

PB 17-36



To: Garrett Duquesne, AICP
Commissioner, Community Development
and Conservation
Town of Greenburgh
Case No. PB 17-36

Date: May 22, 2019

Project #: 112061003

From: John Canning, P.E.
Town of Greenburgh Traffic Consultant

Re: Old Colony Road Subdivision
Sight Distance Review

This memo provides responses to comments on our April 12, 2019 memo regarding sight distance review for the above project.

Comment 1: Are we using the same Math (Ross Vinograd, Jim Blann)

Response 1: No.

As indicated in the attached, which is the applicable standard, since 2001, the American Association of State Highway and Transportation Officials (AASHTO) bases braking distance on a deceleration rate of 11.2 feet per second squared, not on the coefficient of friction. Studies used to develop this standard have indicated that a deceleration rate of 11.2 feet per second squared is suitable to allow 90 percent of drivers to stop while staying within their lane and maintaining steering control during the braking maneuver on a wet roadway surface. AASHTO also notes and studies have indicated that the friction available on most wet pavement surfaces and the capability of most vehicle braking systems can provide coefficients of friction that exceed this braking rate (typically 0.45 or higher). Thus, the current standard is more conservative than the analysis presented by Mr. Vinograd (which was based on a coefficient of friction (0.345) that was almost 25% less than the typical value) and, therefore, motorists can stop shorter than the value required by the standard.

B. N. J. Persson,¹ U. Tartaglino,^{1,2,3} O. Albohr,⁴ and E. Tosatti^{2,3,5}
PHYSICAL REVIEW B 71, 035428 (2005)

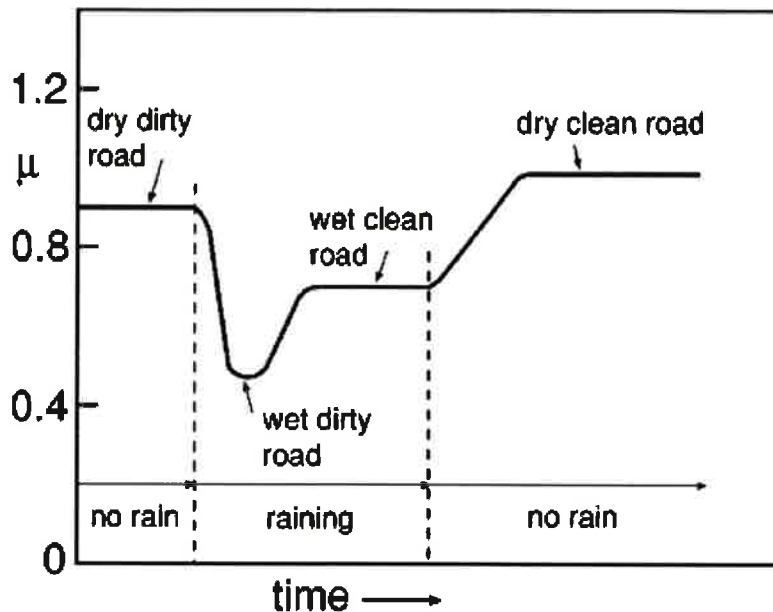


FIG. 8. The dependence of the tire-road friction coefficient on time during rain.

Comment 2: Kimley-Horn measured 315 feet of sight distance south of Lot 1 while Zappico measures 309 feet. (Ross Vinograd, Caroline Lugones)

Response 2: Correct. Kimley Horn did not rely on the Zappico sight-distance measurements but conducted its own, independent field measurements. Kimley-Horn's 315-foot value was double checked and we stand by that value. It is noted that the Zappico 309 feet is also above the required standard of 300 feet.

Comment 3: The grade calculation (at 14%) appears off and, at 33mph, pushes Lot 1 from safe to unsafe. (Ross Vinograd, Caroline Lugones)

Response 3: The grade calculation is correct and exceeds the minimum standard. The Vinograd calculation is incorrect because it uses the vehicle-grade of 285 feet as opposed to the grade of 283 feet at the 309' distance. Using the 283 feet, the Vinograd grade is calculated to be 13%. The correct grade calculation is 14 percent, the required sight distance is 300 feet and the available sight distance is 315 feet.

Comment 3: Going faster than 33, breaks the safety calculation. (Ross Vinograd)

Response 3: Per the 2018 AASHTO publication, *Policy on Geometric Design of Highways and Streets (the "Policy")*, the standard is to use the 85th percentile speed at the point where the driveway becomes visible, which is what was used. Streets are not designed to the 100th percentile as the costs and environmental impacts would be excessive and would not be justified by the incremental increase in benefits.

Comment 4: Weather Issues, also make Lot 1 unsafe, 0.345 coefficient is wet, 0.3 approaches icy. (Ross Vinograd, Caroline Lugones).

Response 4: It is unsafe to drive on any road in the town of Greenburgh (or anywhere in the county) at the speed limit when it is icy, which is why the Town brines, plows and salts the roadways. The standard is to use an 11.2 foot per second squared deceleration rate to calculate sight distance, which is what was used.

Comment 5: Indicating safety based on Police reports is unreliable. (Ross Vinograd)

Response 5: An absence of accidents does not indicate a safe condition, however, a high accident frequency can indicate an unsafe condition. The information provided by the Town Police Department did not indicate that there was a high accident frequency related to sight distances in the vicinity of the proposed driveways. In the past 10 years there were only 2 accidents reported within ¼ mile of this section of Old Colony Road (excluding the recently reported accident at 115 Old Colony Road). This limited accident history does not appear to indicate that there is a particular problem on this section of Old Colony Road that will be exacerbated by the construction of driveways that are provided adequate sight lines.

Comment 5: How do initial margins where 90% can stop and 85% will be within speed ranges translate into 98% of all instances being accounted for? (Ross Vinograd, Jim Blann)

Response 5: Regardless of the percentiles, the standard is to use the 85th percentile for speed, the 90th percentile for perception-reaction time and the 90th percentile for deceleration. From a probability perspective, only if a motorist is above these values for all three variables, can we be certain that they will not be able to stop within the specified distance. If they are exceeding one or two of the variables but not the third, there is a possibility that they will be sufficiently lower on the third that they will be able to stop within the specified distance. The Rule of Product dictates that the probability that a motorist is exceeding all three percentiles is the sum of the products of the probabilities - in this instance, $(0.15 \times 0.1 + 0.15 \times 0.1) / 2 = 0.0185$, or less than 2%.

As indicated above, regardless of the probability, the sight distance analysis was conducted using the applicable standard and field measurements have concluded that the required sight distances can be provided.

Comment 6: How was the rate of Speed determined? (Ross Vinograd, Jim Blann)

Response 6: The rate of speed was determined and provided by the police Department. Between 5 and 8 days of data were collected at the various locations and between 2,000 and 3,300 individual observations were made.

Comment 7: Shared driveways, though they would create additional work for ordinances, would provide the highest level of scrutiny to ensure safety. (Ross Vinograd, Jim Blann)

Response 7: Although we have not evaluated sightlines at shared driveways, it is possible, if not probable, that shared driveways could provide better sightlines, though it is noted that the minimum required sight lines are provided.

Comment 8: A third lane on Old Colony Road would improve sightlines. (Ross Vinograd)

Response 8: Although we have not evaluated sightlines with a third (southbound left-turn) lane for the subject driveways, it is possible, if not probable, that a third lane could provide better sightlines, though it is noted that the minimum required sight lines are provided. The AASHTO Policy recommends that, for the anticipated volume of traffic on Old Colony Road, more than 50 vehicles per hour would need to be making left-turns before a left-turn lane would be warranted.

Comment 9: Darkness inhibits the driver's ability see the risk and effectively shortens the sightline before brakes are engaged. (Ross Vinograd, Jim Blann)

Response 9: Assuming the cars exiting and entering the driveways have their lights on they will be as or more visible than during some daylight hours.

It is noted again that the sight distances meet the standards, however, it is recommended that the Applicant be required to add a street luminaire to the utility pole on the east side of Old Colony Road just east of Midvale Road.

Comment 10: Could a stop sign be put at Midvale Road in either one or both directions. (Ross Vinograd, Jim Blann)

Response 10: A stop sign could be put on Old Colony Road at Midvale Road, however, the Federal Manual on Uniform Traffic Control Devices (the "Manual") recommends that multi-way stop control be used where the volume of traffic on the intersecting roads is approximately equal and that five (5) or more crashes in a susceptible to correction by a multi-way stop installation be reported in a 12-month period. The Federal Manual further recommends that the vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day; and that the combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour. The Manual does, however note that locations where a road user, after stopping, cannot see conflicting traffic and is not able to negotiate the intersection unless conflicting cross traffic is also required to stop can be a good candidate for a multi-way stop.

In this instance, Midvale Road has a poorer sight distance to the south than the proposed new driveways and has not exhibited five or more accidents in any 12-month period. For this reason, it is not recommended that a multi-way stop condition be implemented at this intersection at this time.

Comment 11: The 4 new homes will add a lot of traffic to Old Colony Road. (Caroline Lugones)

Response 11: Based on Institute of Transportation Engineers data, the four new homes will add approximately 5 more trips to Old Colony Road during the busiest hours (the morning and afternoon commute hours), and the addition of these trips is not expected to have a significant adverse impact on traffic operating conditions.

Comment 12: How are the effects of slope accounted for in the sight distance calculations. (Jim Blann)

Response 12: The effect of slope (uphill or downhill) is calculated over the braking distance by either subtracting from or adding to the deceleration rate as a fraction of acceleration due to gravity.

Comment 13: There are repeat offenders for speeding on northbound Old Colony Road. (Jim Blann)

Response 13: It is recommended that the Town prioritize speed enforcement operations to address those Town roads that present the greatest danger to the public. With regard to northbound Old Colony Road, the 85th percentile speed was recorded at 33 mph, 3 miles per hour above the posted speed limit. Speed feedback signs have been proven to reduce the 85th percentile speed by approximately 2 miles per hour, which, in this instance, would bring the 85th percentile speed more in line with the posted speed limit. The Town may consider requiring the applicant to install such a sign on northbound Old Colony Road, just south of Midvale Road.