume	1904	vph
Hourly directional volume	1275	vph
Through-volume 15-min. flow rate	0	v
Running time	215.0	sec
v/c ratio	0.00	
Through capacity	1403	vph
Progression factor, PF	1.000	
Uniform delay	16.5	sec
Filtering/metering factor, I	1.000	
Incremental delay	0.0	sec
Control delay	16.5	sec/v
Total travel speed, Sa	36.5	mph
Total urban street LOS	B	

HCS+: Urban Streets Release 5.4

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co.: Hussey Gay Bell & DeYoung
 Date Performed: 8/1/2013
 Analysis Time Period: **PM**
 Urban Street: SR 21
 Direction of Travel: Northbound
 Jurisdiction: Chatham County
 Analysis Year: **2035**
 Project ID: **Alternative 10B, Arterial 2**

Traffic Characteristics

Annual average daily traffic, AADT 26083 vpd
 Planning analysis hour factor, K 0.073
 Directional distribution factor, D 0.738
 Peak-hour factor, PHF 0.920
 Adjusted saturation flow rate 1800 pcphgpl
 Percent turns from exclusive lanes 100 %

Roadway Characteristics

Number of through lanes one direction, N 2
 Free flow speed, FFS 50 mph
 Urban class 1
 Section length 2.85 miles
 Median Yes
 Left-turn bays Yes

Signal Characteristics

Signalized intersections 4
 Arrival type, AT 3
 Signal type (k = 0.5 for planning) Actuated
 Cycle length, C 98.7 sec
 Effective green ratio, g/C 0.430

Results

Annual average daily traffic, AADT 26083 vpd
 Two-way hourly volume 1904 vph
 Hourly directional volume 1405 vph
 Through-volume 15-min. flow rate 0 v
 Running time 215.0 sec
 v/c ratio 0.00
 Through capacity 1548 vph
 Progression factor, PF 1.000
 Uniform delay 16.0 sec
 Filtering/metering factor, I 1.000
 Incremental delay 0.0 sec
 Control delay 16.0 sec/v
 Total travel speed, Sa 36.8 mph
 Total urban street LOS B

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co.: Hussey Gay Bell & DeYoung
 Date Performed: 8/1/2013
 Analysis Time Period: **AM**
 Urban Street: SR 21
 Direction of Travel: Southbound
 Jurisdiction: Chatham County
 Analysis Year: **2035**
 Project ID: **Alternative 10B, Arterial 3**

Traffic Characteristics

Annual average daily traffic, AADT	20267	vpd
Planning analysis hour factor, K	0.074	
Directional distribution factor, D	0.500	
Peak-hour factor, PHF	0.920	
Adjusted saturation flow rate	1800	pcphgpl
Percent turns from exclusive lanes	50	%

Roadway Characteristics

Number of through lanes one direction, N	3	
Free flow speed, FFS	40	mph
Urban class	2	
Section length	1.80	miles
Median	Yes	
Left-turn bays	Yes	

Signal Characteristics

Signalized intersections	3	
Arrival type, AT	3	
Signal type (k = 0.5 for planning)	Actuated	
Cycle length, C	60.0	sec
Effective green ratio, g/C	0.390	

Results

Annual average daily traffic, AADT	20267	vpd
Two-way hourly volume	1499	vph
Hourly directional volume	749	vph
Through-volume 15-min. flow rate	407	v
Running time	166.3	sec
v/c ratio	0.19	
Through capacity	2105	vph
Progression factor, PF	1.000	
Uniform delay	12.1	sec
Filtering/metering factor, I	0.989	
Incremental delay	0.2	sec
Control delay	12.3	sec/v
Total travel speed, Sa	31.9	mph
Total urban street LOS	B	

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co.: Hussey Gay Bell & DeYoung
 Date Performed: 8/1/2013
 Analysis Time Period: **AM**
 Urban Street: SR 21
 Direction of Travel: Southbound
 Jurisdiction: Chatham County
 Analysis Year: **2035**
 Project ID: **Alternative 10B, Arterial 3**

Traffic Characteristics

Annual average daily traffic, AADT	20267	vpd
Planning analysis hour factor, K	0.074	
Directional distribution factor, D	0.500	
Peak-hour factor, PHF	0.920	
Adjusted saturation flow rate	1800	pcphgpl
Percent turns from exclusive lanes	50	%

Roadway Characteristics

Number of through lanes one direction, N	3	
Free flow speed, FFS	40	mph
Urban class	2	
Section length	1.80	miles
Median	Yes	
Left-turn bays	Yes	

Signal Characteristics

Signalized intersections	3	
Arrival type, AT	3	
Signal type (k = 0.5 for planning)	Actuated	
Cycle length, C	60.0	sec
Effective green ratio, g/C	0.390	

Results

Annual average daily traffic, AADT	20267	vpd
Two-way hourly volume	1499	vph
Hourly directional volume	749	vph
Through-volume 15-min. flow rate	407	v
Running time	166.3	sec
v/c ratio	0.19	
Through capacity	2105	vph
Progression factor, PF	1.000	
Uniform delay	12.1	sec
Filtering/metering factor, I	0.989	
Incremental delay	0.2	sec
Control delay	12.3	sec/v
Total travel speed, Sa	31.9	mph
Total urban street LOS	B	

ALT 11

HCS

Roadway Analysis

2035

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co: Hussey Gay Bell & DeYoung
 Date: 4/22/2013
 Analysis Period: **AM**
 Highway: SR 21
 From/To: County Line to SR 30
 Jurisdiction: Chatham County
 Analysis Year: **2035**
 Project ID: **Alternative 11, Multilane 1**

INPUT DATA

Total AADT volume, AADT	43425	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	76	%
Trucks	4	%
Terrain type	Level	
Base free-flow speed, BFFS	50.0	mph

ANALYSIS

DDHV = AADT x D x K
 DDHV = 43425 x 0.76 x 0.10 = 3300

Volume for :		LOS
4-lane highway = 3300	vph/2 lanes = 1650	vphpl F
6-lane highway = 3300	vph/3 lanes = 1100	vphpl D

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
Terrain	LOS	0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with
 50 mi/h FFS has 25 access points/mi; lane width = 12 ft;
 shoulder width > 6 ft; divided highway; PHF = 0.88;
 all heavy vehicles are trucks and regular commuters

HCS+: Multilane Highways Release 5.4

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co: Hussey Gay Bell & DeYoung
 Date: 4/22/2013
 Analysis Period: **PM**
 Highway: SR 21

From/To: County Line to SR 30
 Jurisdiction: Chatham County
 Analysis Year: 2035
 Project ID: Alternative 11, Multilane 1

INPUT DATA

Total AADT volume, AADT	43425	vpd
Proportion AADT during peak hour, K	0.10	
Percent peak-hour traffic in heaviest direction, D	65	%
Trucks	6	%
Terrain type	Level	
Base free-flow speed, BFFS	50.0	mph

ANALYSIS

DDHV = AADT x D x K
 DDHV = 43425 x 0.65 x 0.10 = 2823

Volume for :		LOS
4-lane highway = 2823	vph/2 lanes = 1411	vphpl E
6-lane highway = 2823	vph/3 lanes = 941	vphpl C

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
	LOS	0	Percent Trucks				0	Percent Trucks			
			5	10	15	20		5	10	15	20
Terrain Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co.: Hussey Gay Bell DeYoung
 Date Performed: 4/22/2013
 Analysis Time Period: **AM**
 Urban Street: SR 21
 Direction of Travel: **Southbound**
 Jurisdiction: Chatham County
 Analysis Year: **2035**
 Project ID: **Alternative 11, Arterial 1**

Traffic Characteristics

Annual average daily traffic, AADT 27590 vpd
 Planning analysis hour factor, K 0.098
 Directional distribution factor, D 0.828
 Peak-hour factor, PHF 0.920
 Adjusted saturation flow rate 1800 pcphgpl
 Percent turns from exclusive lanes 100 %

Roadway Characteristics

Number of through lanes one direction, N 2
 Free flow speed, FFS 45 mph
 Urban class 2
 Section length 1.10 miles
 Median Yes
 Left-turn bays Yes

Signal Characteristics

Signalized intersections 4
 Arrival type, AT 4
 Signal type (k = 0.5 for planning) Actuated
 Cycle length, C 129.6 sec
 Effective green ratio, g/C 0.600

Results

Annual average daily traffic, AADT 27590 vpd
 Two-way hourly volume 2703 vph
 Hourly directional volume 2238 vph
 Through-volume 15-min. flow rate 0 v
 Running time 111.7 sec
 v/c ratio 0.00
 Through capacity 2160 vph
 Progression factor, PF 0.576
 Uniform delay 10.4 sec
 Filtering/metering factor, I 1.000
 Incremental delay 0.0 sec
 Control delay 6.0 sec/v
 Total travel speed, Sa 29.2 mph
 Total urban street LOS B

HCS+: Urban Streets Release 5.4

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co.: Hussey Gay Bell DeYoung
 Date Performed: 4/22/2013
 Analysis Time Period: PM
 Urban Street: SR 21
 Direction of Travel: Northbound
 Jurisdiction: Chatham County
 Analysis Year: 2035
 Project ID: Alternative 11, Arterial 1

Traffic Characteristics

Annual average daily traffic, AADT	27590	vpd
Planning analysis hour factor, K	0.095	
Directional distribution factor, D	0.669	
Peak-hour factor, PHF	0.920	
Adjusted saturation flow rate	1800	pcphgpl
Percent turns from exclusive lanes	100	%

Roadway Characteristics

Number of through lanes one direction, N	3	
Free flow speed, FFS	45	mph
Urban class	2	
Section length	1.10	miles
Median	Yes	
Left-turn bays	Yes	

Signal Characteristics

Signalized intersections	4	
Arrival type, AT	4	
Signal type (k = 0.5 for planning)	Actuated	
Cycle length, C	150.0	sec
Effective green ratio, g/C	0.650	

Results

Annual average daily traffic, AADT	27590	vpd
Two-way hourly volume	2621	vph
Hourly directional volume	1753	vph
Through-volume 15-min. flow rate	0	v
Running time	111.7	sec
v/c ratio	0.00	
Through capacity	3509	vph
Progression factor, PF	0.439	
Uniform delay	9.2	sec
Filtering/metering factor, I	1.000	
Incremental delay	0.0	sec
Control delay	4.0	sec/v
Total travel speed, Sa	31.0	mph
Total urban street LOS	B	

HCS+: Multilane Highways Release 5.4
PLANNING ANALYSIS

Analyst: Kelly Farabee
Agency/Co: Hussey Gay Bell & DeYoung
Date: 4/22/2013
Analysis Period: AM
Highway: SR 21
From/To: Hendley Rd to JDL Parkway
Jurisdiction: Chatham County
Analysis Year: 2035
Project ID: Alternative 11, Multilane 2

INPUT DATA

Total AADT volume, AADT	21810	vpd
Proportion AADT during peak hour, K	0.07	
Percent peak-hour traffic in heaviest direction, D	74	%
Trucks	5	%
Terrain type	Level	
Base free-flow speed, BFFS	60.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 21810 x 0.74 x 0.07 = 1130

Volume for :		LOS
4-lane highway = 1130	vph/2 lanes = 565	vphpl B
6-lane highway = 1130	vph/3 lanes = 376	vphpl A

LEVEL OF SERVICE

Free-Flow Speed = 60 mph							Free-Flow Speed = 50 mph				
Terrain	LOS	Percent Trucks					Percent Trucks				
		0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co: Hussey Gay Bell & DeYoung
 Date: 4/22/2013
 Analysis Period: PM
 Highway: SR 21
 From/To: Hendley Rd to JDL Parkway
 Jurisdiction: Chatham County
 Analysis Year: 2035
 Project ID: **Alternative 11, Multilane 2**

INPUT DATA

Total AADT volume, AADT	21810	vpd
Proportion AADT during peak hour, K	0.07	
Percent peak-hour traffic in heaviest direction, D	71	%
Trucks	6	%
Terrain type	Level	
Base free-flow speed, BFFS	60.0	mph

ANALYSIS

DDHV = AADT x D x K
 DDHV = 21810 x 0.71 x 0.07 = 1084

Volume for :		LOS
4-lane highway = 1084	vph/2 lanes = 542	vphpl A
6-lane highway = 1084	vph/3 lanes = 361	vphpl A

LEVEL OF SERVICE

Free-Flow Speed = 60 mph							Free-Flow Speed = 50 mph				
Terrain	LOS	Percent Trucks					Percent Trucks				
		0	5	10	15	20	0	5	10	15	20
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260
	B	920	780	680	600	540	710	610	530	470	420
	C	1310	1120	970	860	770	1030	880	760	680	610
	D	1680	1430	1250	1100	990	1350	1150	1000	890	800
	E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with
 50 mi/h FFS has 25 access points/mi; lane width = 12 ft;
 shoulder width > 6 ft; divided highway; PHF = 0.88;
 all heavy vehicles are trucks and regular commuters

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co.: Hussey Gay Bell & DeYoung
 Date Performed: 4/22/2013
 Analysis Time Period: **AM**
 Urban Street: SR 21
 Direction of Travel: **Southbound**
 Jurisdiction: Chatham County
 Analysis Year: **2035**
 Project ID: **Alternative 11, Arterial 2**

Traffic Characteristics

Annual average daily traffic, AADT	25180	vpd
Planning analysis hour factor, K	0.073	
Directional distribution factor, D	0.692	
Peak-hour factor, PHF	0.920	
Adjusted saturation flow rate	1800	pcphgpl
Percent turns from exclusive lanes	100	%

Roadway Characteristics

Number of through lanes one direction, N	2	
Free flow speed, FFS	50	mph
Urban class	1	
Section length	2.85	miles
Median	Yes	
Left-turn bays	Yes	

Signal Characteristics

Signalized intersections	4	
Arrival type, AT	3	
Signal type (k = 0.5 for planning)	Actuated	
Cycle length, C	110.0	sec
Effective green ratio, g/C	0.320	

Results

Annual average daily traffic, AADT	25180	vpd
Two-way hourly volume	1838	vph
Hourly directional volume	1271	vph
Through-volume 15-min. flow rate	0	v
Running time	215.0	sec
v/c ratio	0.00	
Through capacity	1151	vph
Progression factor, PF	1.000	
Uniform delay	25.4	sec
Filtering/metering factor, I	1.000	
Incremental delay	0.0	sec
Control delay	25.4	sec/v
Total travel speed, Sa	32.4	mph
Total urban street LOS	C	

HCS+: Urban Streets Release 5.4

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co.: Hussey Gay Bell & DeYoung
 Date Performed: 4/22/2013
 Analysis Time Period: **PM**
 Urban Street: SR 21
 Direction of Travel: **Northbound**
 Jurisdiction: Chatham County
 Analysis Year: **2035**
 Project ID: **Alternative 11, Arterial 2**

Traffic Characteristics

Annual average daily traffic, AADT	25180	vpd
Planning analysis hour factor, K	0.073	
Directional distribution factor, D	0.697	
Peak-hour factor, PHF	0.920	
Adjusted saturation flow rate	1800	pcphgpl
Percent turns from exclusive lanes	100	%

Roadway Characteristics

Number of through lanes one direction, N	2	
Free flow speed, FFS	50	mph
Urban class	1	
Section length	2.85	miles
Median	Yes	
Left-turn bays	Yes	

Signal Characteristics

Signalized intersections	4	
Arrival type, AT	3	
Signal type (k = 0.5 for planning)	Actuated	
Cycle length, C	130.0	sec
Effective green ratio, g/C	0.340	

Results

Annual average daily traffic, AADT	25180	vpd
Two-way hourly volume	1838	vph
Hourly directional volume	1281	vph
Through-volume 15-min. flow rate	0	v
Running time	215.0	sec
v/c ratio	0.00	
Through capacity	1224	vph
Progression factor, PF	1.000	
Uniform delay	28.3	sec
Filtering/metering factor, I	1.000	
Incremental delay	0.0	sec
Control delay	28.3	sec/v
Total travel speed, Sa	31.3	mph
Total urban street LOS	C	

HCS+: Urban Streets Release 5.4

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co.: Hussey Gay Bell & DeYoung
 Date Performed: 4/22/2013
 Analysis Time Period: **AM**
 Urban Street: SR 21
 Direction of Travel: **Southbound**
 Jurisdiction: Chatham County
 Analysis Year: **2035**
 Project ID: **Alternative 11, Arterial 3**

Traffic Characteristics

Annual average daily traffic, AADT	31760	vpd
Planning analysis hour factor, K	0.074	
Directional distribution factor, D	0.547	
Peak-hour factor, PHF	0.920	
Adjusted saturation flow rate	1800	pcphgpl
Percent turns from exclusive lanes	50	%

Roadway Characteristics

Number of through lanes one direction, N	3	
Free flow speed, FFS	40	mph
Urban class	2	
Section length	1.80	miles
Median	Yes	
Left-turn bays	Yes	

Signal Characteristics

Signalized intersections	3	
Arrival type, AT	3	
Signal type (k = 0.5 for planning)	Actuated	
Cycle length, C	70.0	sec
Effective green ratio, g/C	0.370	

Results

Annual average daily traffic, AADT	31760	vpd
Two-way hourly volume	2350	vph
Hourly directional volume	1285	vph
Through-volume 15-min. flow rate	698	v
Running time	166.3	sec
v/c ratio	0.35	
Through capacity	1998	vph
Progression factor, PF	1.000	
Uniform delay	16.0	sec
Filtering/metering factor, I	0.946	
Incremental delay	0.5	sec
Control delay	16.4	sec/v
Total travel speed, Sa	30.1	mph
Total urban street LOS	B	

HCS+: Urban Streets Release 5.4

PLANNING ANALYSIS

Analyst: Kelly Farabee
 Agency/Co.: Hussey Gay Bell & DeYoung
 Date Performed: 4/22/2013
 Analysis Time Period: PM
 Urban Street: SR 21
 Direction of Travel: Northbound
 Jurisdiction: Chatham County
 Analysis Year: 2035
 Project ID: Alternative 11, Arterial 3

Traffic Characteristics

Annual average daily traffic, AADT	31760	vpd
Planning analysis hour factor, K	0.079	
Directional distribution factor, D	0.547	
Peak-hour factor, PHF	0.920	
Adjusted saturation flow rate	1800	pcphgpl
Percent turns from exclusive lanes	50	%

Roadway Characteristics

Number of through lanes one direction, N	3	
Free flow speed, FFS	40	mph
Urban class	2	
Section length	1.80	miles
Median	Yes	
Left-turn bays	Yes	

Signal Characteristics

Signalized intersections	3	
Arrival type, AT	3	
Signal type (k = 0.5 for planning)	Actuated	
Cycle length, C	65.0	sec
Effective green ratio, g/C	0.410	

Results

Annual average daily traffic, AADT	31760	vpd
Two-way hourly volume	2509	vph
Hourly directional volume	1372	vph
Through-volume 15-min. flow rate	745	v
Running time	166.3	sec
v/c ratio	0.34	
Through capacity	2213	vph
Progression factor, PF	1.000	
Uniform delay	13.1	sec
Filtering/metering factor, I	0.951	
Incremental delay	0.4	sec
Control delay	13.5	sec/v
Total travel speed, Sa	31.3	mph
Total urban street LOS	B	