



Billings District Office
424 Morey Street
PO Box 20437
Billings, MT 59104-0437

June 16, 2006

Yellowstone County Commissioners
PO Box 35000
Billings, MT 59107-5000

Subject: Speed Limit Investigation
S-416 (Blue Creek Road)
Billings

The Traffic section has completed a speed limit investigation of S-416/ Blue Creek Road; as requested. In short, no changes are recommended to the existing speed limits.

Please review the report and provide your comments to us in writing within the next 60 days.

If you have any questions, please contact the District traffic engineer, Stan Jonutis, at 657-0240.

Respectfully,

Bruce H. Barrett
District Administrator - Billings

03s41606aszr:smj

copies: Traffic File



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DISTRICT TRANSPORTATION
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Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

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Memorandum

To: Bruce Barrett – Billings District Administrator

From: *CB* Danielle C. Bolan, P.E. - Traffic Engineer

Date: June 12, 2006

Subject: Secondary 416 – Blue Creek Road
Speed Limit Investigation

Please present the following information to county officials and local law enforcement for review and comment. Inform them that we would prefer to receive all comments in writing within the next sixty days.

Yellowstone County Commissioners requested a follow-up investigation of the 50 mph speed zone on Secondary 416. As the Blue Creek community south of Billings continues to grow, residents are reporting more problems with speeding. The following aerial photo depicts the study area.



The area of primary concern is the semi-developed segment between the intersection with Old Blue Creek Road and the intersection with Hill Crest Road. The current 50 mph speed zone was implemented in 1998 and checked in 2004. Jellison Road and HillCrest Lane intersect Secondary 416 at the end of a curve. Intersection sight distance at both intersections exceeds the minimum desirable distance needed for effective operation at 50 mph travel speeds. However, the change in roadway alignment and the vegetation along Blue Creek Road may be creating some discomfort for motorists accessing Secondary 416.

The roadway was reconstructed in 1983 under project RS 416-1(3) and improved in 1995. The design speed is 50 mph. The typical section consists of two 12-foot travel lanes with 6-foot shoulders in each direction. There is a two-way-left-turn lane in operation for the area having the highest density of access points and a right-turn lane for the intersection with Jellison Road. As indicated in the aerial photograph Jellison Road serves a large bedroom community located west of Secondary 416.

Accident History

The accident experience was reviewed for three-year period from January 1, 2003 to December 31, 2005. During this period there were 33 accidents reported within the study area. The accident rate is 1.79 accidents per million vehicle miles traveled. This is consistent with the statewide average of 1.68 accidents per million vehicle miles traveled for rural secondary highways and below the 1.91 accident rate for the three year period in which the previous investigation covered. The following table lists the accident types by location.

	<u>Angle</u>	<u>Rearend</u>	<u>Single Veh.</u>	<u>Other</u>
Intersection	3	4	3	3
Non-intersection	1	1	16	2

Adverse roadway conditions and alcohol were listed as contributing factors in 30 percent of the accident experience. One of the alcohol related accidents resulted in a fatality.

There was a concentration of nine accidents within the portion of the 50 mph speed zone south of the intersection with Jellison Road. They consisted of six single vehicle accidents, a rearend accident and two other multiple vehicle type accidents. There are no definable trends that pin-point a correctable condition. Adverse roadway conditions were listed as a contributing factor in four of the accidents that occurred within this segment.

Travel Speeds

Vehicular travel speeds were sampled at six locations in April 2006. The following table depicts the speed statistics by location.

Location	85th Percentile Speed	Pace of Traffic Stream
South end of Yellowstone River Bridge (50 mph zone)	54 mph Northbound 54 mph Southbound	(44 mph – 54 mph) 69% (44 mph – 54 mph) 67%
Near the Intersection w/ Old Blue Creek Rd. (50 mph zone)	53 mph Northbound 54 mph Southbound	(44 mph – 54 mph) 59% (44 mph – 54 mph) 65%
Near the Intersection w/ Quanta Lane (50 mph zone)	52 mph Northbound 51 mph Southbound	(41 mph – 51 mph) 58% (41 mph – 51 mph) 59%
Near the Intersection w/ Jellison Road (50 mph zone)	52 mph Northbound 49 mph Southbound	(44 mph – 54 mph) 43% (41 mph – 51 mph) 49%
Near the Intersection w/ Hill Crest Road (50 mph zone)	56 mph Northbound 53 mph Southbound	(47 mph – 57 mph) 65% (44 mph – 54 mph) 68%
1,300' South of Hill Crest Road (60 mph zone)	62 mph Northbound 61 mph Southbound	(52 mph – 62 mph) 59% (49 mph – 59 mph) 61%

The 50 mph speed limit is at or just below the 85th percentile speeds and the upper limit of the pace identified within the boundaries of the zone. The speed statistics did show that there is some reduction in the travel speeds in the area of the intersection with Jellison Road. We attribute this to the number of turning movements in the area.

Conclusions and Recommendations

Based on the travel speeds gathered at five locations within the study area the existing 50 mph speed limit is the lowest that can be supported by current engineering practices used to arrive at a speed limit recommendation. The 50 mph speed limit is also commensurate with the roadway's design features.

Since our last investigation both traffic operation and the roadway's safety record have remained consistent. Therefore, based on the results of this and previous investigations we recommend no change to the existing speed limit configuration.

DCB:DRB:TRF:s416rpt

attachments

copies: D.E. Williams
D.R. Bailey

SPEED ZONE STUDY

station number 1 NB in BLUE CK RD
S-416

the 85th percentile speed is 53.98 mph
the total number of vehicles in the sample is 16466
the average speed of this sample is 49.38 mph
the standard deviation of this sample is 5.15 mph
the standard error of the mean is 0.064 mph
the upper limit of the pace is 54 mph
the lower limit of the pace is 44 mph
the number of vehicles in the pace is 14440
the percent of vehicles in the pace is 68.67
the 7th percentile speed = 42.19 mph
the 50th percentile speed = 49.63 mph
the 90th percentile speed = 55.46 mph
the 93rd percentile speed = 56.37 mph

SPEED ZONE STUDY

station number 1 SB in BLUE CK RD
S-416

the 85th percentile speed is 53.95 mph
the total number of vehicles in the sample is 17225
the average speed of this sample is 49.10 mph
the standard deviation of this sample is 5.41 mph
the standard error of the mean is 0.064 mph
the upper limit of the pace is 54 mph
the lower limit of the pace is 44 mph
the number of vehicles in the pace is 14858
the percent of vehicles in the pace is 67.24
the 7th percentile speed = 41.36 mph
the 50th percentile speed = 49.28 mph
the 90th percentile speed = 55.57 mph
the 93rd percentile speed = 56.57 mph

SPEED ZONE STUDY

station number 2 NB in BLUE CK RD
S-416

the 85th percentile speed is 52.54 mph
the total number of vehicles in the sample is 6453
the average speed of this sample is 46.65 mph
the standard deviation of this sample is 6.29 mph
the standard error of the mean is 0.078 mph
the upper limit of the pace is 54 mph
the lower limit of the pace is 44 mph
the number of vehicles in the pace is 3801
the percent of vehicles in the pace is 58.90
the 7th percentile speed = 36.21 mph
the 50th percentile speed = 47.54 mph
the 90th percentile speed = 53.59 mph
the 93rd percentile speed = 54.58 mph

SPEED ZONE STUDY

station number 2 SB in BLUE CK RD
S-416

the 85th percentile speed is 53.82 mph
the total number of vehicles in the sample is 7184
the average speed of this sample is 48.68 mph
the standard deviation of this sample is 5.71 mph
the standard error of the mean is 0.067 mph
the upper limit of the pace is 54 mph
the lower limit of the pace is 44 mph
the number of vehicles in the pace is 4650
the percent of vehicles in the pace is 64.73
the 7th percentile speed = 40.01 mph
the 50th percentile speed = 49.13 mph
the 90th percentile speed = 55.28 mph
the 93rd percentile speed = 56.29 mph

SPEED ZONE STUDY

station number 3 NB in BLUE CK RD
S-416

the 85th percentile speed is 51.78 mph
the total number of vehicles in the sample is 669
the average speed of this sample is 45.80 mph
the standard deviation of this sample is 6.13 mph
the standard error of the mean is 0.237 mph
the upper limit of the pace is 51 mph
the lower limit of the pace is 41 mph
the number of vehicles in the pace is 390
the percent of vehicles in the pace is 58.30
the 7th percentile speed = 36.67 mph
the 50th percentile speed = 46.26 mph
the 90th percentile speed = 53.10 mph
the 93rd percentile speed = 53.89 mph

SPEED ZONE STUDY

station number 3 SB in BLUE CK RD
S-416

the 85th percentile speed is 51.38 mph
the total number of vehicles in the sample is 499
the average speed of this sample is 45.23 mph
the standard deviation of this sample is 6.77 mph
the standard error of the mean is 0.303 mph
the upper limit of the pace is 51 mph
the lower limit of the pace is 41 mph
the number of vehicles in the pace is 296
the percent of vehicles in the pace is 59.32
the 7th percentile speed = 35.70 mph
the 50th percentile speed = 45.93 mph
the 90th percentile speed = 52.72 mph
the 93rd percentile speed = 53.52 mph

SPEED ZONE STUDY

station number 4 NB in BLUE CK RD
S-416

the 85th percentile speed is 52.41 mph
the total number of vehicles in the sample is 4843
the average speed of this sample is 40.98 mph
the standard deviation of this sample is 11.62 mph
the standard error of the mean is 0.167 mph
the upper limit of the pace is 54 mph
the lower limit of the pace is 44 mph
the number of vehicles in the pace is 2069
the percent of vehicles in the pace is 42.72
the 7th percentile speed = 23.31 mph
the 50th percentile speed = 45.31 mph
the 90th percentile speed = 53.67 mph
the 93rd percentile speed = 54.86 mph

SPEED ZONE STUDY

station number 4 SB in BLUE CK RD
S-416

the 85th percentile speed is 49.22 mph
the total number of vehicles in the sample is 5016
the average speed of this sample is 39.37 mph
the standard deviation of this sample is 10.26 mph
the standard error of the mean is 0.145 mph
the upper limit of the pace is 51 mph
the lower limit of the pace is 41 mph
the number of vehicles in the pace is 2479
the percent of vehicles in the pace is 49.42
the 7th percentile speed = 23.12 mph
the 50th percentile speed = 43.12 mph
the 90th percentile speed = 50.31 mph
the 93rd percentile speed = 50.97 mph

SPEED ZONE STUDY

station number 5 NB in BLUE CK RD
S-416

the 85th percentile speed is 55.63 mph
the total number of vehicles in the sample is 3355
the average speed of this sample is 50.27 mph
the standard deviation of this sample is 5.90 mph
the standard error of the mean is 0.102 mph
the upper limit of the pace is 57 mph
the lower limit of the pace is 47 mph
the number of vehicles in the pace is 2164
the percent of vehicles in the pace is 64.50
the 7th percentile speed = 42.46 mph
the 50th percentile speed = 50.74 mph
the 90th percentile speed = 56.67 mph
the 93rd percentile speed = 57.74 mph

SPEED ZONE STUDY

station number 5 SB in BLUE CK RD
S-416

the 85th percentile speed is 53.24 mph
the total number of vehicles in the sample is 3836
the average speed of this sample is 48.03 mph
the standard deviation of this sample is 5.98 mph
the standard error of the mean is 0.097 mph
the upper limit of the pace is 54 mph
the lower limit of the pace is 44 mph
the number of vehicles in the pace is 2612
the percent of vehicles in the pace is 68.09
the 7th percentile speed = 39.97 mph
the 50th percentile speed = 48.62 mph
the 90th percentile speed = 54.18 mph
the 93rd percentile speed = 55.44 mph

SPEED ZONE STUDY

station number 6 NB in BLUE CK RD
S-416

the 85th percentile speed is 62.39 mph
the total number of vehicles in the sample is 3044
the average speed of this sample is 56.65 mph
the standard deviation of this sample is 5.66 mph
the standard error of the mean is 0.103 mph
the upper limit of the pace is 62 mph
the lower limit of the pace is 52 mph
the number of vehicles in the pace is 1807
the percent of vehicles in the pace is 59.36
the 7th percentile speed = 48.18 mph
the 50th percentile speed = 56.71 mph
the 90th percentile speed = 63.88 mph
the 93rd percentile speed = 64.77 mph

SPEED ZONE STUDY

station number 6 SB in BLUE CK RD
S-416

the 85th percentile speed is 61.14 mph
the total number of vehicles in the sample is 3517
the average speed of this sample is 55.60 mph
the standard deviation of this sample is 5.58 mph
the standard error of the mean is 0.094 mph
the upper limit of the pace is 59 mph
the lower limit of the pace is 49 mph
the number of vehicles in the pace is 2146
the percent of vehicles in the pace is 61.02
the 7th percentile speed = 47.69 mph
the 50th percentile speed = 55.50 mph
the 90th percentile speed = 62.40 mph
the 93rd percentile speed = 63.72 mph