

APPENDIX

**Chinden Boulevard Corridor Study**

Interchange spacing		Type						
criteria	1	2	3	rural				
New Jersey	1 mi	1 mi	1 mi	2 mi				
Colorado	1 mi	2 mi	2 mi	2 mi				
Florida	1 mi	2 mi	3 mi	6 mi				
Oregon	2 to 3 mi	2 to 3 mi	2 to 3 mi	3 to 8 mi				
AASHTO	1 mi	1 mi	1 mi	2 mi				
NCHRP 348 Freeway	1 mi	1 mi	1 mi	3 mi				
NCHRP 348 Expressway	1 mi	1 mi	1 mi	2 mi				
Type 1 - CBD and Fringe Cities in Urbanizing Areas Type 2 - Existing Urbanized Areas Other Than Type 1 Type 3 - Transitioning Urbanized Areas Other Than Type 2								
Recommended signal spacing		Design Speed						
criteria	30	35	40	45	50	55	60	
Reference 1	maximize operational efficiency	1/2 mi	1/2 mi	1/2 mi	1/2 mi	1/2 mi	1/2 mi	
New Jersey	bandwidth	1/2 mi	1/2 mi	1/2 mi	1/2 mi	1/2 mi	1/2 mi	
Colorado	bandwidth	1/2 mi	1/2 mi	1/2 mi	1/2 mi	1/2 mi	1/2 mi	
Florida	distance	1/2 mi	1/2 mi	1/2 mi	1/2 mi	1/2 mi	1/2 mi	
Oregon		1/2 to 2 mi	1/2 to 2 mi	1/2 to 2 mi	1/2 to 2 mi	1/2 to 2 mi	1/2 to 2 mi	
TRB Circular 456		1/2 mi	1/2 mi	1/2 mi	1/2 mi	1/2 mi	1/2 mi	
NCHRP 348	based on cycle length of 120 sec. and desired progression speed equal to posted speed limit	2640'	3080'	3520'	3960'	4400'	4840'	
Recommended spacing for median openings		30	35	40	45	50	55	60
Reference 1	eliminate overlap of functional area	325'	425'	525'	630'	750'	875'	1005'
New Jersey	* Code does not establish standards for spacing of unsignalized access points, but utilizes site frontage and posted speed to determine lot conformity.							
Colorado	based on access category					2640'	2640'	2640'
Florida (directional)	posted speed limits	660'	660'	660'	660'	1320'	1320'	1320'
Florida (full)	posted speed limits	1320'	1320'	1320'	1320'	2640'	2640'	2640'
Oregon	Category 2 (principal arterial)	1/2 to 1 mi	1/2 to 1 mi	1/2 to 1 mi	1/2 to 1 mi	1/2 to 1 mi	1/2 to 1 mi	1/2 to 1 mi
ITE	* When v/c ratios exceed 0.8 there are too few of gaps to allow unsignalized left-turns.							
TRB Circular (suburban)		660'	660'	660'	660'	660'	660'	660'
TRB Circular (rural)		1320'	1320'	1320'	1320'	1320'	1320'	1320'
NCHRP 348	330' urban, 660' suburban, 1320' rural	not based on speed see values at left						
FHWA	based on functional design - major arterial (2640'), minor arterial (1320'), minor arterial (1320'), major collector (as may meet warrants), minor collector or local street (n/a)							
Recommended median width		30	35	40	45	50	55	60
Reference 1	storage of left-turn vehicles	protection for vehicles crossing						
	18 feet (14 feet minimum)	30 feet (25 feet minimum)						
Recommended driveway spacing		30	35	40	45	50	55	60
Reference 1	1.5 X (distance to accelerate)	340'	450'	625'	850'	1150'	1500'	
FHWA - Access Mangement Notebook	based on functional design - major arterial (1320' or 880'), minor arterial (440'), minor arterial or major collector (220'), minor collector or local street (as determine by property frontage)							
New Jersey	overlapping right turn criteria and posted speed	200'	250'	325'	400'	475'	550'	
Colorado	AASHTO SSD for wet pavement	200'	250'	325'	400'	475'	550'	650'
Florida	type or access class of road	125'	245'	440'	660'	660'	1320'	1320'
Nebraska	Based on volume (suburban highway >1500 ADT)	1320'	1320'	1320'	1320'	1320'	1320'	1320'
Ohio-Kentucky-Indiana	near edge to near edge 1.64 sec reaction time and dry pave.	125'	150'	185'	230'	275'		
Tri-County	PT to PC, braking and decision sight distance *for facilities which generate primarily truck traffic these rates should be increased according to lower rates of vehicle deceleration.	200'	250'	325'	375'	450'	525'	
Chicago	posted speed	200'	225'	275'	325'	350'		
ITE Guidelines for Driveway Design and Location	*safe SSD, operating speeds, overlapping right turn requirements, traffic generator *should be based on design and posted speed, corridor volume, traffic generator, access class of road, driver behavior, and design vehicle.							
NCHRP 348	based on trip generation from development, functional classification, and operating speed Driveway Spacing (based on access level) = (operating speed x type of generator factor from Table 7-6)							
Conforming lot frontage requirements		30	35	40	45	50	55	60
New Jersey	centerline to centerline * 50 peak hour trips is permissible from a nonconforming lot. * Credit is given for maximum permissible volume where alternative access is available as well as for lot size. (15% increase for alternative access)	200'	250'	325'	400'	475'	550'	
Nebraska	* Accesses unable to meet minimum spacing requirements are labeled "restricted". Under these circumstances, ingress and egress may be permitted, but cannot exceed 10 vph.							
Ohio-Kentucky-Indiana	* Recommend designate non compliant access as "temporary" when at such time alternate access is made available the temporary access can be restricted or eliminated.							

\*\* Reference 1 - Access Management as a Congestion Management Strategy by Vergil Stover, Partick Hawley, Donald Woods, Robert Hamm, and the Texas Transportation Institute from the 1993 Conference on Access Management Compendium of Technical Papers

## **Benefits and Drawbacks of Various Median Types -**

***Continuous Two-Way Left Turn Lane (CTWLTL) - These are striped flush traversable center lanes that provide storage for, and deceleration of, left turning vehicles. CTWLTL's currently exist along the majority of the corridor.***

### ***Benefits -***

- Allows maximum left turn access
- Low maintenance
- Low cost

### ***Drawbacks -***

- Reduces capacity along the major corridor by introducing additional side friction and speed differentials
- Increased accident potential
- No pedestrian refuge
- Provides no aesthetic improvements

***Traversable Median - Traversable medians permit cross traffic and left turns along their entire length using a slightly raised or flush median design. These medians can be constructed with concrete, brick pavers, asphalt, pavement markings, etc.***

### ***Benefits -***

- Allows left turn access
- Potential to provide aesthetic improvements without losing left-turn access

### ***Drawbacks -***

- Reduces capacity along the major corridor by introducing additional side friction and speed differentials
- Increased accident potential
- No pedestrian refuge
- Higher construction cost

***Non-Traversable Median - Non-traversable medians are raised or depressed medians which prevent the left-turning movements. Non-traversable medians can be landscaped or filled with concrete, brick pavers, asphalt, etc.***

### ***Benefits -***

- Increases capacity along the major corridor by eliminating side friction and speed differentials created by left-turning vehicles
- Reduced accident potential
- Increased pedestrian safety by providing for a "safe haven" for pedestrians in the median thereby allowing them to cross only half of the street at a time
- Increased safety for bicyclists as conflicts with left-turning vehicles are eliminated
- Potential for aesthetic improvements
- Potential fuel savings by eliminating speed differentials and decreasing delay

### ***Drawbacks -***

- Increased maintenance cost
- Higher construction cost
- Increased delay for left-turning vehicles
- Requires u-turn capabilities

## Traffic Volumes for Chinden Boulevard

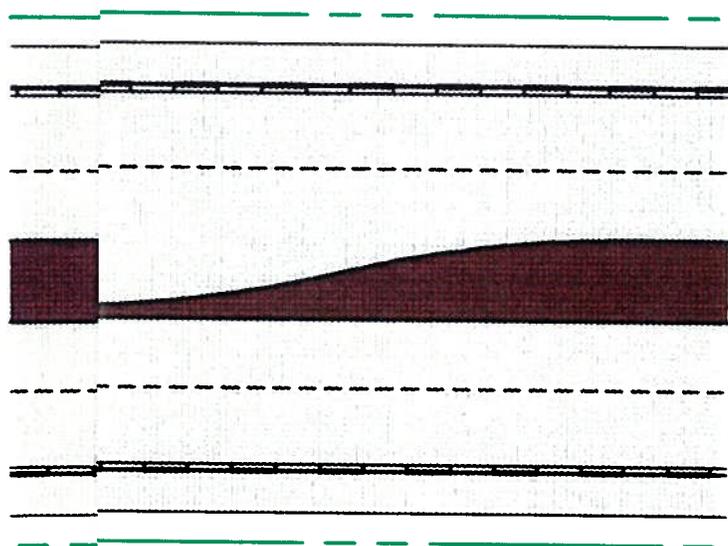
Location	1997 ADT	2015 Volume*	Existing Capacity**
Can-Ada Rd. to Star Rd.	6,100	11,416	15,500
Star Rd. to McDermott Rd.	6,000	13,167	15,500
McDermott Rd. to Pollard Ln.	6,200	13,167	15,500
Pollard Ln. to Black Cat Rd.	6,100	13,167	15,500
Black Cat Rd. to Linder Rd.	8,600	18,407	15,500
Linder Rd. to Meridian Rd.	10,000	19,959	15,500
Meridian Rd. to Locust Grove Rd.	13,000	20,278	18,500
Locust Grove Rd. to Eagle Rd.	15,000	21,702	18,500
Eagle Rd. to Cloverdale Rd.	16,000	36,619	18,500
Cloverdale Rd. to H-P entrance	16,000	39,670	18,500
H-P entrance to Joplin Rd.	19,000	40,529	18,500
Joplin Rd. to Garrett Rd.	21,000	33,123	37,000
Garret Rd. to Coffey Ln.	27,000	29,654	37,000
Coffey Ln. to Glenwood St.	29,000	34,757	37,000
Glenwood St. to Kent Ln.	30,000	39,409	33,000
Kent Ln. to 48th St.	29,000	37,022	33,000
48th St. to 44th St.	30,000	37,022	33,000
44th St. to Veteran's Memorial Parkway	39,000	42,841	33,000
Veteran's Memorial Parkway to 36th St.	42,000	48,311	33,000
36th St. to 30th St.	32,000	39,688	33,000
30th St. to I-184	30,000	31,076	33,000

\* Volumes taken from the Ada Planning Association's approved 2015 Network Model Run dated 5/13/97

\*\* Capacities taken from the Ada County Roadway Capacity Guidelines for Planning Applications updated on 7/31/97



SCALE: 1"=40'



EN BOULEVARD  
(HWY 20/26)

**JY**  
**COACHES**

**MR. CENTENNIAL**  
CENTENNIAL ENGINEERING, INC.

**Sum of Left-Turn and Opposing Volumes During the Peak Hour Necessary to Create a Left-Turn Delay Problem**

Signalized Intersection (4-Lane Highway)			
Cycle Split			
Cycle Length	70/30	60/40	50/50
120	950	800	600
90	1,000	850	700
60	1,150	1,000	850

Signalized Intersection (2-Lane Highway)			
Cycle Split			
Cycle Length	70/30	60/40	50/50
120	650	550	400
90	700	600	500
60	750	650	550

Non-Signalized Intersection		
Delay Criterion	4-Lane Highway	2-Lane Highway
30 Seconds	1,000	900
20 Seconds	900	800

Note - Assumes a minimum left-turn volume of 50 left turns in the peak hour.

Source Kenneth R. Agent, "Warrants for Left Turn Lanes,"  
Transportation Quarterly, Vol. 37, January 1983