NORTH CAROLINA WAKE COUNTY		IN THE GENERAL COURT OF JUSTICE SUPERIOR COURT DIVISION 10-CVS-19930
BRIAN CECCARELLI and LORI MILLETTE Individually and as class representative, Plaintiffs, v. TOWN OF CARY, Defendant	)	SUPPLEMENTAL AFFIDAVIT OF BRIAN CECCARELLI

I am a plaintiff and am 51 years of age and competent to testify as a fact witness and as an expert witness for the reasons stated hereafter. I hold a Bachelor of Science in Physics from the University of Arizona. In the course of my career I have practiced engineering for private companies and for the NCDOT.

Cary Towne Blvd and Convention

1. Cary Towne Blvd at Convention. Cary claims that the posted speed limit on all of Cary Town Blvd between I40 and Maynard was 35 mph on November 2009. 35 mph is what the traffic signal plan says and 35 mph is what Cary used to set the yellow light duration. By setting the yellow light duration to that of a 35 mph road, Cary forced more than 8000 people to get red light camera citations just at this one intersection. To instantly disprove Cary's claim that this road is a 35 mph road, I submit the follow pictures and videos. I took the pictures and videos on January 28, 2010 just after the Town sent me a guilty verdict notice.

Picture 1.The first sign I saw as I turned left from Maynard onto eastbound Cary Town Blvd. is "School—*Reduced* Speed Ahead." Note that the next sign coming up. It is a School-Speed-Limit-When-Flashing sign. Convention Drive is still ½ mile away.

Picture 2."School Speed Limit 35 When Flashing." Given that the previous sign said this speed is a *reduced* speed, the normal speed limit must be more than 35 mph. In Cary speed limit

signs are always 15, 25, 35, 45, 55 and 65. Therefore the logical conclusion is that the normal speed limit must be 45 mph or higher.

Picture 3.Right after crossing Convention Drive I saw this: 45 mph.I am now sure that the speed limit is 45 mph starting at Maynard. I am not out of the school zone yet. When does the school zone end?

Picture 4.The next sign is a few hundred feet down the road. School zone ends and the speed limit returns to 45 mph.

- ✓ **All the normal speed limits on this road say 45 mph. But the traffic sign plan says the speed limit is 35 mph everywhere on this road. The traffic sign plan is wrong.**

2. The red light camera ticket that I received from the Town of Cary says that the speed limit is 45 mph.

   http://redlightrobber.com/red/links_pdf/north-carolina/Brian-Ceccarelli-Citation-Photo.jpg

   Attached as Exhibit A

3. Cary's traffic engineer David Spencer makes opposing statements between his e-mails to his colleagues and his affidavits to the Court. In his e-mails David Spencer admits the traffic signal plan was in error, asserts that the speed limit really is 45 mph and that the traffic signal plan was done in error. But in his affidavit Spencer (Dec 7, 2012, #8) claims the speed limit is whatever the posted speed limit is, and that because he did not see a 45 mph sign when he went to check, concludes that the speed limit must have been 35 mph. Spencer omits the fact that all posted speed limit signs along east and westbound Cary Town Blvd say 45 mph, and that even the posted school zone speed limit sign asserts a normal speed limit higher than 35 mph. All speed signs contradict the 35 mph designation on the signal plan.

   http://redlightrobber.com/red/links_pdf/Spencer-Speed-Limit-Mistake-at-Cary-Towne-Blvd.pdf

   Attached as Exhibit B

4. Brad Hudson, Cary's Safelight Program Director and retired policemen, in a December 1, 2009 e-mail to his colleagues said, "I have pulled up Ceccarelli citation (attached). In short he was traveling 50 mph in a 45 mph zone."

   http://redlightrobber.com/red/links_pdf/Spencer-Speed-Limit-Mistake-at-Cary-Towne-Blvd.pdf

   See Exhibit B

5. Michael Bajorek, Assistant Town Manager of Cary, e-mailed me on November 24, 2009 and said that many intersections in Cary that have a posted 45 mph speed limit have a shorter amber timing:

   http://redlightrobber.com/red/links_pdf/north-carolina/Mike-Bajorek-Letter.pdf

   Attached as Exhibit C

6. In the June 24, 2011 affidavit of Tim Bailey, Director of Engineering for the Town of Cary, Bailey asserts the speed limit on the relevant section of Cary Towne Blvd is 45 mph and has

been 45 mph since he began working with the Town of Cary. Bailey says that he had been working for Cary since 1989.

7. In the deposition of Cary's expert witness Daren Marceau, Marceau asserts that the speed limit on Cary Town Blvd has been 45 mph at least November 2009.

8. In a NCDOT ordinance from August 1, 1984, the NCDOT declares this section of Cary Towne Blvd a 45 mph road.

9. The Town of Cary fixes its mistake and acknowledges the validity of my complaint. In the December 7, 2012 affidavit of David Spencer, Spencer says in point 9, "I subsequently notified NCDOT that the section of the highway that Mr. Ceccarelli was complaining about did not have a 45 mph posted speed limit sign. Thereafter, someone from NCDOT did come out accompanied by a Town engineer and erect a 45 mph speed limit sign on that section of the roadway."

10. In an affidavit by Alfred Grandy, a NCDOT traffic engineer, Grandy says that on January 12, 2012, the NCDOT erected a 45 mph sign. Two years after I notify Cary it has a problem, Cary puts up this sign:

Picture 5.Cary corrects its error. I took these photos on October 5, 2012, According to Grandy's affidavit, Cary and the NCDOT placed this 45 mph sign on January 12, 2012. Following the 45 mph sign are two different school speed signs. Cary and Spencer mention nothing about the dismantling of the old school signs or the erection of the new ones.

It may be significant to note that school zone signs changed between January 28, 2010 and January 12, 2012.One could use this fact to verify the timestamps of my videos.

11. Links to the videos.

#	Pictures	Links
1	Pictures 1 and 2	http://redlightrobber.com/red/links_pdf/Cary-Towne-Blvd-Eastbound-Starting-at-Maynard-2010-01-28.mp4
2	Pictures 3 and 4	http://redlightrobber.com/red/links_pdf/Cary-Towne-Blvd-Eastbound-After-Convention-2010-01-28.mp4
3	Picture 5	http://redlightrobber.com/red/links_pdf/north-carolina/Cary-Towne-Blvd-Eastbound-Starting-at-Maynard-2012-10-05.mp4

12. The Town of Cary and the NCDOT also finished a corrected signal plan, a plan with 45 mph on it, two days before I got my ticket. Had Cary implemented this signal plan immediately, I would have entered the intersection on a yellow light with 0.12 seconds to spare. I would not have received a ticket. There would not have been a lawsuit.

13. Cary is quick to point out that I was travelling at 50 mph in a 45 mph zone (Cary's citation to me says "45 mph zone") when I entered the intersection. Cary believes that my going 5 mph over the speed limit removes Cary's guilt of illegally operating a red light camera. Session Laws SL2001-286, SL2004-141, Cary Ordinance 8:16 and Cary Charter App 2.8 make it clear that the operation of this red light camera has been illegal since the camera's installation in January 2004.

14. It is my opinion that Cary and/or Redflex knew about the bad signal timing since the camera's installation. This intersection at Cary Towne Blvd and Convention Drive has little traffic yet it is the first of seventeen cameras that Cary installed. Seeing the ticket statistics, seeing the timings on the signal plans, knowing how the formula works, and noting the suspiciously idiosyncratic pattern in the placement of all of Cary's red light camera, I believe that Cary and/or Redflex knew beforehand about the local traffic

engineering errors and/or where the misapplied physics of the ITE yellow change interval formula create the most red light runners. While the Town of Cary does not claim to financially exploit the situation, Redflex most certainly does. This Court case is not about Redflex's involvement. But one of the side conflicts is that now there is financial incentive to keep the roads dangerous.

15. NCGS 89C is the law regarding Professional Engineers, the title. The Town of Cary likes to beat my expert witnesses over the head with this law, in both deposition and in motion to strike my expert witnesses. The Town of Cary infers that most of us are not Professional Engineers (the title) thereby we cannot officially practice engineering. The Town of Cary further asserts that we have no knowledge of traffic engineering and so we are incompetent. The Town of Cary has misconstrued the law and in fact, this law works against Cary's expert witnesses. Here is NCGS 89C:

http://redlightrobber.com/red/links_pdf/north-carolina/Professional-Engineer-Chapter89C.htm

See Exhibit E

a. The Town of Cary asks me and my expert witnesses whether we are professional engineers (P.E.s) or not, as if that title means that professional engineers somehow have the corner on the practice of engineering. About 90% of the practicing engineers in North Carolina are not P.E.s.

b. My only wish from the beginning was for Cary's and the NCDOT's engineers to do their job. I do not *want* to do it! I do not even *want to offer* to do it! But because Defendant's engineers do not know physics, they have put my life in jeopardy as well as millions of others. Ethically I feel compelled to act.

c. 89C-25(7) allows engineers who are not P.E.s to practice engineering legally. That means Dr. Shovlin, Dr. Elizabeth George and me. 89C-25(7) confines the scope of our practice to "internal engineering" for the sake of manufacturing a product or for public service. Therefore NCGS 89C neither confines the practice of engineering to licensed professional engineers nor expects special knowledge of the physical sciences to come only from

license professional engineers. The laws of North Carolina recognize the expertise of people like Dr. George, Dr. Shovlin and myself.

d. Dr. Shovlin wears two hats at the same time. Physicist and engineer. He is a semi-conductor physicist who engineers systems to build LEDs for Cree. It is Dr. Shovlin who tells floor engineers what to do. It is not the reverse. If there is a problem with an engineering process, they go to Dr. Shovlin for a solution. Also while Shovlin was a graduate student at his University, he *taught engineers*.

e. Dr. Elizabeth George is the head of the physics department at her University and a research physicist--a nuclear experimental physicist to be exact. She must put on the engineering hat to design and set up her experiments. She is the type of person who *instructs engineers*; for example, on how to build a nuclear reactor. In her deposition, as a full professor, she *teaches engineers* every semester.

f. As for me, I have the most humble credentials of all. I have a bachelor of science in physics. But that degree is satisfactory for the level of physics required to understand my complaint against the Town of Cary. The kind of physics involved in this case is called classical mechanics. I learned this topic as a sophomore in high school and then again in greater detail as a freshman college physics major. Having this knowledge and having dissected the Formula, I know that the Formula as the NCDOT and the Town of Cary apply it, violates a law of classical mechanics. The law is called Newton's Second Law. $F = ma$ where $a = dv/dt$.

I have practiced engineering under 89C-25(7). I have applied physics directly to mechanical engineering, to mining engineering, to traffic engineering (for the NCDOT), to Martian space probes, and even to the more mundane topics of predictive statistics in financial applications. At the NCDOT my practice of engineering was supervised by David Alford, P.E. as required by 89C-25(4). While the main reason I was at the NCDOT was for computer software architectural engineering, physics is very useful and applies to all real-world situations. Alford knew that and that is one reason why he hired me. Physics easily applies to the motion of traffic. When Alford had a traffic flow problem on Capital Blvd in Raleigh and he could not figure out what it was, Alford asked *me* for help. Knowing that I had formal physics training, Alford knew I could help. Alford knows the

capabilities of a physicist albeit one with even just an undergraduate degree. I took one look at his data and told him what the problem was. I was correct.

g. It is my wish that if the case comes to trial, that I will be allowed to explain to the Court the issue between physics and the Formula. It will take me about 15 minutes. I need only a whiteboard and a dry marker. I have been able to explain this issue successfully to all types of audiences. And I believe that every person from the bailiff to Cary's own engineers will see the light. It may even be at this point when Cary's expert witnesses concede the case. When faced with the reality of the physics definition of the Formula (which none of Cary's experts know at this point and so admit), there is not much more to be said. By the laws of physics, the application of the Formula induces drivers to run red lights even if they are law-abiding, reasonably perceptive and willing to decelerate at the rate that the NCDOT uses in its Formula.

h. All of Cary expert witnesses recognize and yield to the immutability of the accuracy of physics to describe the real world. They have all said so in their depositions. Hummer summarizes Cary's official stance nicely: "We can't oppose the laws of physics, so if a judge makes a ruling, we will abide by the law and adjust to that."

Hummer at page 7 lines 13-19; page 82 line 9 to page 83 line 4:
http://redlightrobber.com/red/links_pdf/north-carolina/Joseph-Hummer-Deposition-with-Errata-2012-10-17.pdf

See Exhibit E

Marceau at page 9 lines 13-15; page 13 line 14-20;page 132 lines 7-11:
http://redlightrobber.com/red/links_pdf/north-carolina/Daren-Marceau-Deposition-with-Exhibits-2012-10-31.pdf

See Exhibit F

Fuller at page 7 lines 18-19; page 9 lines 21-24:
http://redlightrobber.com/red/links_pdf/north-carolina/Greg-Fuller-Deposition-2012-10-15.pdf

See Exhibit G

Moon at page 21 lines 7-9; page 22 lines 20-22:
http://redlightrobber.com/red/links_pdf/north-carolina/Lisa-Moon-Deposition-with-Exhibits-2012-10-09.pdf

See Exhibit H

i. The Court may wish to note that NCGS 89C-3(6) holds all of Cary's P.E.s accountable to practice engineering. 89C-3(6) states that the "practice of engineering . . . requires special knowledge of the mathematical, physical and engineering sciences . . . ."I believe that Cary's professional engineers do not know the special knowledge of the physical sciences, namely physics, to carry out their job. They are not practicing engineering as defined by law in spite of their title. 89C-21(a)(2) offers disciplinary actions against such engineers. I am not interested in pursuing such actions. I want only what I have always wanted. I just want an understanding and a call to action. I want traffic engineers to understand what the Formula means, that they cannot use it the way they are using it without causing harm to life, health and property. I want traffic engineers to fix it. I even provide the solution.

Cary's Misunderstanding of the Yellow Change Interval Formula

16. Cary's expert witnesses do not understand the meaning of the yellow light change interval formula. It is this misunderstanding which traps drivers like me and Lori Millette. I do not want to elaborate any further within this affidavit because Dr. Joseph Shovlin and I already covered this topic in the papers *Misapplied Physics in the International Standards Force Drivers to Run Red Lights* and *Short Yellows and Turns*.

    http://redlightrobber.com/red/links_pdf/Misapplied-Physics-Red-Light-Cameras.pdf

    http://redlightrobber.com/red/links_pdf/Short-Yellow.pdf

    Attached to previous deposition exhibits and included in Judge's notebook for Conv.

    Copies are attached and the articles state my opinions in greater detail.

    I will briefly address some items that came up in the last couple of months.

17. After hearing the Town of Cary's mantra "The signal plan complies with the spec." repeated often, please allow me to put everything in perspective. When the Town of Cary witnesses say, "The signal plan complies with the spec.", think, "Too bad the spec is wrong."

18. Every time an expert witness from the Town of Cary says, "Most cars can decelerate faster than spec.", or "Most drivers perceive and react faster than the spec.", the expert discredits their own spec. If the spec does not work for its own model driver, then the spec is not a spec.

19. Pointing out my 50 mph speed starts to expose Cary's misunderstandings of the Yellow Change Interval Formula. For example Cary likes to say that I was speeding when I was caught by the red light camera at Cary Towne Blvd and Convention Drive. At the instant I crossed over the red light camera detection loops, I was going 50 mph. I accelerated 5 mph to beat the light. I was in that precarious location on the road where I did not know

whether I should stop or go. We all do this when we are in that position. Is that a sin? No . . . it is built into the yellow change interval formula that sometimes the driver must accelerate in order to not commit a higher offense—run a red light. According to the operational directions of a yellow light, the Institute of Transportation Engineers (ITE) says about its Formula:

> "At the termination of a green phase, motorists approaching a signalized intersection are advised by a yellow signal indication that the red interval is about to commence. The speed and location of some approaching vehicles will be such that they can stop safely at the stop line; others will have to continue at their speed or even ***accelerate*** into or through the intersection."
>
> http://redlightrobber.com/red/links_pdf/Transportation-And-Traffic-Engineering-Handbook-1982.pdf
>
> Attached as Exhibit I

But in contrast the NCDMV Driver's Handbook instructs drivers to "not beat the light"which opposes the engineering mandate. In any case my beating of the light would have worked had the yellow change interval been set to its own spec.

20. Daren Marceau says in his affidavit that I could have stopped. He attached to his affidavit what appears to be a computer-generated page of calculations attesting. It says I could have stopped 5 feet before the stop bar. In the midst of a fairy tale of algebraic assumptions, I noticed this. Marceau gave me 1.0 second of perception/reaction time. The State-approved Formula allots 1.5 seconds. And I was travelling at night. That extra half second would have gotten me through the intersection with no citation.

21. Daren Marceau saysin his affidavit that Lori Millette could have stopped. Marceau gave her 1.5 seconds of perception/reaction time and assumed that she started down the left turn lane at 45 mph. Marceau knows she entered the intersection at 23 mph. Marceau allows her to decelerate. Then Marceau commits his mistake. He uses the ITE Formula. But unknown to Marceau, the Formula does not apply to vehicles that decelerate into the intersection. A precondition of the Formula is the *requirement that* the driver go her initial speed, in Millette's case, 45 mph all the way from the safe stopping distance upstream from the stop bar to the stop bar. No slowing down. Remember the Analytic Consideration in Denos Gazis' paper. The driver *must proceed at his constant initial speed*.

The definition of the yellow change interval is the time it takes a vehicle to traverse the safe stopping distance. The safe stopping distance for a 45 mph vehicle is 294 feet. Lori Millette is approaching the intersection at 45 mph. She is at 294 feet from the intersection. Once Millette is inside 294 feet, she no longer has the distance to stop. She must proceed. Millette proceeds. How long does it take Millette to traverse the safe stopping distance?

rate x time = distance

The distance is 294 feet. Millette's rate is the average between her initial and final velocity = (45 mph + 23 mph)/2 = 34 mph. 34 mph = 50 ft/s. So the time it takes Millette to get to the stop bar is 294/50 = 5.9 seconds. But Cary sets the yellow change interval to 3.0 seconds! The yellow light is 2.9 seconds too short. Millette entered 1.2 seconds into the red at Kildaire Farms at Cary Parkway. Where exactly Millette was when she began decelerating and how quick her deceleration are unknowns and impossible to determine. Marceau's could-have-beens are a fiction. The fact remains is that the yellow light duration for drivers who need to enter the intersection and decelerate to 23 mph is 2.9 seconds too short.

To make the definition of the yellow light interval clear, if Millette was going straight and traversed the safe stopping distance at the average speed limit of 45 mph, it would take her 294/66 ft = 4.5 seconds to reach the intersection. 4.5 seconds is the yellow duration Cary sets for straight-through movement. The ITE Formula covers only the case where drivers proceed through the safe stopping distance at their initial speed. The initial speed for straight-through movement is the speed limit. Engineers must set "v" in the ITE Formula to at least the speed limit lest the traffic engineer takes away the drivers ability to stop from the speed limit.

Taking the average of the speed limit and the intersection entry speed is the method my expert witness Johnnie Hennings used in his deposition. Marceau did not understand it (Marceau Deposition, p 111 line 21 to 17.) Marceau does not know the physics definition of a yellow light.

Shovlin and I, in our paper *Short Yellows and Turns*, use a slightly different model for turning drivers than Hennings. Hennings models a driver who decelerates evenly from the safe

stopping distance upstream from the intersection to the stop bar. Shovlin and I model a driver who continues at the speed limit for as long as he can and then taps his brakes at the NCDOT deceleration rate to a safe turning execution speed. Hennings' resulting values for the yellow change interval are longer than mine but just as valid.

Remember you are an expert witness too. When you are driving towards an intersection and intend to turn left, and you see a green arrow in front of you and you have a clear path to the intersection, what do you do? Do you go the speed limit for as long as you can and then tap your brakes (Shovlin's and my model), or do you take your foot off the accelerator and glide into the intersection (Hennings model)?

I go to work each morning at about 10 AM. Now that the red light camera is gone, I pass through Millette's intersection every day and turn as Millette did. About twice a week I have a clear path to intersection and the arrow is either flashing yellow or green. The more I sense that my time is running out, the more I use my model. The rest of the time I follow Hennings' model.

You can see my model in action at:

http://redlightrobber.com/red/yellow-time-table/yellow-time-table.htm

I programmed this spread sheet. The left side of the spread sheet is for straight through motions. The right side of the spread sheet contains variables and result values specific to turns. The column headers contain variable names like v_f, t_b, b, s, t_s, Z, etc. The meaning and derivation of each of these variables are in the paper *Short Yellow and Turns*. There is a link to the paper in the spread sheet. I wrote this spread sheet and the paper.

22. Cary's expert Dr. Hummer comments on the origin of the Formula in his affidavit. Hummer also offers a short derivation in his affidavit. Hummer says, "The ITE formula is derived from the standard formula to calculate the distance it takes a vehicle to stop once a hazard appears . . . . That formula is from AASHTO . . . ."

    Instead of deriving the Formula from the laws of physics, Hummer derives the Formula starting from AASHTO's version. That is the wrong place to start. AASHTO's version is more removed from its physics origins than ITE's. Hummer's derivation plays with algebra but does not reveal physical truth.

I derived the Formula from scratch from Newton's Laws. This derivation reveals the physical truth of the Formula. The derivation starts on page 23 of:

http://redlightrobber.com/red/links_pdf/Yellow-Light-Duration-Derivation.pdf

Attached as Exhibit J

23. Cary's Marceau makes several points in his affidavit paragraph 5-m. The points are wrong. As opposed to what Marceau writes, Plaintiffs know what yellow lights are intended to do. We know that it provides the distance to stop and the time to go. But we also know that the *time to go* means the time to go only if one goes only at the speed limit or more. Marceau does not know this. He does not put together the fact that non-queued left turning freely-flowing drivers like Lori Millette and the ones I filmed in the videos, approach at or near the speed limit (or at any rate, much faster than 22.9 mph) then decelerate to a safe turning execution speed by the time they reach the stop bar.

24. The laws of physics do not change to the consensus of the NCSITE Task Force. In an e-mail of the NCSITE Task Force, the Task Force declared left turning motions too difficult to model and so it decided to measure the initial approach speed at the location of the final approach speed and thus plug 20 mph into the wrong formula and see what would happen. The result was left turning drivers running red lights 1000% more in Cary literally overnight. Dr. Hummer is willing to let drivers be punished for such engineer changes (Deposition of Hummer, p 108 line 24).

To let the Court know that the Plaintiffs are not alone in its methods for the measurement of approach speed for left turning cars, the National Cooperative Highway Research Program, Report 731 concurs. The NCHRP measures the approach velocity 300 to 600 feet upstream from the intersection, even for left turning vehicles and concludes that for a 45 mph zone the approach speed should be calculated at 40 mph. See page 46 of:

http://redlightrobber.com/red/links_pdf/north-carolina/NCHRP-Guidelines-for-Timing-nchrp_rpt_731.pdf.

Attached as Exhibit K

25. The NCSITE Task Force also contemplates school buses with equanimity. The NCSITE Task Force decided not to handle unique vehicle streams. School buses and other heavy

vehicles have air-brakes which require an extra 0.5 seconds or more to pressurize. That would be 0.5 seconds or more in addition to the perception-reaction time. See page 5 in:

http://redlightrobber.com/red/links_pdf/NCSITE-Task-Force-Records-for-NCDOT-Change-Clearance-Intervals.pdf

Attached as Exhibit L

26. The Town of Cary's own traffic engineers objected as far back as January 13, 2006 to the NCDOT's decreasing left turn yellow lights to 3 seconds. The Town of Cary knew it would cause drivers to run red lights and be punished by red light cameras. Read page 13:

http://redlightrobber.com/red/links_pdf/north-carolina/Cary-Arguing-with-NCDOTs-Decreasing-Yellows-in-Cary.pdf

Attached as Exhibit M

27. Cary's experts say left turning drivers travel down the left turn lane at 22.9 mph. Hummer says they do not design for anyone going faster than that. Here are movies of left turning drivers approaching Kildaire Farms Rd at Cary Parkway and at Walnut at Meeting Pl. The 85th percentile approach speed of the non-queued cars I computed to be 37 mph. All the videos disapprove both Hummer's and Marceau's assumptions that left turning drivers approach at 22.9 mph. I am narrating. I am holding the radar gun. Ji Zhao (http://story2movie.com) was the videographer.

#	Link	Time into Video
1	http://redlightrobber.com/red/movies/kildaire-farms-explanation.mp4	
2	http://redlightrobber.com/red/movies/kildaire-p2-3-examples.mp4	3 Examples, First at 00:29 seconds.
3	http://redlightrobber.com/red/movies/kildaire-p4-1-example.mp4	1 example at beginning
4	http://redlightrobber.com/red/movies/kildaire-p6-1-example.mp4	1 example at beginning

5	http://redlightrobber.com/red/movies/kildaire-p7-4-good-examples.mp4	4 examples starting at 00:51.
6	http://redlightrobber.com/red/movies/kildaire-p10-scooting-into-the-bay-near-intersection-at-36mph.mp4	1 great example starting at 4:40. A 36 mph driver pulls into the left turn bay a few feet before the stop bar.
7	http://redlightrobber.com/red/movies/walnut-explanation.mp4	
8	http://redlightrobber.com/red/movies/walnut-1-left-turn-bay-entry-speeds.mp4	

28. Out of Cary's experts, Hummer knows the most about the Formula. But the more one knows about the Formula the less one can justify Cary's practices. In the end Hummer's position became his own enemy. In order to justify the idea that drivers must travel down the left turn lane at or less than 22.9 mph, Hummer had to argue that cars are not allowed to travel faster than 22.9 mph even when the speed limit is 45 mph. When we asked Hummer, "When the posted speed limit is 45 mph, is it allowed for drivers to travel at 45 mph in any lane?" Hummer would only answer, "I must consult a lawyer. I do not know." (Aff. Hummer, p. 63 line 11-12).

    http://redlightrobber.com/red/links_pdf/north-carolina/Joseph-Hummer-Deposition-with-Errata-2012-10-17.pdf

    Attached as Exhibit N

29. In my deposition, I incorrectly stated that the NCDOT got its 20-30 mph assumption from the 1994 ITE paper, *Determining Vehicle Signal Change and Clearance Intervals*. In the last 2 months I found out that that paper was not the origin of the assumption. I now revert back to my original belief I mentioned in my first affidavit. The20 – 30 mph assumption

comes from a typo error which evolved out an annual succession of NCDOT yellow change interval spec sheets. The NCSITE Task Force makes mention that it took the 20 – 30 mph from a current practice. What the NCSITE Task Force did was formally adopt the typo error and rationalize it into a standard.

http://redlightrobber.com/red/links_pdf/NCDOT-Typo-20-30-Document-Error.pdf

Attached as Exhibit O

This history of the NCDOT's 20 – 30 mph speed range shows that it was meant to be applied only to the all-red clearance interval.

30. By reading the depositions of Marceau and Hummer, one may get the idea that they have conflicting definitions of a dilemma zone. There really is no conflict. There is just a confusion of vocabulary among traffic engineers. There are two types of dilemma zones and Marceau refers to one type while Hummer refers to the other. A type I zone is a region on the road where if a driver is in it when the light turns yellow, there is no solution. The driver can neither stop nor can he proceed legally into the intersection. My and Millette's intersections have type I dilemma zones. The driver who is reasonably perceptive, acting lawfully and decelerating at the rate modeled by the NCDOT, will sometimes run a red light. A type II dilemma zone is a zone where there is a solution but the reasonably perceptive driver does not know what it is. Type II dilemma zones are also called indecision zones. A type II dilemma zone is where the driver may decide to go but the correct solution was that he should have stopped. It is an innocent mistake due to the nature of the mutual exclusivity of the choice and the precision demanded by the Formula. Such a driver usually enters the intersection on a red just by a fraction of a second. According to a Texas Study, 83% of all red light incursions occur within 1 second.

http://redlightrobber.com/red/links_pdf/The-Dilemma-with-Dilemma-Zones.pdf

Attached as Exhibit P

Hummer's dilemma zones are type I dilemma zones. Hummer dubs them "dilemma zones." Hummer says the ITE Formula makes dilemma zones go away. That is true in utopic circumstances. Marceau's dilemma zones, however, are type II dilemma zones.A type II dilemma zone is also called an *indecision zone*. Marceau has a table of indecision zones length on page 77 and 78 in his book *Accident Reconstruction at Traffic Signal Intersections.*

31. Cary's expert witness reject longer yellow lights and say, "Drivers will begin to disrespect the yellow" or that "they will treat the yellow like a green." That will cause traffic congestion, etc. Even in 1959 Gazis heard the same excuses. Gazis, the inventor of the yellow change interval formula, rejected that reasoning for the same reasons I do. To traffic engineers now and to traffic engineers then, "disrespecting of the yellow" has been a rumor. Gazis mentions the same rumor in his paper and calls it just that. No one knows where it came from and why it was ever said. Gazis answer to such chastisement was a rebuke, "It is the duty of the traffic engineer to always provide the driver with a solvable decision."

_____

Brian Ceccarelli

Wake County, North Carolina

Sworn to and subscribed before me this day by: _____

Date: _____ December 2012

(Seal)

_____
Notary Public

_____
Notary Public Printed Name

My Commission Expires: _____