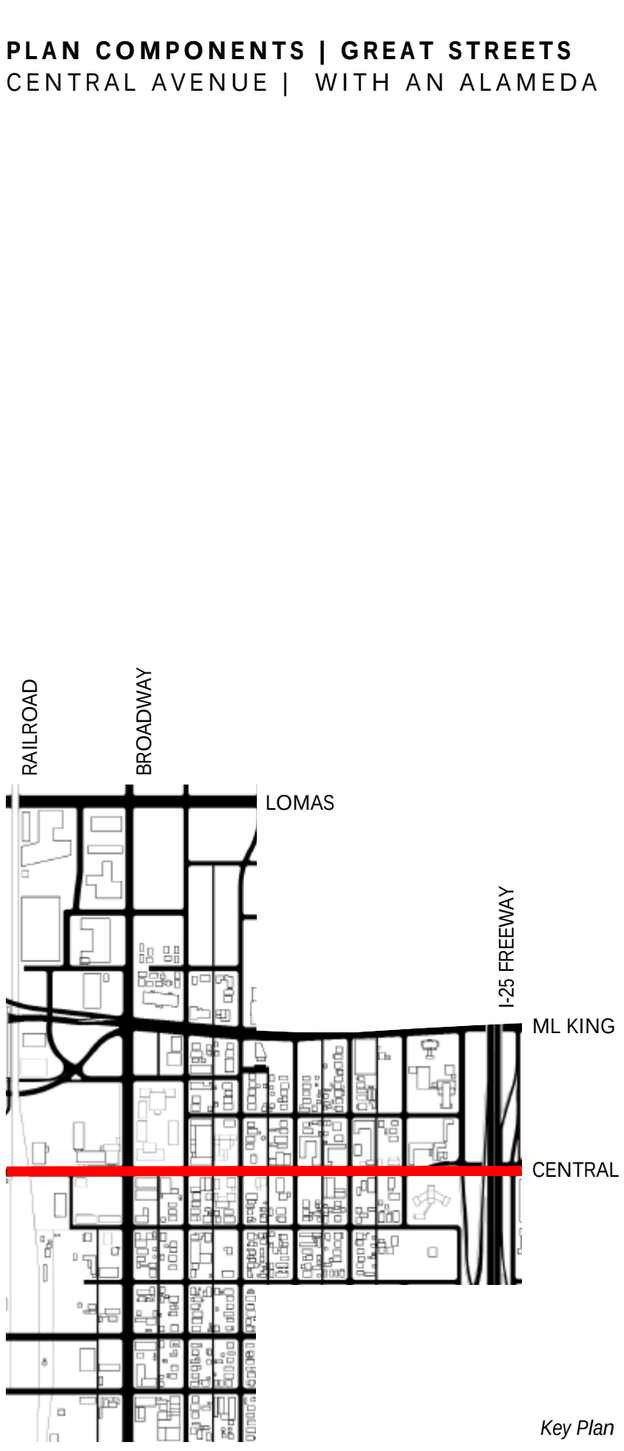
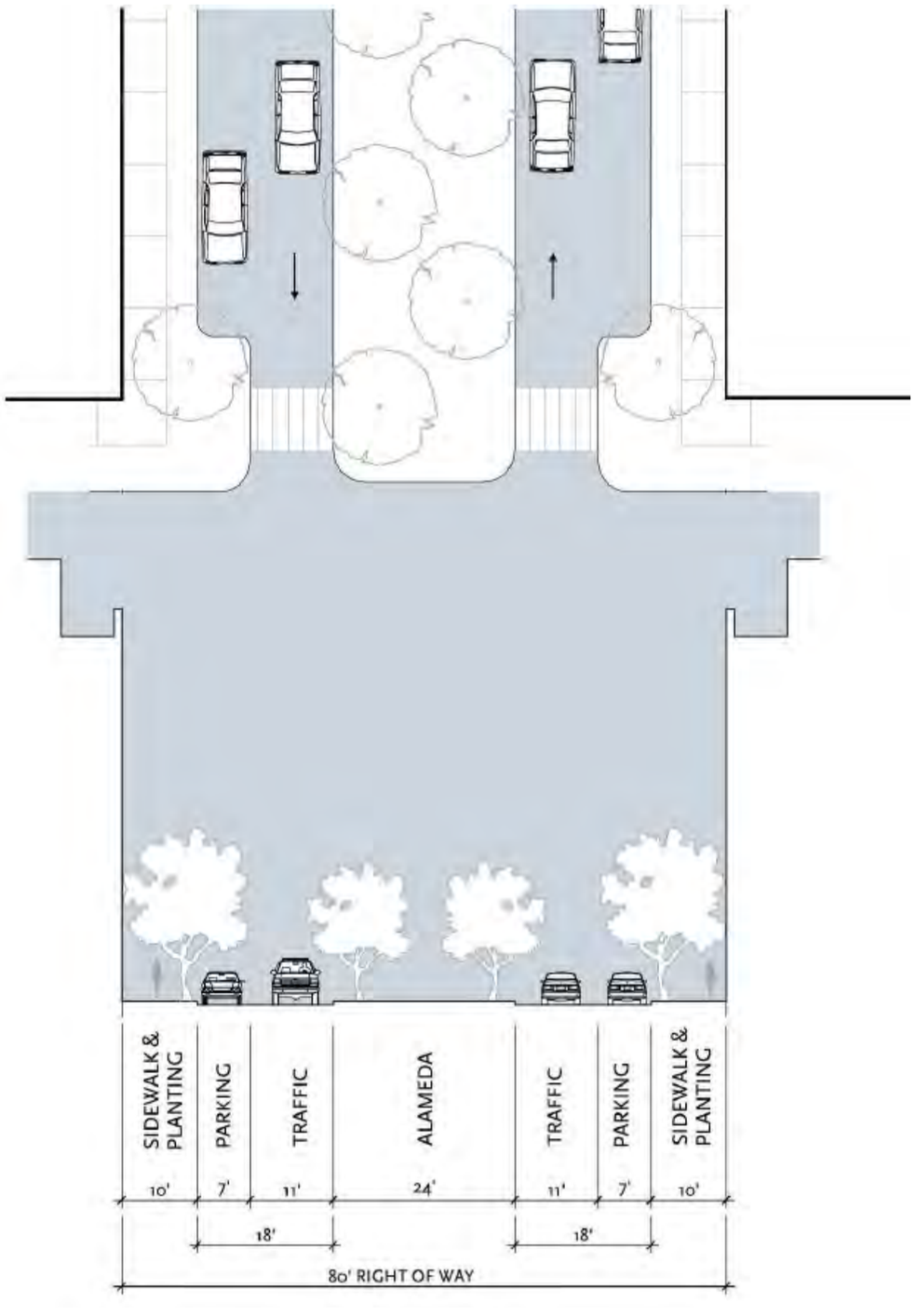
PLAN COMPONENTS | GREAT STREETS
CENTRAL AVENUE | WITH AN ALAMEDA



Key Plan



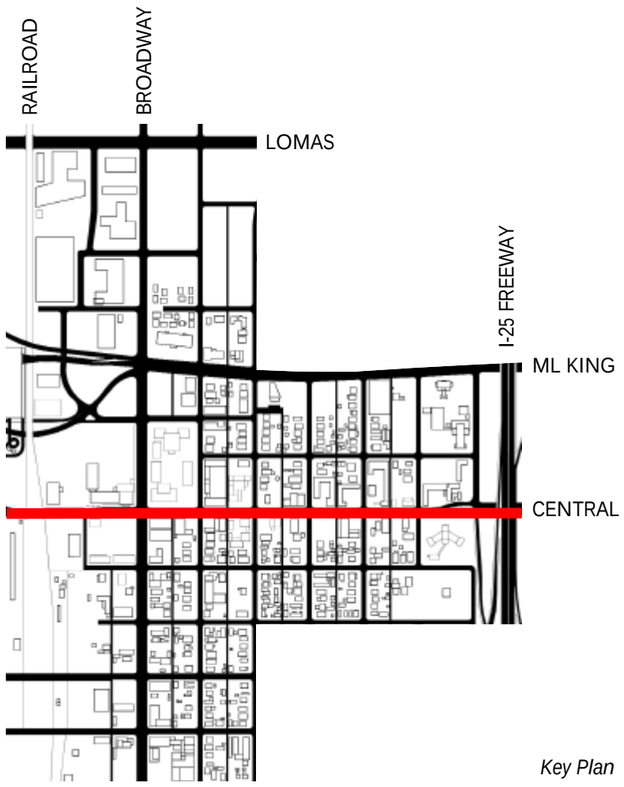
MOVEMENT / SPEED .....Free / 25 mph
CROSSING TIME .....13 seconds
ROW WIDTH ..... 80'
TRAFFIC LANES ..... 2 at 11' each
PARKING ..... Both sides
CURB TYPE ..... vertical
CURB RADIUS ..... 10' typical, with bulb-outs
SIDEWALK WIDTH ..... 10'
PLANTER WIDTH ..... to be determined
PLANTER TYPE ..... tree grates
PLANTING ..... trees 25' on center @ alamedas & corners only

MEDIAN
Materials: Brick pavers and imprinted pavement. Landscape trees should be Berinda Ash and Lacebark Elm.

STREETSIDE PARKWAY
Materials: Brick pavers should be used for water infiltration in courtyard areas.

BUMP-OUTS
Materials: Planters with vegetation - Natives should be used with a formal quality. Artemisia (sp.) and herbaceous plants like Lavender and Rosemary. Trees should match either Alameda median or parking courts.

Spacing Requirements/Retail Strategies: spacing should be arranged not to block storefronts, and to match property lines.



Key Plan

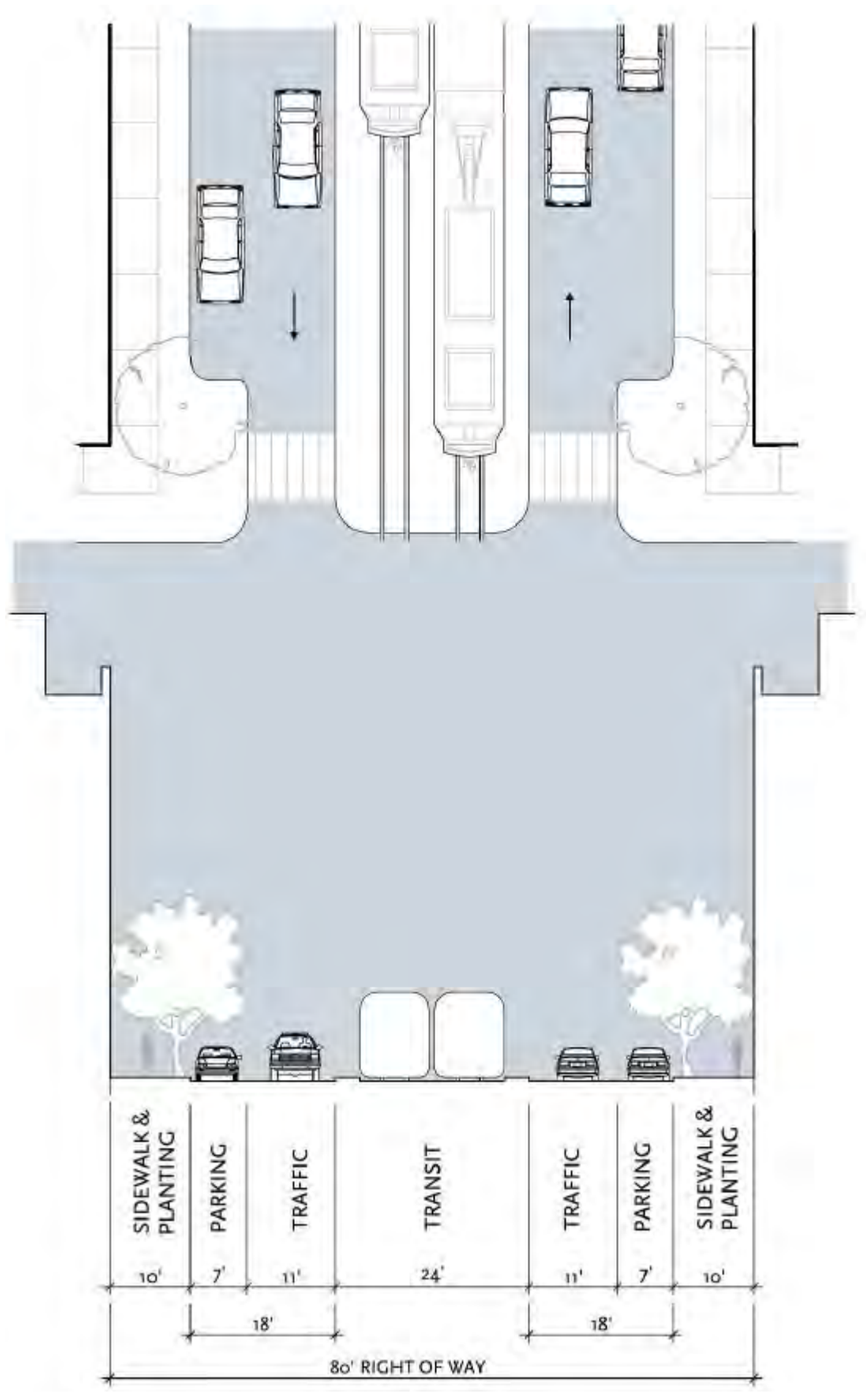
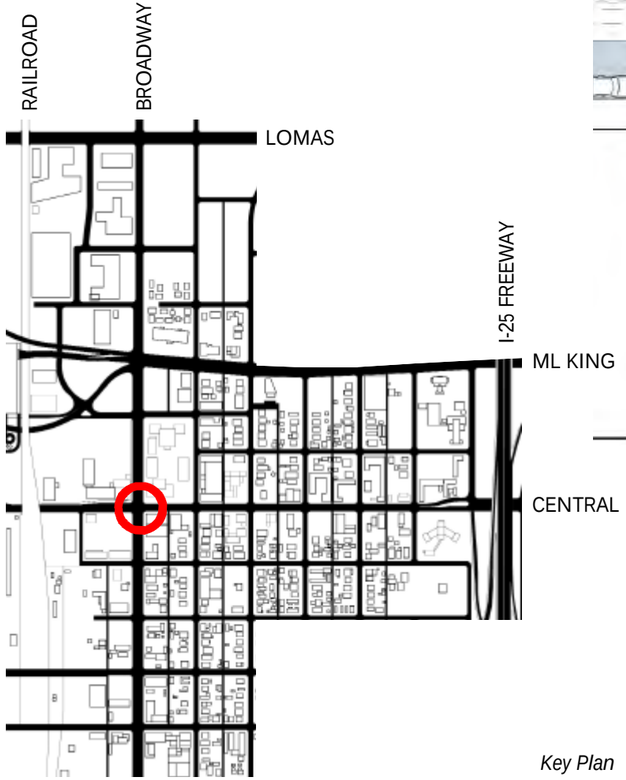


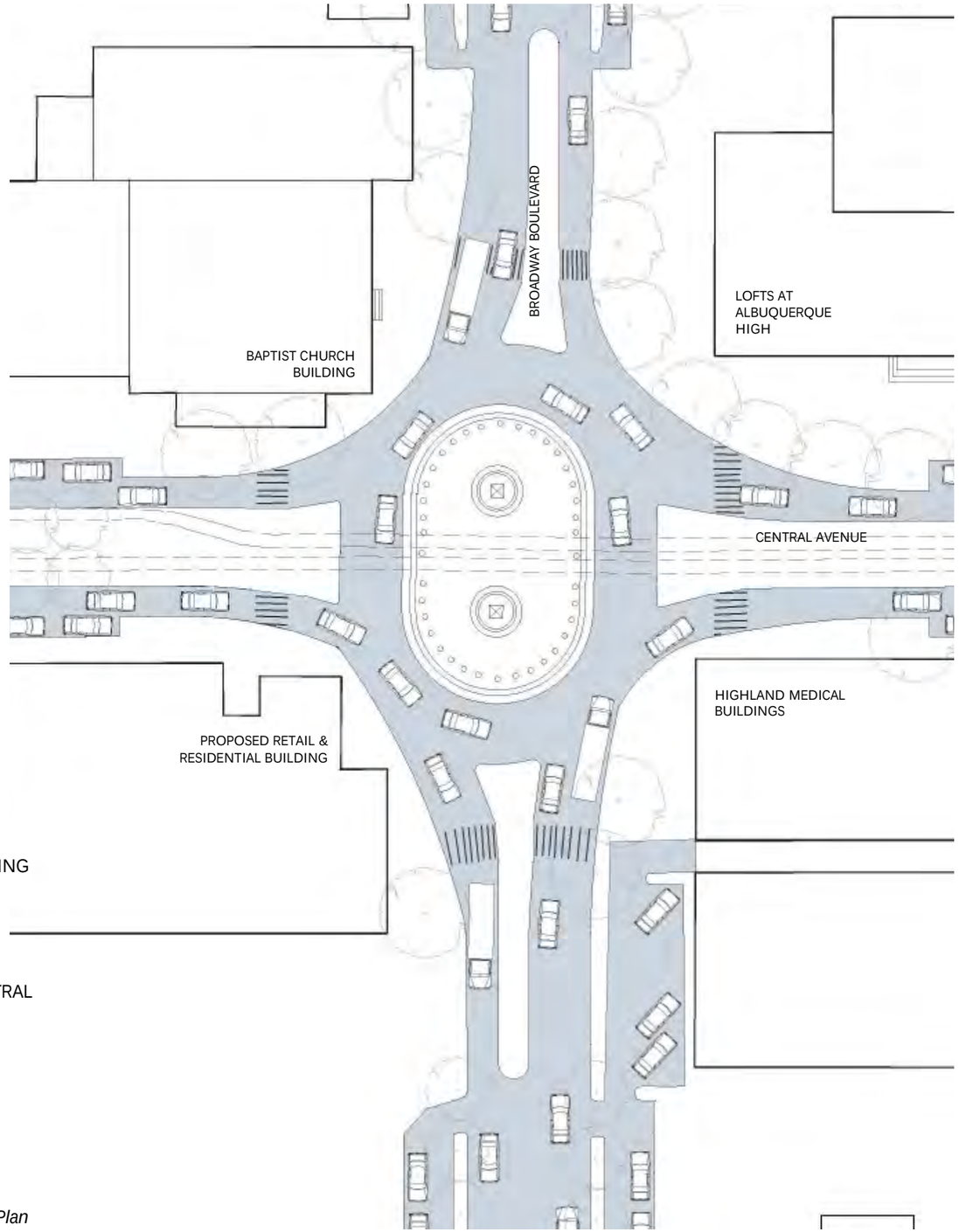
image Courtesy of City of Albuquerque and Parsons Brinckerhoff Engr.

MOVEMENT / SPEED .....Free / 25 mph
CROSSING TIME .....13 seconds
ROW WIDTH ..... 80'
TRAFFIC LANES ..... 2 at 11' each
PARKING ..... Both sides
CURB TYPE ..... vertical
CURB RADIUS ..... 10' typical, with bulb-outs
SIDEWALK WIDTH ..... 10'
PLANTER WIDTH ..... to be determined
PLANTER TYPE ..... tree grates
PLANTING ..... trees 25' min. on center @ alamedas & corners only

PLAN COMPONENTS | GREAT STREETS
CENTRAL & BROADWAY ROUNDABOUT



Key Plan



MOVEMENT / SPEED ..... Slow / 20 mph
CROSSING TIME ..... 6 seconds to island of refuge
ROW WIDTH ..... 80’ @ Central Avenue, 100’ @ Broadway Boulevard
TRAFFIC LANES ..... 2 in 22’parts of Broadway, 1 in 11’ elsewhere
PARKING ..... None
CURB TYPE ..... Roll-over at center, vertical option
CURB RADIUS ..... varies
SIDEWALK WIDTH ..... varies, 10’ min.
PLANTER WIDTH ..... 6’
PLANTER TYPE ..... continuous
PLANTING ..... no trees in center of roundabout
30’-40’ on center at periphery

Note: advantages of the roundabout include smoother traffic flow at intersections with no wait times, increased capacity to handle traffic, easier and safer-pedestrian crossings, and increased aesthetic appeal.

APPENDIX | TRAFFIC ANALYSIS

BROADWAY & CENTRAL: INTERSECTION PERFORMANCE

Introduction

This traffic analysis is done for the intersection of Broadway and Central, Albuquerque, NM, concerning both performance and geometry. The reason that this intersection was chosen is that it has the highest traffic volumes of all the intersections in the study area. It can serve as an example of the worst case scenario. The intersections in the study are with high volumes are listed as follows;

Intersection	Peak Hour	Comment (roundabout performance)
Broadway and Central	2,802 vph	Study intersection
Central and Locust	2,733 vph	Comparable to above
Broadway and Lead	2,380 vph	Perhaps single approach and exit lanes
Broadway and Coal	2,322 vph	Perhaps single approach and exit lanes
Central and Edith	1,612 vph	Single lanes
Central and 1st	1,136 vph	Single lanes

The reason that roundabouts are proposed, particularly on Central at both Broadway and Locust, is to reduce lane requirements while maintaining capacity and at the same time increasing pedestrian trips. It is the intent of the East Downtown Master Plan to provide a walkable environment for the corridors, and thereby stimulate additional and needed residential, retail, and commercial development and redevelopment.. Per our analysis of current and planned conditions, no more than 4 total lanes would be required in any of the proposed thoroughfares. In this way, crossing time for the pedestrian is reduced, and the perception of safety is increased, essential to the success of a multi-modal and mixed-use neighborhood environment.

Therefore, it is important to establish intersection types compatible with such a neighborhood and mobility design philosophy. The following report will address both performance and geometry for Broadway and Central.

Design Theory:

The design theory for the study area is based on the following practices and observations;

Induced traffic is avoided by creating corridors with LOS that approach E and F if there is traffic added to the area. By adding lanes, especially in a signalized condition, additional traffic is encouraged to appear in the "improved" facilities . It is interesting to see the results of the traffic reductions (average -26%) experienced with the "Big I" project as evaluated by the Mid-Region Council of Governments as depicted in the diagram at right . Traffic appeared on adjacent arterials, but peak hour behavior was not generally affected. This indicates that is a relatively high percentage of discretionary trips in the corridor. That may mean that the project objectives of reducing lanes will change driver behavior, but not have a significant affect on the existing arterial network.

In any event, it is important to realize that the proposed roundabout at Broadway and Central can handle up to a 50% increase in traffic and perform at LOS C. The volume/capacity ratio of the links may exceed 1.2, however, without roundabouts at Locust and Central and on Central mid way between Broadway and Locust. Design speeds for walkable communities and successful retail and residential Main Streets must be kept at or below 25 mph (preferable <23 mph) on the links and <23 mph in the roundabouts. The speeds in the proposed Broadway-Central roundabout run about 14 to 16 mph. This is a very good standard for vehicles traveling through the roundabout, as well as for pedestrians crossing at the intersections. The reason that slow design speeds are desirable is because non-motorists suffer less severe injuries and they feel more comfortable . The following is a list of the AIS types of injuries and their costs associated with different speeds;

13 mph ; Minor Superficial abrasion or laceration of skin; digit sprain; first-degree burn; head trauma with headache or dizziness (no other neurological signs).

20 mph; Moderate Major abrasion or laceration of skin; cerebral concussion (unconscious less than 15 minutes); finger or toe crush/amputation; closed pelvic fracture with or without dislocation.

25 mph; Serious Major nerve laceration; multiple rib fracture (but without flail chest); abdominal organ contusion; hand, foot, or arm crush/amputation.

29 mph; Severe Spleen rupture; leg crush; chest-wall perforation; cerebral concussion with other neurological signs (unconscious less than 24 hours).

33 mph; Critical Spinal cord injury (with cord transection); extensive second -or third-degree burns; cerebral concussion with severe neurological signs (unconscious more than 24 hours).

36 mph; Fatal Injuries which although not fatal within the first 30 days after an accident, ultimately result in death

Crossing times of 13 to 15 seconds maximum are preferred for a sense of expediency and shorter exposure to traffic movement. Although pedestrian speeds vary, a standard for this evaluation of 3.6 feet per second is reasonable. This represents about 48 feet of crossing distance. The proposed section not including parking (bulb out locations) is 2-11' lanes and a 24' Alameda (or future transit location). This is 46' and within the stated threshold. Additional lanes added to the section with the Alameda will create crossing time too long for general comfort.

Trip generation rates will be reduced as the corridor matures. The existing local neighborhood and proposed residential units will experience fewer trips as more retail and commercial activity occurs .

Reduction of environmental impacts, especially airborne pollutants, is desirable . As we know, Federal funding uses air quality a measure to determine qualification for transportation funds. The fewer vehicles taking trips on the road, the less discharge of pollutants and better overall air quality is also desirable beyond the qualification for funding.

Economic health of the community is enhanced even with the addition of medians . In addition, several highway improvement projects were evaluated with net positive economic results for retail and local tax assessments . These improvements were designed along the guidelines proposed for the project site and include landscaping, narrow lanes, fewer lanes and lower LOS.

Capacity:

Level Of Service, as a measure of performance, relates to capacity. The Broadway and Central corridors are operating at LOS B with 5 lane signalized intersections. There also appears to be a high accident rate at that location. The proposed roundabout scenario will maintain LOS B but with only 3 lanes at the intersections, 3 lanes along Broadway and 2 lanes in the links along Central. This is seen to be a significant improvement for an evolving multi-modal and mixed-use corridor. The scenarios for signalized and roundabout intersections were modeled by Bohannan-Huston and Swift and Associates with the results in Table 1 at right.

The conclusion is that we either maintain the existing 5 lane scenario or add roundabouts with 3 lanes at the intersection. The 5 lane scenario must also include transit. To have it work the fixed guideway must exist within 2 of the 5 lanes. This will have a tendency to further reduce the LOS for the Central corridor. On the other hand, the roundabout option will allow the fixed guideway to exist as its own independent facility. This will also allow for a choice between a street car or a light rail conveyance.

Bus service to the area will allow for the vehicles to mix within traffic. This, however, is not the case with a BRT (bus rapid transit) scenario. The roundabout option allows for flexibility in the choice of transit for the community without impacting walkability. This is not necessarily the case with the signalized option.

Geometry:

The Broadway and Central corridors have been designed with a preliminary AutoCAD and Autoturn model. It has been determined that with a few modifications to the drawing, a roundabout design is clearly achievable. It should be noted here that the base mapping provided is general and subject to some error. The design presented here is certainly not for construction and must be modified for final design. Below is an exhibit showing Broadway and Central.

The fixed guideway is located through the middle of the proposed roundabout. The roundabout would need to be adjusted to accommodate an existing building at the north west corner of the intersection.

Conclusion:

It is strongly recommended that the City look favorably on this proposal for reasons of quality of life, economic development, increased overall mobility (vehicle, transit, and pedestrian) and environmental benefits, as shown above. We feel that there is enough information in this report to have a dialog with staff, the EPC and City Council concerning the underlying design philosophy and general elements of design for the study area with the objective of getting master plan acceptance early next year.

Central and Broadway
Traffic Performance

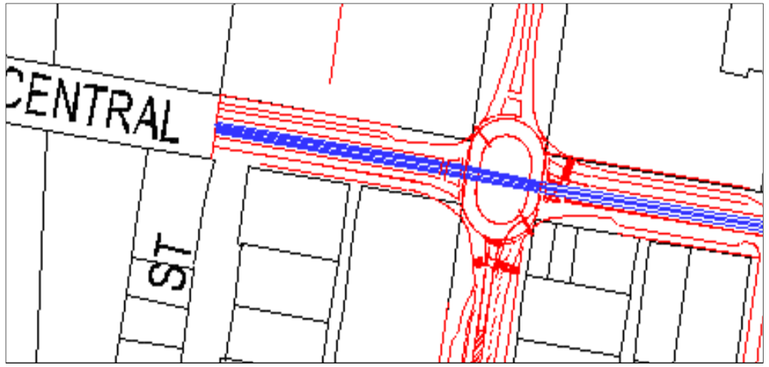
Bohannan-Houston data
Signalized Intersection

	LOS	Worst LOS	Max. Queue	Total # of Lanes	Fatal Flaw
Existing geometry	B	B	237	5	None
1 thru lane with lt. turn lane	D	D	780	3	Queue Length
1 thru lane no turn lane	F	F	1516	2	LOS and Queue Length

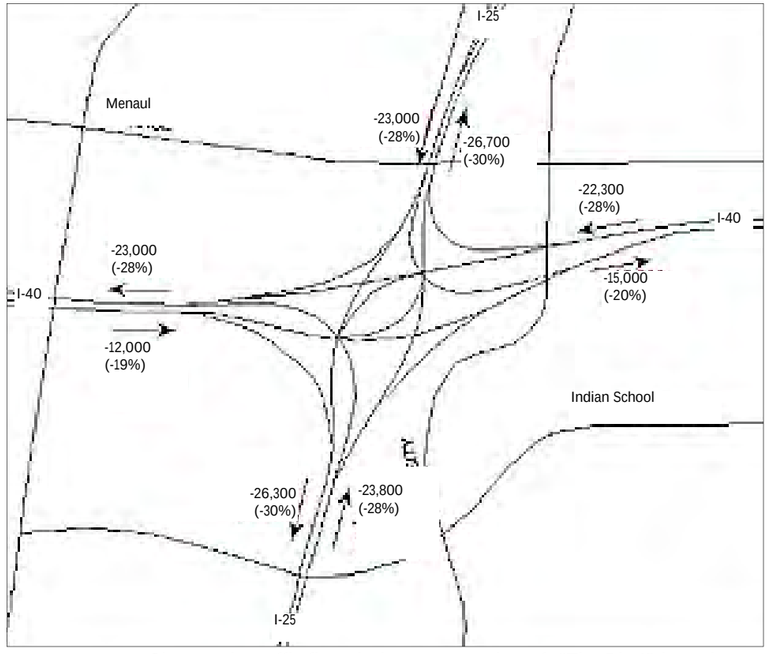
Swift Data
Roundabout Option

	LOS	Worst LOS	Max. Queue	Total # of Lanes	Fatal Flaw
	N/A	N/A	N/A		
2 lane entry, 1 lane exit	B	B	137	3	None
1 lane entry, 1 lane exit	E	F	1690	2	LOS and queue length

Table 1 - traffic performance



Modern roundabout at Central Avenue and Broadway Boulevard



Changes in traffic flow during construction of "The Big I" interchange

Modern roundabout in Utah

Footnotes:

1. Cervero, Robert, Road Expansion, Urban Growth, and Induced Travel; A Path Analysis, Journal of the American Planning Association, Vol. 69, Number 2, Spring, 2003. P. 145. For references to previous studies on induced traffic see p. 161-162 of the citation.
2. MRCOG, "Local Motion". 2000. From their web site
3. Almost 2 out of 5 people in the United States are subjected to noise from traffic >55 db (A). Annoyance at sound levels begins at 50 db (A). See Our Built and Natural Environments, EPA, p. 32.
4. ITE, Trip Generation Handbook, October, 1998, Institute of Transportation Engineers
5. ibid., EPA
6. Eisele, William, et. al., Assessment of Economic Impacts at Selected Raised Median Installation Locations in Texas and Development of Recommended Methodology for Economic Impacts Estimation", Project Number 7-3904, Texas Transportation Institute, October, 2000
7. Design guidelines of the Town of Gridley, California, Swift and Associates with Heritage Partners, 2002

APPENDIX | TRAFFIC ENGINEERING
SIDRA OUTPUT: BROADWAY AND CENTRAL EXISTING VOLUMES

INTERSECTION PARAMETERS: 2 lane entry, 1 lane exit, model follows

Degree of saturation (highest)	=	0.555
Practical Spare Capacity (lowest)	=	53 %
Total vehicle flow (veh/h)	=	2951
Total vehicle capacity, all lanes (veh/h)	=	6234
Average intersection delay (s)	=	12.0
Largest average movement delay (s)	=	15.0
Total vehicle delay (veh-h/h)	=	9.88
Largest back of queue, 95% (ft)	=	137
Performance Index	=	46.99
Total fuel (ga/h)	=	25.1
Intersection Level of Service	=	B
Worst movement Level of Service	=	B

Table S.3 - INTERSECTION PARAMETERS: 1 lane entry, 1 lane exit, no model printed

Degree of saturation (highest)	=	1.177
Practical Spare Capacity (lowest)	=	-28 %
Total vehicle flow (veh/h)	=	2951
Total vehicle capacity, all lanes (veh/h)	=	2879
Average intersection delay (s)	=	67.7
Largest average movement delay (s)	=	106.4
Total vehicle delay (veh-h/h)	=	55.50
Largest back of queue, 95% (ft)	=	1690
Performance Index	=	174.58
Total fuel (ga/h)	=	57.9

SIDRA US Highway Capacity Manual Version Roundabout - RUN INFORMATION
* Basic Parameters: Intersection Type: Roundabout, Driving on the right-hand side of the road, Input data specified in US units, Default Values File No. 1,
Peak flow period (for performance): 15 minutes, Unit time (for volumes): 60 minutes (Total Flow Period), Delay definition: Control delay, Geometric delay
included, Delay formula: Highway Capacity Manual, Level of Service based on: Delay (HCM), Queue definition: Back of queue, 95th_Percentile

Table S.0 - TRAFFIC FLOW DATA
(Flows in veh/hour as used by the program)

Mov No.	Left LV	Left HV	Through LV	Through HV	Right LV	Right HV	Flow Scale	Peak Flow Factor
West: West Approach								
12	66	6	543	47	45	4	1.00	0.95
South: South Approach								
32	67	6	491	43	79	7	1.00	0.95
East: East Approach								
22	88	8	472	41	61	5	1.00	0.95
North: North Approach								
42	71	6	661	58	70	6	1.00	0.95

Based on unit time = 60 minutes. Flow Scale and Peak Hour Factor effects included in flow values.

Table R.0 - ROUNDABOUT BASIC PARAMETERS

Cent Island Diam (ft)	Circ Width (ft)	Insc Diam. (ft)	No.of Circ. Lanes	No.of Entry Lanes	Av.Ent Lane Width (ft)	Flow (veh/ h)	%HV (pcu/h)	Adjust. Flow Effect	%Exit Cap. Incl. Constr.
Circulating/Exiting Stream									
West: West Approach									
84	20	124	1	2	16.00	892	8.0	918	0 N
South: South Approach									
84	20	124	1	2	16.00	739	8.0	761	0 N
East: East Approach									
84	20	124	1	2	16.00	678	8.0	698	0 N
North: North Approach									
84	20	124	1	2	16.00	681	8.0	701	0 N

Table S.5 - MOVEMENT PERFORMANCE

Mov No.	Total Delay (veh-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest 95% Back (vehs)	Queue (ft)	Perf. Index	Aver. Speed (mph)
West: West Approach								
12 LTR	2.97	15.0	0.77	1.02	5.2	137	13.54	13.2
South: South Approach								
32 LTR	2.18	11.3	0.68	0.81	3.1	81	10.42	14.9
East: East Approach								
22 LTR	1.96	10.5	0.64	0.75	2.7	71	9.54	15.4
North: North Approach								
42 LTR	2.77	11.4	0.68	0.84	4.1	110	13.49	14.9

Table S.6 - INTERSECTION PERFORMANCE

Total Flow (veh/h)	Total Delay (veh-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Perf. Index	Aver. Speed (mph)
West: West Approach						
711	2.97	15.0	0.777	1.02	13.54	13.2
South: South Approach						
693	2.18	11.3	0.686	0.81	10.42	14.9
East: East Approach						
675	1.96	10.5	0.646	0.75	9.54	15.4
North: North Approach						
872	2.77	11.4	0.682	0.84	13.49	14.9
INTERSECTION:						
2951	9.88	12.0	0.697	0.86	46.99	14.6

Table S.7 - LANE PERFORMANCE

Lane No.	Mov No.	Arv Flow (veh /h)	Cap (veh /h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Q u e u e 95% Back (vehs)	Q u e u e Short Lane (ft)
West: West Approach								
1 LT	12	317	570	0.555	15.9	1.06	4.8	128
2 TR	12	394	710	0.555	14.3	1.00	5.2	137
South: South Approach								
1 LT	32	312	692	0.451	12.1	0.85	3.0	81
2 TR	32	381	845	0.451	10.7	0.78	3.1	81
East: East Approach								
1 LT	22	305	768	0.397	11.0	0.77	2.5	66
2 TR	22	370	934	0.397	10.0	0.74	2.7	71
North: North Approach								
1 LT	42	479	941	0.509	11.1	0.81	4.1	110
2 TR	42	393	773	0.509	11.8	0.87	4.0	108

Table R.5 - ROUNDABOUT CAPACITY & LEVEL OF SERVICE - SIDRA & HCM MODELS

Mov No.	Arv Flow (veh /h)	SIDRA Cap. (veh /h)	SIDRA Deg. Satn x	SIDRA Av. Delay (sec)	SIDRA LOS	HCM Lower Cap. (veh /h)	HCM Lower Deg. Satn x	HCM Lower Av. Delay (sec)	HCM Lower LOS	HCM Upper Cap. (veh /h)	HCM Upper Deg. Satn x	HCM Upper Av. Delay (sec)	HCM Upper LOS
West: West Approach													
12 LTR	711	1281	0.555	15.0	B	1009	0.705	25.6	C	1292	0.550	19.2	B
		1281	0.555	15.0	B	1009	0.705	25.6	C	1292	0.550	19.2	B
South: South Approach													
32 LTR	693	1537	0.451	11.3	B	1161	0.597	17.6	B	1468	0.472	14.1	B
		1537	0.451	11.3	B	1161	0.597	17.6	B	1468	0.472	14.1	B
East: East Approach													
22 LTR	675	1702	0.397	10.5	B	1229	0.549	15.4	B	1546	0.437	12.6	B
		1702	0.397	10.5	B	1229	0.549	15.4	B	1546	0.437	12.6	B
North: North Approach													
42 LTR	872	1714	0.509	11.4	B	1226	0.711	19.1	B	1541	0.566	14.5	B
		1714	0.509	11.4	B	1226	0.711	19.1	B	1541	0.566	14.5	B
ALL VEHICLES:	6234	0.555	12.0	B	4625	0.711	19.5	B	5847	0.566	15.1	B	

Table R.1 - ROUNDABOUT GAP ACCEPTANCE PARAMETERS

Turn	Lane No.	Lane Type	Circ/ Exit Flow (pcu/h)	Intra- Bunch Headway (s)	Prop. Bunched Vehicles	Critical Gap (s)	Follow Up Headway (s)
West: West Approach							
Left	1	Subdominant	918	2.00N	0.721	3.22	2.31
Thru	1	Subdominant	918	2.00N	0.721	3.22	2.31
	2	Dominant	918	2.00N	0.721	2.72	1.95
Right	2	Dominant	918	2.00N	0.721	2.72	1.95
South: South Approach							
Left	1	Subdominant	761	2.00N	0.653	3.37	2.34
Thru	1	Subdominant	761	2.00N	0.653	3.37	2.34
	2	Dominant	761	2.00N	0.653	2.88	2.00
Right	2	Dominant	761	2.00N	0.653	2.88	2.00
East: East Approach							
Left	1	Subdominant	698	2.00N	0.621	3.43	2.35
Thru	1	Subdominant	698	2.00N	0.621	3.43	2.35
	2	Dominant	698	2.00N	0.621	2.95	2.01
Right	2	Dominant	698	2.00N	0.621	2.95	2.01
North: North Approach							
Left	1	Dominant	701	2.00N	0.623	2.94	2.01
Thru	1	Dominant	701	2.00N	0.623	2.94	2.01
	2	Subdominant	701	2.00N	0.623	3.43	2.34
Right	2	Subdominant	701	2.00N	0.623	3.43	2.34

N The number of circulating lanes specified in front of this approach ("No. of circ. lanes" in Roundabout Data screen) is less than the number of lanes effectively used when the entry flows that constitute the circulating flow are considered. Intra-bunch headway for the circulating stream has been set to a higher value as a result.

Table S.2 - MOVEMENT CAPACITY PARAMETERS

Mov No.	Arv Flow (veh /h)	Total Opng Flow (veh /h)	%HV	Adjust. Opng Flow (pcu/h)	Total Cap. (veh /h)	Prac. Deg. Satn xp	Prac. Spare (%)	Lane Util (%)	Deg. Satn x
West: West Approach									
12 LTR	711	892	8.0	918	1281	0.85	53	100	0.555*
South: South Approach									
32 LTR	693	739	8.0	761	1537	0.85	89	100	0.451
East: East Approach									
22 LTR	675	678	8.0	698	1702	0.85	114	100	0.397
North: North Approach									
42 LTR	872	681	8.0	701	1714	0.85	67	100	0.509

Table S.3 - INTERSECTION PARAMETERS

Degree of saturation (highest)	=	0.555
Practical Spare Capacity (lowest)	=	53 %
Total vehicle flow (veh/h)	=	2951
Total vehicle capacity, all lanes (veh/h)	=	6234
Average intersection delay (s)	=	12.0
Largest average movement delay (s)	=	15.0
Total vehicle delay (veh-h/h)	=	9.88
Largest back of queue, 95% (ft)	=	137
Performance Index	=	46.99
Total fuel (ga/h)	=	25.1
Total cost ($/h)	=	220.85
Intersection Level of Service	=	B
Worst movement Level of Service	=	B

Table S.8 - LANE FLOW AND CAPACITY INFORMATION

Lan No.	Mov No.	Arv Flow (veh/h) Lef	Thru	Rig	Tot	Lane Width (ft)	Adj. Basic (tcu)	Saturation Flow Aver 1st (veh)	Aver 2nd (veh)	Min Cap (veh /h)	Tot Cap (veh /h)	Deg. Satn x	Lane Util %
West: West Approach													
1 LT	12	72	245	0	317	16.0N	-	-	-		60	570	0.555 100
2 TR	12	0	345	49	394	16.0N	-	-	-		60	710	0.555 100
South: South Approach													
1 LT	32	73	239	0	312	16.0N	-	-	-		60	692	0.451 100
2 TR	32	0	295	86	381	16.0N	-	-	-		60	845	0.451 100
East: East Approach													
1 LT	22	96	209	0	305	16.0N	-	-	-		60	768	0.397 100
2 TR	22	0	304	66	370	16.0N	-	-	-		60	934	0.397 100
North: North Approach													
1 LT	42	77	402	0	479	16.0N	-	-	-		60	941	0.509 100
2 TR	42	0	317	76	393	16.0N	-	-	-		60	773	0.509 100

N Width value was not used for saturation flow adjustment in this case. (Lane width adjustment does not apply at sign-controlled intersections or to gap-acceptance capacities at signalised intersections).

Basic Saturation Flow in this table is adjusted for lane width, approach grade, parking manoeuvres and number of buses stopping. Saturation flow scale applies if specified.

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Arrival Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	95% Queue (ft)	Shrt Lane (ft)
West: West Approach												
1 LT	72	245	0	317	8				0.555	15.9	128	
2 TR	0	345	49	394	8				0.555	14.3	137	
	72	590	49	711	8				0.555	15.0	137	
South: South Approach												
1 LT	73	239	0	312	8				0.451	12.1	81	
2 TR	0	295	86	381	8				0.451	10.7	81	
	73	534	86	693	8				0.451	11.3	81	
East: East Approach												
1 LT	96	209	0	305	8				0.397	11.0	66	
2 TR	0	304	66	370	8				0.397	10.0	71	
	96	513	66	675	8				0.397	10.5	71	
North: North Approach												
1 LT	77	402	0	479	8				0.509	11.1	110	
2 TR	0	317	76	393	8				0.509	11.8	108	
	77	719	76	872	8				0.509	11.4	110	

ALL VEHICLES	Tot Arv.	% HV	Max X	Aver. Delay	Max Queue
	2951	8	0.555	12.0	137

Total flow period = 60 minutes. Peak flow period = 15 minutes.
Note: Basic Saturation Flows are not adjusted at roundabouts or sign- controlled intersections and apply only to continuous lanes. Values printed in this table are back of queue.

Table S.15 - CAPACITY AND LEVEL OF SERVICE (HCM STYLE)

Mov No.	Mov Typ	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS
West: West Approach						
12	LTR	711	1281	0.555*	15.0	B
		711	1281	0.555	15.0	B
South: South Approach						
32	LTR	693	1537	0.451	11.3	B
		693	1537	0.451	11.3	B
East: East Approach						
22	LTR	675	1702	0.397	10.5	B
		675	1702	0.397	10.5	B
North: North Approach						
42	LTR	872	1714	0.509	11.4	B
		872	1714	0.509	11.4	B
ALL VEHICLES:		2951	6234	0.555	12.0	B
INTERSECTION:		2951	6234	0.555	12.0	B

Level of Service calculations are based on
average control delay including geometric delay (HCM criteria),
independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in
the SIDRA Output Guide or the Output section of the on-line help.
* Maximum v/c ratio, or critical green periods

Table D.1 - LANE DELAYS

Lane No.	Mov No.	Deg. Satn x	Stop-line Delay (seconds/veh) 1st d1	2nd d2	Delay dSL	Acc. dn	Queuing dq	Total dqm	MvUp	Stopd (Idle) di	Geom dig	Control dic
West: West Approach												
1 LT	12	0.555	7.1	2.1	9.2	4.2	5.1	2.3	2.8	6.7	15.9	
2 TR	12	0.555	6.2	1.7	7.9	4.2	3.7	2.0	1.7	6.4	14.3	
South: South Approach												
1 LT	32	0.451	4.9	0.4	5.3	3.7	1.6	0.5	1.1	6.7	12.1	
2 TR	32	0.451	4.2	0.1	4.3	3.7	0.7	0.1	0.5	6.3	10.7	
East: East Approach												
1 LT	22	0.397	4.2	0.0	4.2	3.5	0.7	0.0	0.7	6.8	11.0	
2 TR	22	0.397	3.6	0.0	3.6	3.4	0.2	0.0	0.2	6.4	10.0	
North: North Approach												
1 LT	42	0.509	4.0	0.5	4.4	3.6	0.8	0.6	0.2	6.7	11.1	
2 TR	42	0.509	4.6	0.8	5.4	3.7	1.7	0.9	0.8	6.4	11.8	

dn is average stop-start delay for all vehicles queued and unqueued

Table D.3 - LANE QUEUES

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average Nb1	Nb2	Nb	Percentile 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: West Approach											
1 LT	0.555	0.3	1.1	0.5	1.6	2.8	3.4	3.9	4.8	5.6	0.43
2 TR	0.555	0.3	1.2	0.5	1.7	3.0	3.6	4.2	5.2	6.0	0.46
South: South Approach											
1 LT	0.451	0.1	0.9	0.1	1.0	1.8	2.2	2.4	3.0	3.5	0.27
2 TR	0.451	0.0	1.0	0.0	1.0	1.8	2.2	2.5	3.1	3.5	0.27
East: East Approach											
1 LT	0.397	0.0	0.8	0.0	0.8	1.5	1.8	2.0	2.5	2.9	0.22
2 TR	0.397	0.0	0.9	0.0	0.9	1.6	1.9	2.2	2.7	3.1	0.24
North: North Approach											
1 LT	0.509	0.1	1.2	0.2	1.3	2.4	2.9	3.3	4.1	4.8	0.37
2 TR	0.509	0.1	1.1	0.2	1.3	2.3	2.9	3.3	4.0	4.7	0.36

Values printed in this table are back of queue.

Table D.4 - MOVEMENT SPEEDS (mph)

Mov No.	App. Speeds Cruise	Negn	Exit Speeds Negn	Cruise	Queue 1st Grn	Move-up 2nd Grn	Av. Running	Section Spd Overall
West: West Approach								
12	25.0	14.0	14.0	25.0	13.3		14.2	13.2
South: South Approach								
32	25.0	14.0	14.0	25.0	14.0		15.4	14.9
East: East Approach								
22	25.0	14.0	14.0	25.0			15.7	15.4
North: North Approach								
42	25.0	14.0	14.0	25.0	14.3		15.1	14.9

"Running Speed" is the average speed excluding stopped periods.