December 28, 2016

To: Jason Post, Roads Superintendent, Limerick Township

Chris Bent, Project Manager, G.D. Jewell Engineering

Re: Steenburg Lake Road Preliminary Design Comments

Firstly, our family has had property on Steenburg Lake since the 1930's. Then there was one cottage; now (since the late 1960's) three, #844, 850 and 852. It is a very special place for us! We very much appreciate the lake and the views from the road while driving in, and of course, the view from our cottages while sitting outside.

Steenburg Lake N Road passes between our cottages and the lake, which has some challenges, but traffic volumes are low so it has never bothered us too much. Also, the township roads department has been responsive with concerns we've had over the years.

We are supportive of the project in general as the road is very rough and breaking up in many places. A hot mix asphalt (HL-3) surface will be a big improvement, compared to the existing (breaking up) surface treated condition. While we don't feel a hot mix asphalt surface is necessary, it will be very nice.

Generally, we would have concerns if the intention is to increase the posted speed, impair our access to the lake or negatively impact the view and natural shoreline appearance.

The main concern related to the preliminary design is the planned, extensive installation of steel beam guiderail and extruder end treatments. The roadway doesn't appear to be wide enough to safely accommodate the guiderail and the warrants for the guiderail are unclear, based on a comparison with some Canadian design standards and design standards used in other jurisdictions. The planned guiderail presents a significant safety concern for pedestrians and cyclists. As well, traffic accidents and incidental vehicle damage will be caused due to the narrow roadway width and proximity of the barriers to the edge of the roadway. Additionally, in the winter, snow plows will have a challenging time clearing the snow, which will leave an even narrower roadway at this time of the year. Accordingly, I would request if the Township would please consider alternatives to the broad application of steel beam guiderail and extruder end treatments on this project.

Detailed comments and questions are attached for your review and response.

Sincerely,

Frank Pinder

#844 Steenburg Lake North Rd.

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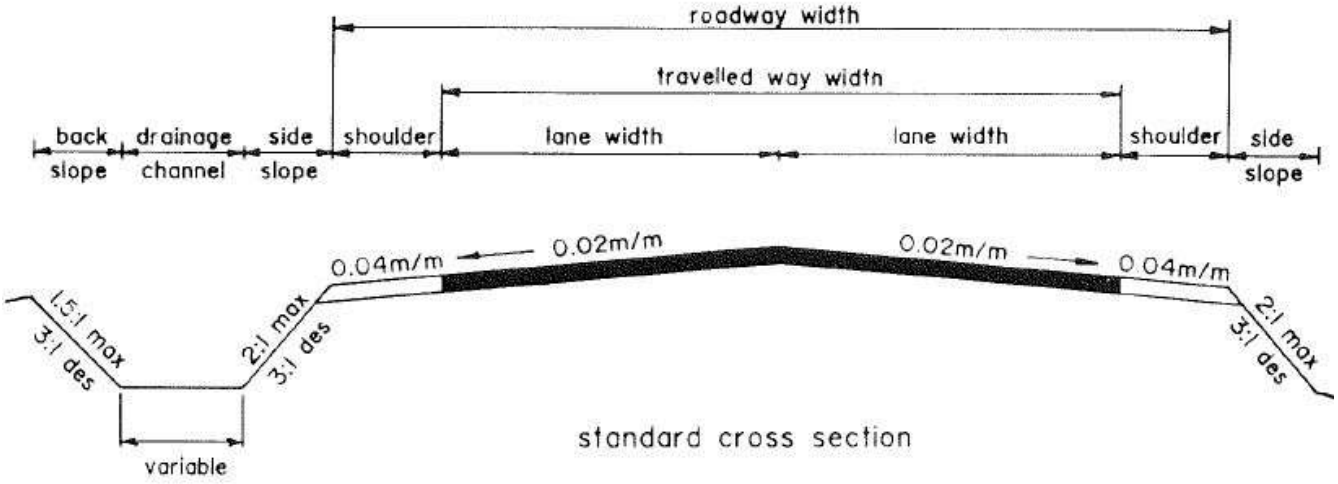
Roadway Width:

The design roadway width in the G.D.Jewell Engineering (GDJE) Preliminary Design Drawings, Sheet 14, is shown as 6.0m in non-guiderail locations and 7.0m in guiderail locations.

These widths do not appear adequate to accommodate the planned guiderail installations. With the exception of the 1km section of Steenburg Lake Road between Hwy. 62 and East Bay Rd., the Average Daily Traffic meets the RTAC (Roads and Transportation Association of Canada) recommendation for a low-volume road; ie less than 200 vpd. Per the RTAC Geometric Design Manual and recommendations per the paper "Development of Geometric Design Standards for Low-Volume Roads in Canada", by D. Bews, G. Smith and G. Tencha, the following drawing excerpt is provided:



ADT less than 200

class LVR (all categories)	roadway width** m	travelled way width m	lane width m	shoulder width* m
100	8.4	7.4	3.7	0.5
90	8.4	7.4	3.7	0.5
80	8.0	7.0	3.5	0.5
70	8.0	7.0	3.5	0.5
60	7.6	6.6	3.3	0.5
50	7.2	6.2	3.1	0.5
40	7.2	6.2	3.1	0.5
30	7.0	6.0	3.0	0.5

* where traffic barrier is used, increase shoulder width by 0.5 m
** roadway widths do not include roundings

Note: Surfaced roads are roads on which the travelled lanes have been physically delineated by some form of bituminous or concrete surface.

The design speed for the Steenburg Lake Rd project is not clear, but assuming a conservative 40 km/hr (which is the posted speed from East Bay Rd. westerly to Maple Lane), the RTAC recommended lane width is 3.1m with a 0.5m gravel shoulder in non-guiderail sections and 3.1 m with 1.0m gravel shoulder in guiderail section. Therefore, in sections without guiderail, the

overall roadway width in the GDJE preliminary design is 1.2m too narrow and in sections with guiderail (on both sides) the overall roadway width is 2.2m too narrow.

A sub-standard (ie. narrow) roadway width can perhaps be justified by the local agency based on factors such as the rugged terrain, winding alignment, low posted and operating speeds and the limited right-of-way available. After all, this will be a big improvement compared to the current conditions.

However, the rationale or warrants for the extensive addition of steel beam guiderail (with extruder end treatments?) is unclear. The guiderail and end treatments appears to be installed according to a highway-type standard, which may not be appropriate as the posted speed is 40 – 50 km/hr; not 80 to 100 km/hr.? It would be beneficial if GDJE could clarify what standard or guidelines were used to determine that steel beam guiderail is required, at so many locations?

According to the MTO Ontario Roadside Safety Manual, 1990:

> Section 1.2.1, Roadside Safety, Barrier Warrants:
>
> "*After (barrier) installation, the severity of accidents generally decreases but with added installations <u>the frequency of minor accidents may also increase</u>. For the above reason, and where economically feasible, the designer should make every effort to design without guiderail*."
>
> Section 1.4, Risk Acceptance:
>
> "*The alternative to removing, replacing or shielding hazards is to accept some risk… The suitability of the risk acceptance alternative is a function of accident history and future accidents… The accident history should consider multiple years of run off the road accidents and the possibility of future accidents*."

Given that the steel beam guiderail along the road is a new hazard, one can expect that there will be new and more frequent accidents related to the steel beam guiderail and end treatments that did not occur in the past. Has there been a study of the accident history to demonstrate the need? That the anticipated increase in new accidents will be offset by a reduction in the severe accidents / fatalities that have occurred?

The context of the Steenburg Lake Road and environment does not appear to have been given due consideration. It is a very low volume (146 to 250 vehicles per day), low speed (40 to 50 km/hr) rural / recreational road, through rugged terrain with a restricted right-of-way. The alignment has many sharp horizontal and vertical curves. Given the recreational nature, there are always people walking their dogs, jogging, riding bikes etc. If cars or trucks were to meet where someone is walking or biking, presently the people can get out of the way of the traffic, but with the guiderail, it will block people in. <u>This is a significant safety concern</u>. On this basis, the addition of guiderail should only be considered in specific areas where there is a clear demonstrated need / benefit; where the severity of traffic accidents has been a problem.

Based on my experience, I don't believe there is a Canadian or Ontario Standard for roadside safety design specific to low volume, low speed roads. In the absence of a Canadian / Ontario standard, the US Federal Highway Administration has researched and published a "Barrier Guide For Low Volume and Low Speed Roads, Nov. 2005", for Federal Lands Highways. The US FHWA Manual details a warranting methodology for barriers specific for low volume (<2000 AADT), low speed (less than 80 km/hr) roadways, which considers Hazard type and size, Hazard offset, Traffic volume, Traffic growth, Horizontal curvature, Grade and Speed. The Manual is written for US Federal lands projects, but has useful elements related to a context sensitive design such as the Steenburg Lake Road project.

Appendix A, Roadside Barrier Warrants includes the following tables for Trees and Water:

Table A.20: Barrier Warrants for Group of Trees 2.4 Meters Wide X 30 Meters Long

Metric Units

Speed	Hazard Offset From Edge of Travel Way	Adjusted Traffic Factor (ATF)		
		Not Warranted	Possibly Warranted	Warranted
80 km/h	1.2 – 2.3 m	0 – 149	150 – 549	550 (+)
	2.4 – 3.6 m	0 – 199	200 – 749	750 (+)
	3.7 – 4.8 m	0 – 249	250 – 899	900 (+)
	4.9 – 6.0 m	0 – 349	350 – 1,499	1,500 (+)
	6.1 – 7.2 m	0 – 749	750 (+)	
	7.3 (+)	All		
60 km/h	1.0 – 2.3 m	0 – 249	250 – 999	1,000 (+)
	2.4 – 3.6 m	0 – 299	300 – 1,249	1,250 (+)
	3.7 – 4.8 m	0 – 349	350 – 1,649	1,650 (+)
	4.9 – 5.4 m	0 – 599	600 – 3,199	3,200 (+)
	5.5 – 6.0 m	0 – 799	800 (+)	
	6.1 (+)	All		
50 km/h	0.6 – 2.3 m	0 – 449	450 – 2,149	2,150 (+)
	2.4 – 3.6 m	0 – 599	600 – 2,999	3,000 (+)
	3.7 – 4.2 m	0 – 799	800 (+)	
	4.3 (+) m	All		
30 km/h	0.6 – 2.3 m	0 – 2,599	2,600 (+)	
	2.4 – 2.9 m	5,000 (+)		
	3.0 (+) m			

Note: Based on the Manual, it appears that a Barrier is not warranted to protect trees located between 0.6 and 2.3m from the edge of the travelled way when the speed is less than 60 km/hr and the traffic volume is less than 250 AADT.

Table A.22: Barrier Warrants for Water 1.0 Meters Deep X 30 Meters Long

Metric Units

Speed	Hazard Offset From Edge of Travel Way	Adjusted Traffic Factor (ATF)		
		Not Warranted	Possibly Warranted	Warranted
80 km/h	1.2 – 2.3 m	0 – 249	250 – 1,099	1,100 (+)
	2.4 – 3.6 m	0 – 349	350 – 1,499	1,500 (+)
	3.7 – 4.8 m	0 – 449	450 – 1,999	2,000(+)
	4.9 – 6.0 m	0 – 2,999	3,000 (+)	
	6.1 (+) m	All		
60 km/h	1.0 – 2.3 m	0 – 249	250 – 1,099	1,100 (+)
	2.4 – 3.6 m	0 – 349	350 – 1,499	1,500 (+)
	3.7 – 4.8 m	0 – 449	450 – 1,999	2,000 (+)
	4.9 – 5.4 m	0 – 2,999	3,000 (+)	
	5.5 (+) m	All		
50 km/h	0.6 – 2.3 m	0 – 599	600 – 3,199	3,200 (+)
	2.4 – 3.6 m	0 – 749	750 (+)	
	3.7 – 4.2 m	0 – 799	800 (+)	
	4.3 (+) m	All		
30 km/h	0.6 – 2.3 m	0 – 3,799	3,800 (+)	
	2.4 (+) m	All		

Note: Based on this Manual, it appears that a Barrier is not warranted to protect water (that is less than 1m deep) located between 1.0 and 2.3m from the edge of the travelled way when the speed is less than 60 km/hr and the traffic volume is less than 250 AADT.

Based on the above, would the Township be open to considering alternatives to the guiderail? Examples could be 1) installation of lane edge delineators / plow markers; 2.) installation of object markers on specific hazards; 3.) installation of pavement edge markings / solid line on sharp curves; 4.) installation of barrier curb. If at some point in time a guiderail installation(s) at any particular location(s) is deemed necessary, it could be installed at that point in time. This approach would defer the immediate expenditure to reflect the current need and allow the issue to be studied further, perhaps leading to a more measured approach.

I would be pleased to discuss my comments further.

Sincerely,

Frank Pinder.