

SPEED ZONE SURVEY: LARIMER COUNTY ROAD 72

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I. Location

County Road Number: Larimer County Road 72

Starting and Ending Locations: US Highway 287 to County Road 21

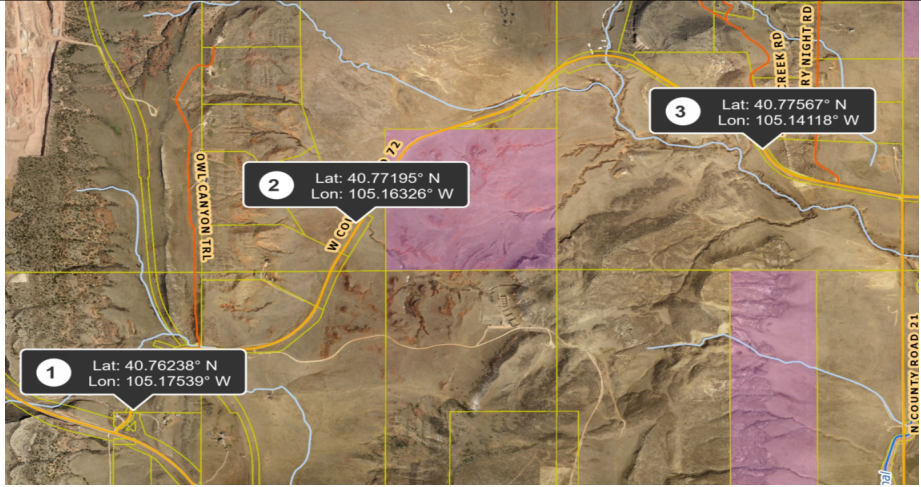
By Milepoints: Milepoints 0.000 to 3.229

II. General Remarks

A request has been submitted to Larimer County to perform a speed study on this 3.1 mile section of County Road 72 from US Highway 287 to County Road 21 to determine the appropriate speed limit because of the recent improvements from Larimer County Construction Project PN 335. Prior to completion of this project, CR 72 was a treated gravel road with a posted speed limit of 40 MPH.

III. Prevailing Vehicle Speeds

Speed data for the section of 72 from Highway 287 to CR 21 that was collected on 10/13 to 10/14/2021 is shown in Table 1.

				
Location	Vehicles per Day	E/B 85 th Percentile Speed (MPH)	W/B 85 th Percentile Speed (MPH)	Current Posted Speed (MPH)
1	1283	51.6	47.4	None
2	1276	62.8	65.3	None
3	1345	67.5	62.6	None

IV. Physical Features



Figure 1: Section of Road for Study

Design or Existing Speed Limit:

The previous existing speed limit for this segment of CR 72 was 40 MPH, with advisory speeds of 30 MPH at horizontal curves on a non-paved roadway. The Design speed for PN 335 is 55 MPH with a proposed regulatory speed limit of 50 MPH.

Measurable Physical Features:

The section of CR 72 being studied is bounded by US 287 on the western side and the previous surface change from non-paved to paved on the eastern side. This section is approximately 3.10 miles in length. The average measured width of the surface is a 24 foot driving surface with 8 foot paved shoulders resulting in a 40 foot paved cross-section.

Roadway Surface and Characteristics:

The road surface along the section of CR 72 was recently paved as part of re-construction project PN 335 so the condition is excellent with no distresses.

Vertical Alignment Information:

Along this segment of CR 72, large contributing hills are scarce. The few that do exist are large and steady enough to have little effect on visibility issues. After multiple test drives, it was determined that the vertical alignment was not the controlling geometric roadway feature, therefore no vertical alignment information was gathered.

Horizontal Alignment Information:

The section of CR 72 being studied contain 5 horizontal alignment features. All curves were run with a ball-bank indicator, with results shown in Table 2.

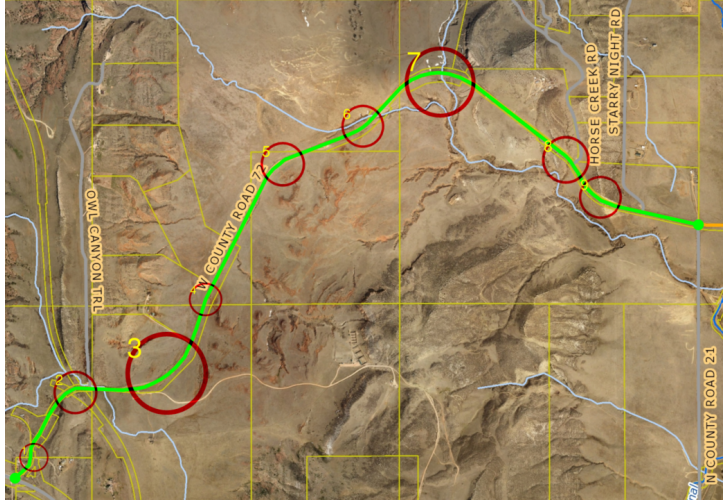
					
Curve Number	Milepoint	Posted Speed (mph)	Existing Advisory (mph)	Safe speed-Eastbound	Safe speed-Westbound
1	0.130	None	None	N/A	N/A
2	0.340	None	None	60	55
3	0.600	None	None	60	65
4	0.950	None	None	N/A	N/A
5	1.460	None	None	60	55
6	1.760	None	None	60	70
7	2.000	None	None	60	55
8	2.730	None	None	60	55
9	2.900	None	None	55	60

Table 2 - Data results from Ball-banks

Intersection Sight Distance Information:

Sight Distance measurements were done at the Horse Creek Rd and Starry Night Ln intersections to determine available stopping sight distance and entering vehicle sight distance from the intersecting roads. Measurements were taken from the center of the travel lane to a position on approach lane of the intersecting road 10 feet back from the north edge of pavement on CR 72. The features limiting sight distance are a rock outcrop on the north side of CR 72 between Horse Creek Rd and Starry Night Ln and a vertical curve (hill) to the east of Starry Night Ln. The observed measurements are shown in the table below:

CR 72 - Observed Sight Distance to intersections			10/11/2021		
CR 72 Speed Study				CDOT Access policy	CDOT - County
				55 MPH	50 - 55 MPH
			Measured	Minimum -Desired	Access Policy - minimum
Street	Direction	Sight Restriction	Sight Distance	Sight Distance	Passenger Cars - Pickups
Starry Night Rd	EB west of inter	Rock outcrop north side of rd	740 feet	450 - 550 Feet	500 - 550 feet
Starry Night Rd	WB east of inter	vertical curve on CR 72	820 feet	450 - 550 Feet	500 - 550 feet
Horse Creek Rd	WB east of inter	Rock outcrop north side of rd	630 feet	450 - 550 Feet	500 - 550 feet
Sight distance measured in travel lane to position 10 feet north of edge of pavement on intersection road.					

The measured sight distances meet the minimum requirements for design and access requirements.

V. Test Run Information

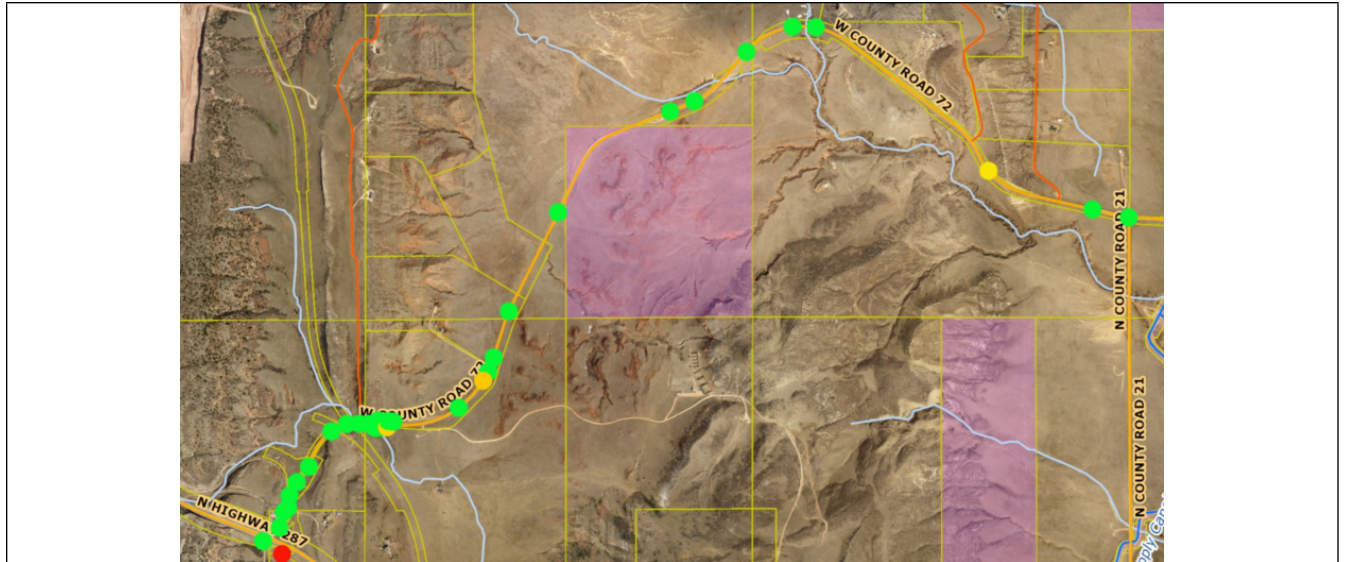
Test runs were performed on this roadway at speeds ranging from 40 to 55 MPH along the stretch of CR 72 for this study utilizing an F-150 pickup truck (unit no. 8836).

- 40 MPH – speed felt too slow and hard to maintain on all portions of the roadway.
- 45 MPH – speed felt comfortable around some of the horizontal curves but still felt too slow for straight portions of the road.
- 50 MPH – speed felt comfortable on straight portions and in the horizontal curves. This speed was easier to maintain and was more reasonable.
- 55 MPH – speed felt comfortable on straight portions but felt a little tight in the outside lane on a couple of the horizontal curves.

VI. Crash Experience

The Larimer County crash database shows the occurrence of 31 crashes on CR 72 from US 287 to CR 21 during the last 5 years (1/1/2016 to 7/1/2021).

Crashes on CR 72 include 1 fatality and 3 injury related crashes. A summary of each crash is shown below:



MP	Severity	Desc	Location	Road Surface	Road Condition	Light Condition	Weather
0.002	FAT	CR 72 @ CO 287	On Roadway	Blacktop	Dry	Daylight	Clear
0.005	PDO	26 FT N OF SH 287 ON CR 72	On Roadway	Blacktop	Dry	Daylight	Clear
0.062	PDO	CR 72 325 FT E OF US 287	Ran Off Left Side	Dirt	Dry	Dark - Unlighted	Clear
0.1	PDO	OWL CANYON RD (CR 72) 0.1 MI E OF US 287	Ran Off Left Side	Dirt	Dry	Daylight	Clear
0.133	PDO	CR 72 700 FT E OF CO 287	On Roadway		Muddy	Daylight	Clear
0.2	PDO	CR 72, 0.2 MI E OF US 287	Ran Off Right Side	Dirt	Dry	Dawn or Dusk	Clear
0.208	PDO	CR 27 1100 FT E OF CO 287	Ran Off Right Side	Dirt	Dry	Dark - Unlighted	Clear
0.341	PDO	CR 72 453 FT W OF OWL CANYON TR	Ran Off Right Side	Dirt	Dry	Daylight	Clear
0.387	PDO	CR 72 @ OWL CANYON TR	Ran Off Right Side	Dirt	Dry	Dark - Unlighted	Wind
0.42	PDO	CR 72 @ OWL CANYON TRAIL	Ran Off Right Side	Dirt	Dry	Dark - Unlighted	Clear
0.446	PDO	CR 72 100 FT E OF OWL CANYON TRAIL	Ran Off Left Side	Dirt	Dry	Daylight	Clear
0.467	PDO	OWL CANYON RD (CR 72) 221 FT E OWL CANYON TRAIL	Ran Off Right Side	Dirt	Dry	Dark - Unlighted	Clear
0.469	PDO	CR 72 220 FT S OF OWL CANYON TR	Ran Off Right Side	Dirt	Dry	Daylight	Clear
0.477	PDO	263 FT E OF OWL CANYON TRL ON CR 72	Ran Off Left Side	Dirt	Snowy	Dark - Unlighted	Sleet or Hail
0.5	INJ	0.5 MI E OF US 287 ON CR 72	Ran Off Right Side	Dirt	Dry	Daylight	Clear

0.502	PDO	OWL CANYON RD & OWL CANYON TRL	Ran Off Left Side	Dirt	Dry	Daylight	Clear
0.7	PDO	CR 72 0.7 MI W OF US 287	On Roadway	Dirt	Muddy	Daylight	Clear
0.7	PDO	CR 72 0.7 MI E OF US 287	Ran Off Left Side	Dirt	Snowy	Dark - Unlighted	Clear
0.8	INJ	CR 72 0.8 MI US 287	Ran Off Right Side	Dirt	Dry	Dark - Unlighted	Clear
0.827	PDO	CR 72 0.4 MI E OF OWL CANYON TRAIL	Ran Off Right Side	Gravel, Slag or Stone	Dry	Daylight	Clear
0.866	PDO	98 FT E OF 4750 N CR 72 ON CR 72	Ran Off Right Side	Gravel, Slag or Stone	Dry	Dark - Unlighted	Clear
1	PDO	CR 72 1 MI E OF CO 287	Ran Off Left Side		Dry	Dark - Unlighted	Clear
1.3	PDO	CR 72 (OWL CANYON) .3 MI S OF US 287	Ran Off Right Side	Gravel, Slag or Stone	Dry	Daylight	Clear
1.735	PDO	CR 72 1 MI W OF HORSE CREEK RD	Ran Off Right Side	Dirt	Dry	Dark - Unlighted	Clear
1.8	PDO	OWL CANYON RD (CR 72) 1.8 MI E OF US 287	Ran Off Left Side	Gravel, Slag or Stone	Dry	Daylight	Clear
2	PDO	OWL CANYON, 2 MI E OF US 287	On Roadway	Dirt	Dry	Daylight	Clear
2.139	PDO	1.5 MI W OF CR 19 ON CR 72	Ran Off Right Side	Dirt	Slushy	Dark - Unlighted	Sleet or Hail
2.2	PDO	OWL CANYON RD (CR 72) 2.2 MI E US 287	Ran Off Right Side	Gravel, Slag or Stone	Snowy	Daylight	Sleet or Hail
2.835	INJ	CR 72 573 FT N OF HORSE CREEK RD	Ran Off Left Side		Dry	Dark - Unlighted	Clear
3.129	PDO	0.1 MI W OF CR 21 ON CR 72	On Roadway	Dirt	Dry	Daylight	Clear
3.23	PDO	INTERSECTION OF CR 72 AND CR 21	On Roadway	Blacktop	Dry	Dark - Unlighted	Clear

The majority of the crashes in the five-year crash history along this section of road are single vehicle run off the road property damage only (PDO) crashes. The project improvements, including alignment improvements on the horizontal curves, a better (less rough) asphalt paved surface with pavement markings for guidance and the additional 8 feet paved shoulders, should lead to less of these type of crashes in the future.

VII. Traffic Characteristics and Control

Average Daily Traffic Information:

Location	Weekday ADT	Weekend ADT	Year
CR 72 NORTH OF US 287	2000	2450	2019
	2400	3000	2016
	1100	1600	2013
	1200	-	2010
CR 72 NW OF CR 72 – CR 19 INTERSECTION	2100	1850	2019
	2700	2400	2016

Table 3: Traffic Counts

Functional Classification:

Due to its location and usage, CR 72 in connection with CR 9 and CR 70 provides direct access from US287 to I-25 so it is classified as an arterial on the Larimer County Road Network.

Turning Movements and Control:

Along the section of CR 72 from US 287 to CR 21 all turning movements are either intersections or residential driveways with no control. The proposed control of each intersection is as follow:

- Intersection of CR 72 and US 287, controlled by a stop sign on CR 72.
- Intersection of CR 72 and Owl Canyon Trail, controlled by stop sign on Owl Canyon.
- Intersection of CR 72 and Gun Club Access, controlled by stop sign on Gun Club.
- Intersection of CR 72 and Horse Creek Dr, controlled by stop sign on Horse Creek.
- Intersection of CR 72 and Starry Night Ln, controlled by stop sign on Starry Night.

Parking and Loading Vehicles:

No on street parking is provided along CR 72. No loading vehicles were observed during the study.

Commercial Vehicles:

Heavy truck traffic was observed along CR 72 at the time of study. Given the roadway's function and location, it is likely that large commercial trucks may be present at any time.

Vehicle Conflicts with Pedestrians, Bicyclists, Animals, etc.:

During the study, no pedestrians or bicyclists were observed on CR 72. Due to the wide shoulders, it is assumed that bicyclists will be using the road shoulder. Wildlife can be on the road at any time due to open land area along the roadway.

Signal or Traffic Control Device Information:

A summary of traffic signs proposed for PN 335 are listed below

Sign	Milepoint	Direction Controlled	Sheeting	Condition
STOP (CDOT)	0.015	WEST		NEW
YIELD	0.017	NORTHWEST		NEW
LARIMER 72 COUNTY ROUTE MARKET	0.030	EAST		NEW
JCT US 287 SYMBOL	0.095	WEST		NEW
SPEED LIMIT 50 MPH	0.105	EAST		NEW
STOP AHEAD SYMBOL	0.171	WEST		NEW
REVERSE CURVE RIGHT WARNING	0.180	EAST		NEW
SPEED LIMIT 35 MPH	0.246	WEST		NEW
SCHOOL BUS STOP AHEAD	0.247	EAST		NEW
LEFT SIDE ROAD WARNING	0.303	EAST		NEW
SPEED LIMIT ## MPH AHEAD	0.370	WEST		NEW
STOP for Side Road w/ street name sign	0.413	SOUTH		NEW
RIGHT SIDE ROAD WARNING	0.493	WEST		NEW
SCHOOL BUS STOP AHEAD	0.549	WEST		NEW
STOP for Side Road right	0.559	NORTH		NEW
REVERSE CURVE RIGHT WARNING	0.843	WEST		NEW
SPEED LIMIT 50 MPH	1.241	EAST		NEW
SPEED LIMIT 50 MPH	1.242	WEST		NEW
CURVE RIGHT WARNING	1.335	EAST		NEW
CURVE LEFT WARNING	1.544	WEST		NEW
REVERSE CURVE LEFT WARNING	1.657	EAST		NEW
TYPE 2 OBJECT MARKERS	1.813	EAST/WEST		NEW
TYPE 2 OBJECT MARKERS	2.087	EAST/WEST		NEW
REVERSE CURVE LEFT WARNING	2.244	WEST		NEW
REVERSE CURVE RIGHT WARNING	2.462	EAST		NEW
SCHOOL BUS STOP AHEAD	2.500	EAST		NEW
LEFT SIDE ROAD WARNING	2.538	EAST		NEW
STOP For Side Road w/street name sign	2.614	SOUTH		NEW
RIGHT SIDE ROAD WARNING	2.718	WEST		NEW
SCHOOL BUS STOP AHEAD	2.746	EAST		NEW
LEFT SIDE ROAD WARNING	2.813	EAST		NEW
REVERSE CURVE RIGHT WARNING	2.870	WEST		NEW
STOP for Side Road w/street name sign	2.905	SOUTH		NEW
RIGHT SIDE ROAD WARNING	3.012	WEST		NEW
STOP For Side Road	3.107	NORTH		NEW
SCHOOL BUS STOP AHEAD	3.122	WEST		NEW
SPEED LIMIT 50 MPH	3.170	WEST		NEW

Table 4: Signs along CR 72

VIII. Comments

This study is being done to determine the appropriate speed limit for CR 72 from US 287 to the end of Project No. 335. The road was recently reconstructed and paved as part of PN 335. The road was a non-paved roadway with a speed limit of 40 MPH prior to construction. As part of the project, there were geometric improvements to the roadway, a surface change from a non-paved to a paved asphalt roadway and the addition of 8 feet paved shoulders on both sides of the road, The proposed speed limit as part of the construction project plans is for 50 MPH based on a 55 MPH design speed.

Based on test drives the more comfortable driving speeds were in the 50 to 55 MPH range. Driving the road at speeds of 40 and 45 MPH felt uncomfortably slow for this rural section of roadway. The design of the new roadway and the excellent pavement condition allows traffic to travel at speeds up to 55 MPH in a safe manner. The horizontal curves were run with a ball-bank indicator and the safe advisory speed for all curves is 55 MPH or higher. Sight distance checks were done at intersections and the measurements exceed the minimum requirements for stopping sight distance for all the locations that were checked. The 50 MPH speed limit proposed with the construction design for Project No. 335 is a safe and reasonable speed limit for this recently reconstructed roadway.

IX. Recommendations

It is recommended the regulatory speed limit for County Rd 72 between US 287 and the end of Project No. 335 be posted at 50 MPH. A step down in the speed limit to 35 MPH should be placed, southbound, approximately 2/10 mile north of the T-intersection at US Highway 287.

Approved By:

X _____ Date: 10/26/2021

Mark Peterson, Larimer County Engineer