The Peregrine Corporation

Specialists in Defense Dynamics

July 26, 2016

Thomas R. Donohue, Esq.
Brody, Hardoon, Perkins & Kesten
699 Boylston Street, 12th Floor
Boston, MA 02116

Re: Supplemental Report – Stamps v. City of Framingham

Dear Attorney Donohue:

I am writing to supplement my July 14, 2016 report in the above-referenced matter.

Proximity Testing. In my July 14, 2016 report, I expressed my opinion that Dr. Di Maio was correct in his estimate that the dense, oval stippling pattern, measuring some 5-1/2" long by 3" wide, which was noted and photographed on the deceased's face at autopsy, would have been produced, as Dr. Di Maio wrote in his report, at "12-18 inches, closer to 12 than 18 inches." (Kapelsohn 7/14/16 Report at p. 14.) I also stated that plaintiff's experts James Gannalo and Barbara C. Wolf, M.D., were far off the mark in their opinions that this small, dense stippling pattern could have resulted from a shot fired by Officer Duncan with the rifle's muzzle two to three feet from Mr. Stamps' face, as shown in some of Gannalo's color images.

Subsequent to the writing of my report, the Framingham Police Department ("FPD") found one remaining box of the same type of ammunition used in the incident, Hornady 5.56mm NATO 75 grain BTHP T2 TAP, product #8126N. Accordingly, on July 20, 2016 I traveled to Massachusetts, where I performed proximity testing using the incident carbine, Colt M4 serial number A0230821, with the same type of ammunition used in the incident. In addition to the ammunition details provided above, I note that the box was designated on its printed label as Lot #3101153. My inquiry to Hornady's technical staff confirmed that this box of ammunition was manufactured by Hornady on August 12, 2010, a bit less than five months prior to the Stamps shooting. Thus it is likely that the box of ammunition found by FPD was from the same lot of ammunition in use by Officer Duncan during the incident, or if not from the same lot, was very similar.

I performed the proximity testing at the Wayland Police Department Range on July 20, 2016, firing the rifle at white cotton duck mounted on cardboard, white felt mounted on cardboard, and at plastic "heads" of the type used at hairdressing schools, covered with white and off-white knit fabric that was stretched to conform closely to the heads. The distance to the target's surface was, in each case, measured from the end of the M4's flash suppressor, which extended forward about 1-1/2" from the end of the M4's barrel proper.

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Firing at fabric on flat cardboard from 12 inches produced a dense pattern, similar to that displayed on the deceased's face, measuring roughly 6 to 6-1/2 inches in diameter. See Exhibit A, attached. From 18 inches, the rifle produced a much less dense, evenly dispersed pattern of powder granules, measuring roughly 10 to 11 inches in diameter. See Exhibit B, attached. From 24 inches, the rifle produced a very thinly dispersed pattern, some 12 to 13 inches in diameter, and far less dense than what was observed on the deceased's face at autopsy. See Exhibit C, attached. And when fired from 36 inches, only an occasional, scattered grain of powder was captured by the cotton duck, within an area some 15 inches in diameter. See Exhibit D, attached.

As described, the above proximity testing was done by firing at flat targets, whereas the stippling pattern observed at autopsy was on the pronouncedly-curved surface of the deceased's head. Accordingly, I also performed proximity testing on knit fabric stretched to conform to the contour of the plastic hairdresser's heads as described above. Fired from 12 inches, the rifle produced an oval-shaped stippling pattern on the head, measuring about 4-1/2 inches in length. See Exhibit E, attached. From 18 inches, only a few grains of powder retained enough energy to penetrate or remain attached to the fabric. See Exhibit F. From 24 and 36 inches (two and three feet), there was no stippling at all visible on the heads. See Exhibit g, attached.

The results of my proximity testing confirms and demonstrates the accuracy of Dr. Di Maio's and my own opinions, to the effect that the muzzle of the rifle was slightly over 12 inches from Mr. Stamps' face when the shot was fired. The testing also shows that both Mr. Gannalo and Dr. Wolf were not only wrong, but that they were in fact very far off the mark, when they opined that the stippling pattern seen at autopsy could be produced by a shot fired from two to three feet from Mr. Stamps' face, as would be necessary in order to support their conjectures that the shot was fired by Officer Duncan from the kitchen, rather than when he entered the hallway, as he has testified is what occurred.

By way of educating jurors or others who are not ballistics experts, the "stippling" seen on the deceased's face is a pattern of small abrasions, produced in this case by granules of gunpowder that exit the muzzle of the gun at high speed along with the bullet when the gun is fired. At close enough range, where the tiny powder granules have not yet lost their velocity and energy, they can cause the observed pattern of small abrasions when they strike a person's skin. In some situations, powder granules can actually embed themselves in the skin.

Due to the incident M4's short barrel length (11-1/2") and the heavy Hornady bullet used (75 grains), the muzzle velocity of the bullet, and of the powder grains when exiting the muzzle, would have been in the vicinity of 2,400 feet per second, not 2,900 fps, as stated by Mr. Gannalo on page 6 of his report.

Using a kinetic bullet puller to disassemble one of the cartridges from the box of ammunition provided by the FPD, I determined that the cartridge was loaded with 24.0 grains (in weight) of a dark gray, flattened-ball type powder, including as well some smaller granules of what Hornady's Technical Services section has informed me is a flash suppressant added to the powder by its manufacturer, St. Marks Powder, an Australian powder manufacturer that is a branch of General Dynamics Corporation. As there are 437.5 grains to one ounce, the 24.0 grains (in weight) of powder contained in the cartridge is slightly more than 1/20 of an ounce. See Exhibit H, attached. Propellant powder granules are manufactured in many shapes, including round flakes with or without central holes in them, strips, tiny balls (spheres), "flattened ball" (microscopically, similar in shape to jelly donuts), "cracked ball," tiny rods, and rods with one or more lengthwise holes in them. When I examined it under a microscope,

the powder used in this ammunition appeared to be of the flattened ball type. Measured with an electronic digital micrometer caliper, the individual granules of powder measured an average of 0.013" (plus or minus 0.001" for the accuracy level of the instrument I used). To give the juror a practical concept of the size of these powder granules, they are roughly one-fifth the diameter of the head of a common pin used in sewing. (I measured and averaged the heads of five pins at 0.068" each.) For another comparison, the 0.013" diameter of these powder granules is the same as the thickness of the paper on which my business cards are printed. Many other types of propellant powder used in small arms ammunition have granules that are larger and heavier than the type used in this Hornady ammunition, and would thus produce stippling at further distances from the muzzle, all other things being equal.

Given the very tiny size of the granules of powder used in this ammunition, it is easy to understand that, after exiting the rifle's muzzle, the granules lose their velocity and force very quickly. In addition, the type of "birdcage" flash suppressor used on the incident M4 deflects some of the expanding gas, and with it some of the powder granules, upward and sideways from the muzzle, further reducing the density of the stippling pattern, and the distance to which a dense pattern will be produced, forward of the M4's muzzle.

The stippling pattern produced by any firearm will, in all cases, be dependent on a range of factors, including the caliber and type of firearm used, the length of the firearm's barrel, whether or not the firearm has a flash suppressor, sound suppressor, muzzle brake, or other muzzle attachment, the individual firearm itself (as different examples of the same firearm model will sometimes produce different stippling patterns), the specific type of ammunition used, the distance involved, the angle and nature of the skin or other surface at which the shot is fired, and other factors. Accordingly, the accepted "best practices" method for making proximity determinations is to perform testing using the actual incident firearm and the same type of ammunition used in the incident, if such ammunition can be found. Dr. Wolf basically admitted this in her deposition. Especially given (1) the unusual nature of the incident M4, with its very short 11-1/2" barrel and birdcage flash suppressor, (2) the uncommon nature of the ammunition used, and (3) the great importance of the proximity determination in this case, given the conflict between Officer Duncan's account that he was falling down in the hallway, almost on top of Mr. Stamps, when the shot discharged, versus plaintiff's conjecture that Officer Duncan was in the kitchen when he shot Mr. Stamps, who was in the hallway, it was incumbent on Mr. Gannalo and Dr. Wolf, testifying in this very serious matter, not to give opinions that <u>this</u> stippling pattern could have occurred at two to three feet, just because <u>some</u> rifle firing <u>some</u> ammunition might perhaps produce <u>some</u> stippling at that distance. In fact, what they said was demonstrably, and significantly, wrong.

<u>Ejection Pattern Testing.</u> While doing the proximity testing on the flat sheets of fabric, I simultaneously charted the ejection pattern of the incident M4 rifle using the same type of ammunition used in the incident. A mason line was stretched downrange to provide a consistent line of fire, and a tape measure was extended to the right of the mason line at a 90-degree angle, using a carpenter's 90-degree triangle to establish the angle. All shots were fired with the rifle's ejection port directly over the intersection of the mason line (line of fire) and the tape measure (perpendicular to the line of fire). With the rifle's bore horizontal (the standard for ejection pattern testing), six shots were charted. The range surface was sand, so the ejected cartridge cases stayed where they first landed, without bouncing or rolling. The ejection angles of the six cases ranged from a minimum of 18 degrees rear of perpendicular to the line of fire, to a maximum or 33 degrees rear of perpendicular to the line of fire.

The six angles were 18, 19, 21, 21, 32, and 33 degrees, for an average (mean) ejection angle of 24 degrees rear of perpendicular to the line of fire.

On page 16 of my July 14, 2016 report, I stated that I found it surprising that Mr. Gannalo has made no mention whatsoever, either in his report or his deposition, of the fact that Officer Duncan's ejected cartridge case was found in the hallway near Mr. Stamps, rather than in the kitchen. Now that I have been able to perform ejection pattern testing, the fact that Officer Duncan's M4 rifle ejects the fired cartridge cases from this ammunition at a significantly rearward angle allows me to state that the fact that the ejected cartridge case was recovered in the hallway is consistent with Officer Duncan's account that his rifle discharged when he lost his balance and fell in the hallway, very close to Mr. Stamps. While it is indeed possible that the shot was fired in the kitchen even though the cartridge case nevertheless ended up in the hallway, it is my opinion that, when combined with the stippling pattern, the presence of the cartridge case in the hallway argues very strongly for the shot having been fired in the hallway, not in the kitchen.

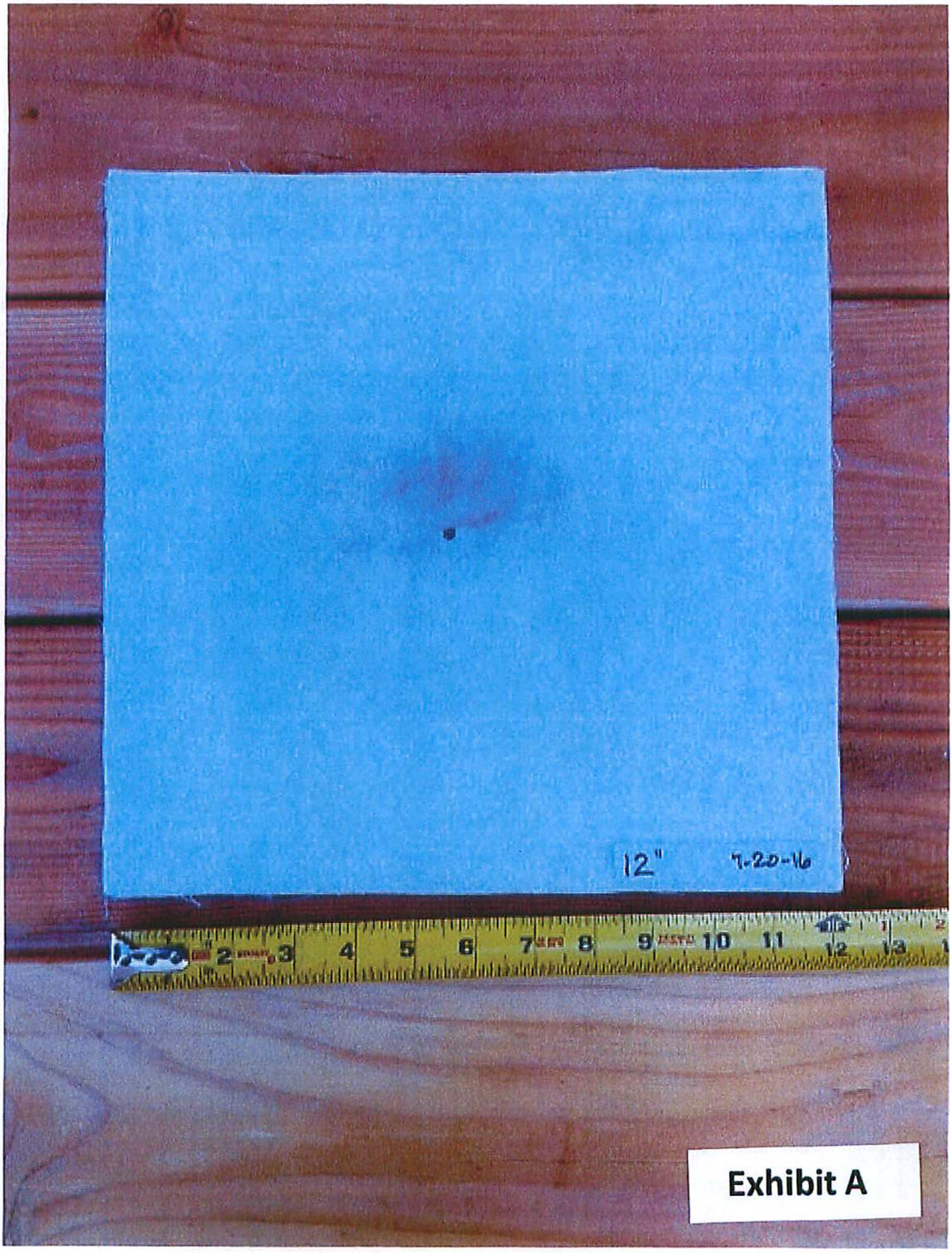
Color Images. I am not sure what Mr. Gannalo's color images (artist's renderings) are intended to do, but one thing I am sure they do not do is provide a realistic view of how this shooting occurred, even if Officer Duncan was in the kitchen when he, for some unknown reason, discharged the rifle, as plaintiff's experts posit. The reason I say this is because the color images are not to scale, and present a significantly distorted and prejudicial view of the elements shown. Using the M4 rifle as an object of known length, I calculate that the color images show Eurie Stamps to be not much over five feet tall (he measured 6'4" tall at autopsy), while Officer Duncan is shown as a giant standing over 6'6" tall, not even counting the height of his helmet (he is 5'10" tall). Even taking perspective into account -- although I note the pictures show a cutaway from the side -- these color images present a distorted and prejudicial view of what they purport to show.

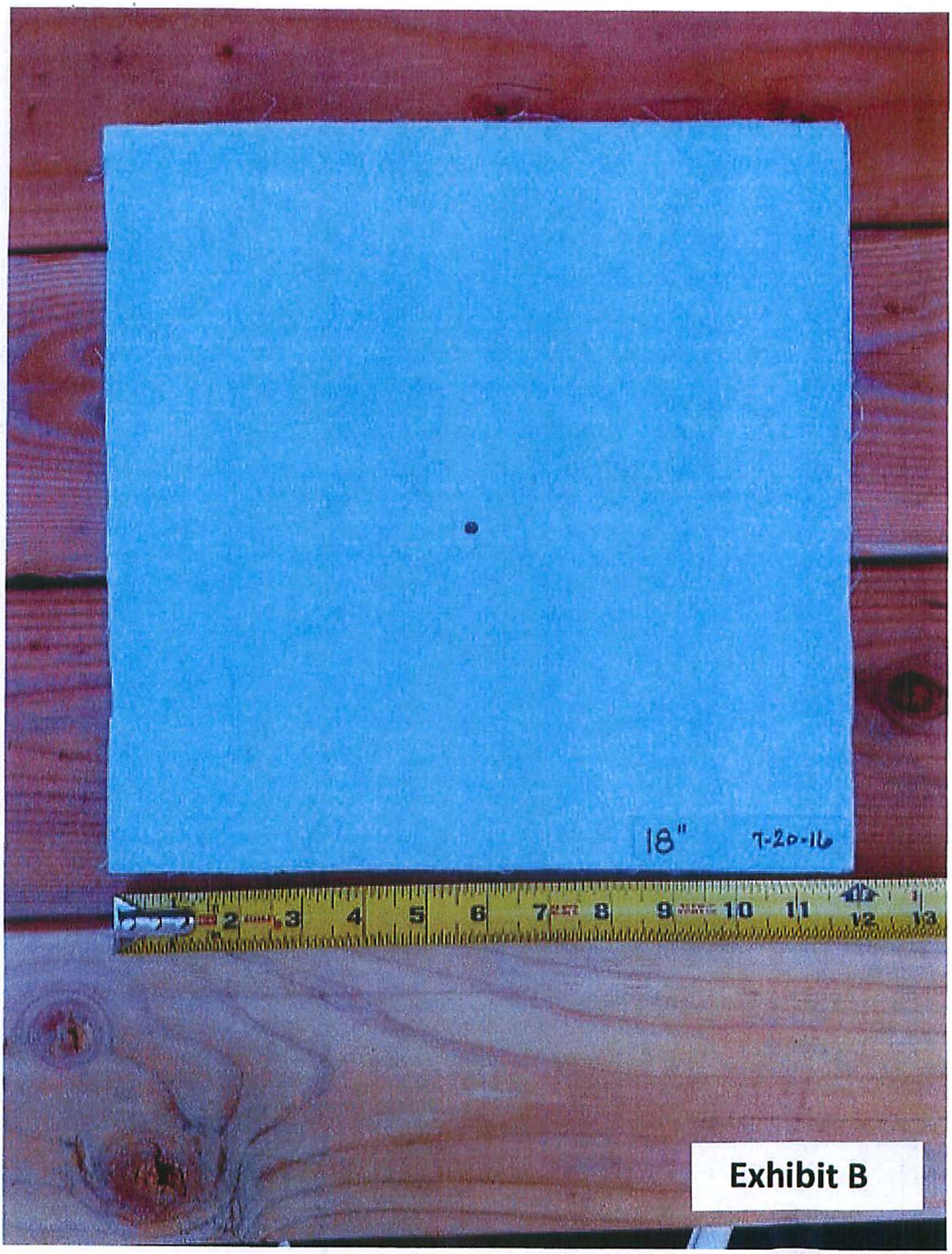
Conclusion. The foregoing facts and opinions are accurate to a reasonable degree of professional certainty in my fields of expertise. Nothing in my additional testing of the incident rifle and ammunition causes me to alter any of the facts or opinions I expressed in my report of July 14, 2016.

I reserve the right to amend or supplement this report, and the opinions contained herein, if further information becomes available to me.

Very truly yours,

Emanuel Kapelsohn, President


12"
7-20-16
Exhibit A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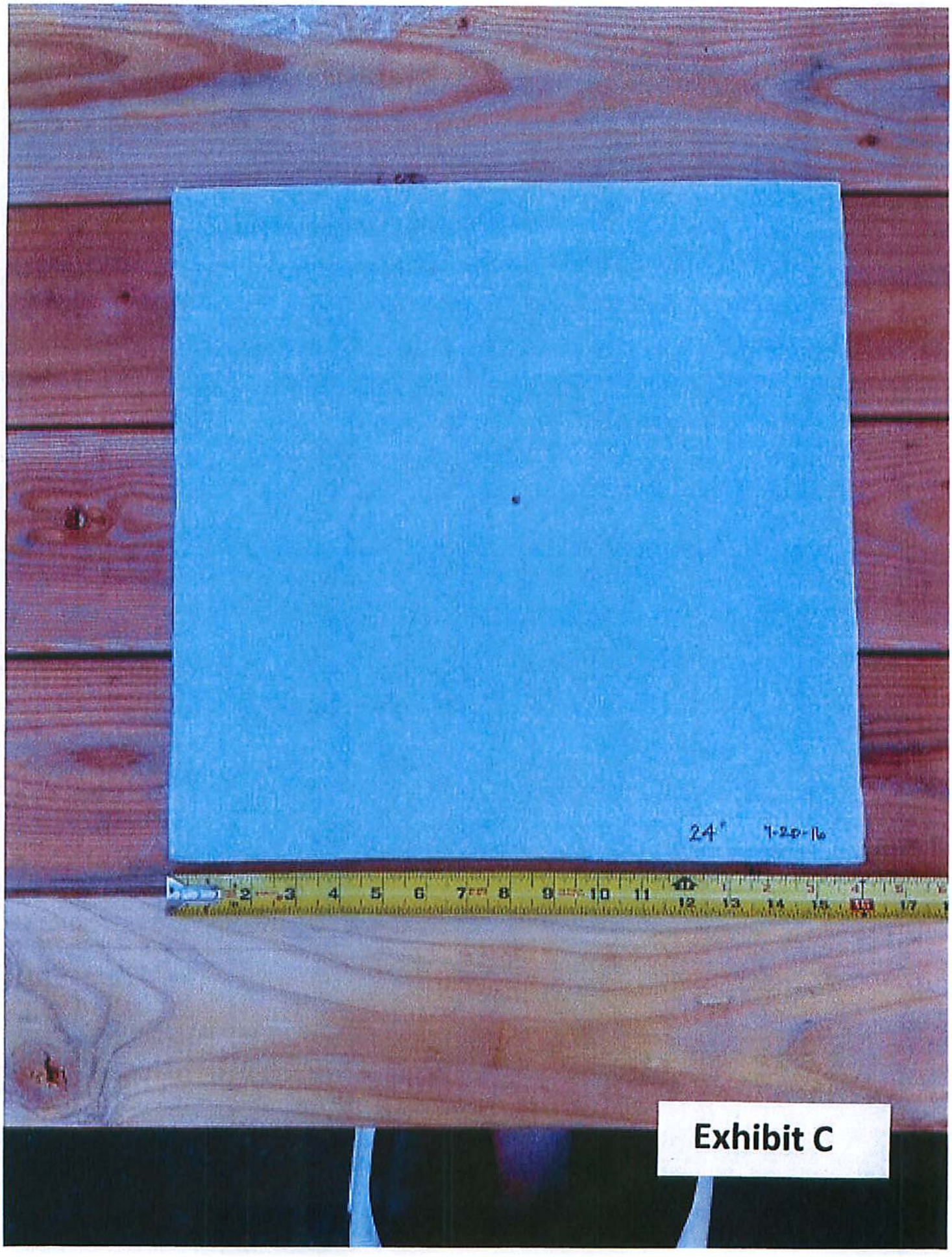
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Exhibit C

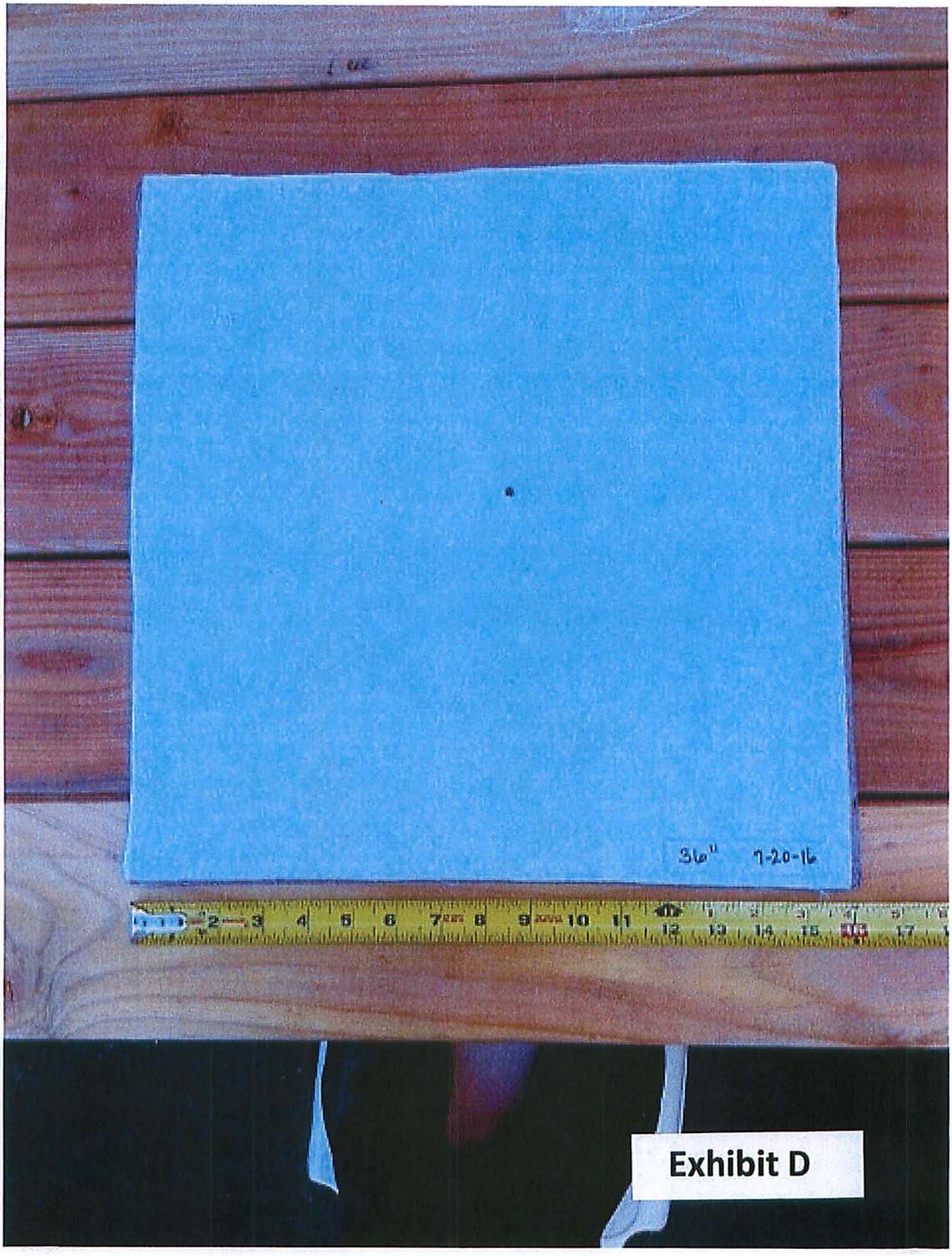
36"
7-20-16
Exhibit D


Exhibit E


Exhibit F


36'
Exhibit G

Exhibit H