SUPERIOR COURT OF NEW JERSEY
APPELLATE DIVISION
DOCKET NO. A-5486-16T2

STATE OF NEW JERSEY,

Plaintiff-Respondent,

v.

RICHARD CARRERA,

Defendant-Appellant.

Argued September 21, 2018 – Decided August 26, 2019

Before Judges O'Connor and DeAlmeida.

On appeal from the Superior Court of New Jersey, Law Division, Essex County, Indictment No. 17-04-0908.

Stefan Van Jura, Deputy Public Defender, argued the cause for appellant (Joseph E. Krakora, Public Defender, attorney; Stefan Van Jura, of counsel and on the brief).

Kayla Elizabeth Rowe, Acting Assistant Prosecutor/Special Deputy Attorney General, argued the cause for respondent (Theodore N. Stephens II, Acting Essex County Prosecutor, attorney; Kayla Elizabeth Rowe, of counsel and on the brief).

PER CURIAM

Defendant Richard Carrera appeals from a December 9, 2016 order of the Law Division denying his motion to preclude the anticipated testimony of an expert witness who used historical cell site data analysis to opine defendant's cell phone was used in the general area of a homicide at the approximate time of the crime. After the trial court denied the motion, defendant entered a guilty plea to manslaughter and a weapons offense, reserving the right to challenge the court's decision. We affirm in part, reverse in part, and remand for further proceedings.

I.

This appeal arises from the February 8, 2014 shooting death of Reylin Torres in a car on a Newark street. The details of the shooting are not relevant to the issues before the court. A grand jury indicted defendant and co-defendant Mark Hoskins for the shooting, charging them with: first-degree conspiracy to commit murder, N.J.S.A. 2C:5-2 and N.J.S.A. 2C:11-3(a)(1); first-degree murder, N.J.S.A. 2C:11-3(a)(1); second-degree unlawful possession of a weapon, N.J.S.A. 2C:39-5(b); second-degree possession of a weapon for an unlawful purpose, N.J.S.A. 2C:39-4(a); second-degree conspiracy to commit robbery, N.J.S.A. 2C:5-2(a)(1) and N.J.S.A. 2C:15-1(a)(1); first-degree robbery,

N.J.S.A. 2C:15-1(a)(1); first-degree felony murder, N.J.S.A. 2C:11-3(a)(3); and second-degree certain persons not to have weapons, N.J.S.A. 2C:39-7(b). Defendant entered a plea of not guilty.

During discovery, the State notified defendant of its intention to call FBI Special Agent John Hauger, a member of the FBI's Cellular Analysis Survey Team (CAST), as an expert in historical cell site data analysis. Hauger was prepared to offer the opinion that, based on his analysis of historical cell site data, cell phones belonging to defendant and Hoskins exchanged transmissions in the general area of the crime scene at about the time of the shooting.

Defendant moved pursuant to N.J.R.E. 104 to preclude Hauger's testimony. Although he did not object to Hauger's qualifications as an expert or claim that the proposed testimony was within the ken of the average juror, defendant argued the process Hauger used to reach his opinion is not a generally accepted method in the scientific community, rendering his opinion and exhibits inadmissible. Defendant also challenged the admission of the illustrative exhibits the expert created to assist the jury to understand his opinion.

The following facts are derived from the record of the hearing on defendant's motion, at which Hauger and Sprint radio frequency engineer Michael Zahra, who was qualified at the hearing as an expert in

telecommunications, and cell tower and cell phone operations, testified. Historical cell site data analysis relies on the fact that a cell phone uses radio frequencies to connect to nearby cell phone towers. A typical cell tower has three 120 degree sectors, covering the full 360 degrees surrounding the tower with antennae tilted downward for the purpose of providing blanket connectivity near the tower. The area covered by a tower is not a perfect circle and the coverage areas of nearby towers may overlap, particularly in urban areas.

From the moment a cell phone is turned on it constantly scans the radio frequency environment for the strongest signal from a cell tower. The cell phone's scanning takes place whether or not the cell phone is moving. When a cell phone "sees" a tower, it identifies itself, provides its location to the tower, and receives acknowledgment from the tower. The tower with the "strongest, clearest" signal is the one to which the cell phone will "more than likely" connect. This is known as the "serving cell" and is not necessarily the closet in proximity to the cell phone, as the closest tower may not be operative, or its signal may be blocked by an obstruction, such as a building or natural feature. The cell phone surveys other towers around the serving cell, measuring the signal strength of those towers. If a cell phone is in an area of overlapping coverage, it may switch back and forth between serving cells.

The cell phone idles on the serving cell until the user initiates a call. At that point, the cell phone communicates with the tower, indicating that it is trying to make a call. The tower thereafter authorizes the call. If the tower is operating at capacity, it will reroute the cell phone to another nearby tower, provided the cell phone's connection to that tower is sufficient to support the call. A cell phone can communicate with a tower only if the cell phone is within the tower's range. An at-capacity tower, therefore, will never reroute a cell phone to a tower to which the cell phone cannot connect. Towers in the Newark area reach capacity an average of less than two percent of the time. A call placed in an area of overlapping coverage could be routed to either tower providing coverage.

A record is generated when a cell phone connects to a tower to make a call. The record contains the calling number, the number dialed, the date and time that a call was placed, the end time of the call, the duration of the call, and the last tower to which the phone was connected during the call. No record is created if the cell phone is unable to connect to a tower when attempting a call. An ongoing call may be transferred from tower to tower, particularly if the cell phone is moving, but may also be transferred when a tower approaches capacity. Only the towers at which a call originates and ends are recorded.

Hauger explained that historical cell site data analysis provides "the approximate area . . . of where a cell phone was when it connected" to an identified sector of a tower at a particular date and time. When Hauger examines a call to a particular sector of a tower, he depicts on a map a "footprint" that roughly reflects a 120-degree, open-ended pie-wedge shape of intended coverage for that sector. The depiction does not have "a nice crisp line" showing the outer bound of a tower's signal. In addition, the actual coverage area may extend beyond the depicted coverage area.

Hauger specified that although he can show a phone communicated within the footprint of the sector of a tower on a particular date and time, he is not able to place the phone at any specific location within the footprint. As he explained, "[a]ll I can do is say the phone utilized this particular tower or this particular sector for this particular call, and that sector most likely covers this area." He admitted "there's no way to measure how far away . . . a phone was from a particular tower" and his analysis would "never be able to tell you where a phone was down to the address or to the corner[.]"

The State introduced maps created by Hauger depicting his opinion of the roughly pie-wedge shaped area covered by a sector of T-Mobile Tower 3397 (Tower 3397) and Sprint Tower 41-2 (Tower 41-2), both of which are near the

site of the shooting. Data from the communications companies identified these towers as having hosted three transmissions between cell phones belonging to defendant and Hoskins on February 8, 2014, between 7:30 p.m. and 7:34 p.m., the date and approximate time of the shooting. The calls involved a cell phone assigned a T-Mobile number and a cell phone assigned a Sprint number. The murder site was near the coverage areas depicted on the maps.

The T-Mobile number called the Sprint number first, using Tower 3397 near the intersection of Orange and Seventh Streets in Newark, about a block from the crime scene. The data indicated that the call used an antenna serving sector seven of the tower. Using a chart depicting the pie-wedge shaped area covered by the sector seven antenna overlaid on a map of Newark, Hauger opined the cell phone with the T-Mobile number was in the pie-wedge shaped area near the murder scene. He also opined that the T-Mobile phone number the received two calls from Tower 3397's sector seven in the next two minutes.

Based on the historical cell phone data from the cell phone assigned the Sprint phone number, Hauger opined that the Sprint cell phone communicated with Tower 41-2, which was close to Tower 3397 and also near the intersection of Orange and Seventh Streets, for four calls during the approximate time of the

shooting: the three calls from the T-Mobile phone number and a fourth incoming call from a phone number in the 862 area code.

Although he relied on the map depicting the 120-degree intended service area of the towers, Hauger testified that "there is no way to tell without doing drive tests what the actual . . . limit of the sector is" for the towers. He conducted a drive test for the two towers on December 22, 2015, twenty-two months after the shooting. He described the process of conducting a drive test as follows:

> [I u]se a device called . . . [a] gladiator autonomous receiver, it's a scanner, built by Venture Designs which is a scanning company that builds scanners for the cell phone industry. So I take the scanner and program it for Sprint and T-Mobile and I get in my car. What the scanner is doing is it's listening for the Sprint and T-Mobile frequencies where cell phones communicate on. And it's measuring the signal strength of the towers as I drive by. So I plug in the machine, set it up to measure the right – the appropriate characters – or carriers, and basically drive every street in the area so the scanner listens to the cellular environment and it determines where a particular phone would go if a phone was placed at that particular moment. It does it like two or three times a second. So what a drive test is is a – the best way that we have currently of determining what the actual cellular footprint of a tower is, without the theoretical pie wedges that we've been showing. It is the measured radio frequency.

He testified that he was trained with the Gladiator device annually and that the device was examined for calibration annually. Testifying that cell phone

carriers use a similar device for signal strength testing, Hauger stated that he believed the Gladiator device is capable of providing a reliable scientific opinion on cell site coverage. Hauger's drive test enabled him to produce a map with a shaded area displaying the Gladiator's readout of the extent of the "dominant coverage area" of the towers. Testifying the "dominant coverage area" displays the range in which a cell phone would "more than likely" connect to that tower, Hauger clarified that a cell phone would not connect to that tower one-hundred percent of the time, especially near the edges of the "blob" where it would potentially connect to a neighboring tower. Yet, according to Hauger, the drive test largely confirmed the pie-wedge shaped coverage predictions he created.

Hauger acknowledged limitations to the drive-test, including that he can only drive down streets and could not go in homes or non-public buildings. Therefore, the Gladiator produces readings while driving down each street and interpolates the outer bounds of the signal coverage map between streets at the edge of the coverage area and in houses and other buildings. It is important to note that the "dominant coverage area" as depicted by Hauger appears as a

meandering shape, with disconnected outlying areas, missing inner portions, and arms reaching out in multiple directions.[1]

Hauger noted that terrain, including buildings and "any kind of large glass structure, large glass and concrete," a bus, and even creek beds and water can affect a cell phone connecting to the geographically closest cell tower. Specifically, Hauger agreed that office buildings in Newark would affect which tower a phone "saw best" and that radio waves could bounce off buildings or other structures. He testified that "with reflection, refraction, that sort of thing, radio waves do all kinds of things when confronted with steel, concrete, you know, glass, that sort of thing." Hauger explained that a cell phone's ability to communicate with a tower could be affected by

> [a]ny new construction. Any large buildings. Well, new construction is kind of – I really wouldn't want to say all new construction because, I mean, somebody could do a – build a sidewalk and that wouldn't effect anything. But any large buildings that are either demolished or constructed in that general area, especially the area I drove relative to February of 2014, that would affect [the tower signal footprint], yes.

[1] Hauger clarified that a drive test only presents a footprint of signal strength at ground level, which does not reflect dominant signal strength if the phone is elevated, such as on a rooftop, or depressed, such as in a basement, or inside a private building.

Hauger testified that there were multi-story apartment and commercial buildings in the area of the towers he tested. He conceded he did not examine building records or any other source to determine if any buildings were built or demolished in the twenty-two months between the crime and the drive test. He testified that he "certainly didn't notice any[buildings that were] brand-new."

Hauger consulted T-Mobile records and a legal compliance attorney for T-Mobile to confirm there was no change to Tower 3397's location, antenna tilt, or its tower angle/azimuth between the date of the shooting and the date of the drive test. On Tower 41-2, all tower elements remained the same, except during the twenty-two-month period the antenna angle was decreased by two degrees. Hauger offered the opinion that this change could potentially expand the tower's footprint slightly. He could not explain the basis for that opinion, apart from saying "a bunch of people" told him what the effect of the change in the antenna angle would be.

Hauger did not consult maintenance logs to determine if the towers surrounding Tower 3397 and Tower 41-2 were operational on February 8, 2014. He acknowledged if the surrounding towers were not operational, the two relevant towers would have had expanded cellular range footprints.

Zahra's testimony disputed Hauger's assumption that a cell phone will always connect to the tower from which it detects the strongest, clearest signal. He testified that when the tower with the strongest, clearest signal is at or near capacity, a cell phone will be rerouted to a neighboring tower with sufficient coverage. In addition, after reviewing Hauger's coverage maps, Zahra agreed Hauger's approximations of the two tower's coverage areas were fair.[2]

On December 9, 2016, the court issued a written opinion and order denying defendant's motion. The court noted that the parties did not dispute Hauger's expertise or that the field of historical cell site data analysis was beyond the ken of the average juror. The only issue before the court was whether the methods used by Hauger to reach his opinions were sufficiently reliable to admit his testimony and the exhibits he created.

The court rejected defendant's two primary objections to the reliability of Hauger's methods – that calls may be rerouted from overloaded towers and that Hauger's drive testing was limited by his inability to enter homes and other non-public places. The court accepted Zahra's testimony that calls are rerouted from the tower with the strongest signal when that tower is at or near capacity, which

[2] Notably, the record contains no evidence with respect to the live tracking of a cell phone using GPS coordinates, triangulation of radio signals, or otherwise. The data examined by the experts concerned the historical use of cell phones.

the court determined occurred only approximately two percent of the time. In addition, the court observed that a rerouted call will be sent to a tower with coverage in the area in which the cell phone is located, resulting in a minimal geographic deviation from the coverage area of the tower from which it was rerouted. In addition, the court, while recognizing the limitations of the drive test and the pie-wedge shaped maps depicting the intended coverage area of the two towers, concluded that the methods used by Hauger were sufficiently reliable to render the maps and his testimony admissible.

On June 6, 2017, defendant withdrew his not guilty plea and entered a negotiated plea of guilty to second-degree manslaughter, N.J.S.A. 2C:11-4(b)(1), and second-degree unlawful possession of a weapon, N.J.S.A. 2C:39-5(b)(1), reserving his right to appeal the trial court's decision. The court sentenced defendant pursuant to the plea agreement to a six-year term of imprisonment with an eighty-five-percent parole ineligibility period pursuant to the No Early Release Act (NERA), N.J.S.A. 2C:43-7.2, as well as to a three-year period of special parole supervision for manslaughter, and a concurrent five-year term of imprisonment for the weapons offense, with forty-two months of parole ineligibility pursuant to the Graves Act, N.J.S.A. 2C:43-6(c). The remaining counts were dismissed.

This appeal followed. Defendant raises the following arguments for our consideration:

> POINT I
>
> THE TRIAL COURT'S RULING ADMITTING THE RESULTS OF THE DRIVE TEST AND HAUGER'S OPINION ON THE LOCATION OF DEFENDANT'S CELL PHONE NEAR THE TIME OF THE HOMICIDE SHOULD BE REVERSED BECAUSE THE "CAST" METHODOLOGY UPON WHICH THEY RELY IS: 1) INHERENTLY UNRELIABLE; AND 2) ESPECIALLY UNRELIABLE IN THIS CASE.
>
> POINT II
>
> THE TRIAL COURT'S RULING ADMITTING THE PIE[-]WEDGE MAPS SHOULD BE REVERSED BECAUSE THEY ARE NOT RECOGNIZED BY THE RADIO FREQUENCY ENGINEERING COMMUNITY, AND IN ANY EVENT, THE GEOGRAPHICAL REPRESENTATIONS THEY EMBODY ARE TOO CRUDE TO AID THE JURY.

II.

Expert testimony is admissible when "scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue" and the proposed expert has the requisite "knowledge, skill, experience, training, or education" to form an expert opinion.

N.J.R.E. 702. The rule creates three requirements for admission of expert testimony:

> (1) the intended testimony must concern a subject matter that is beyond the ken of the average juror; (2) the field testified to must be at a state of the art such that an expert's testimony could be sufficiently reliable; and (3) the witness must have sufficient expertise to offer the intended testimony.
>
> [State v. Kelly, 97 N.J. 178, 208 (1984).]

As noted above, only the second factor is at issue here.

It is well-established that New Jersey courts apply the general acceptance within a scientific community test set forth in Frye v. United States, 293 F. 1013 (D.C. Cir. 1923), to determine the admissibility of expert testimony in criminal cases. While our Supreme Court "adopted the factors identified in Daubert v. Merrell Dow Pharms., Inc., 509 U.S. 579, 593-95 (1993), and a methodology-based approach for determining scientific reliability in certain areas of civil law, [the Court has] not altered [its] adherence to the general acceptance test for reliability in criminal matters." State v. Cassidy, 235 N.J. 482, 492 (2018).

> "Proof of general acceptance within a scientific community can be elusive," and "[s]atisfying the test involves more than simply counting how many scientists accept the reliability of the proffered [technique]." State v. Harvey, 151 N.J. 117, 171 (1997). General acceptance "entails the strict application of the scientific method, which requires an

> extraordinarily high level of proof based on prolonged, controlled, consistent, and validated experience." Ibid. (quoting Rubanick v. Witco Chem. Corp., 125 N.J. 421, 436 (1991)). The proponent of the technique has the burden to "clearly establish" general acceptance, State v. Johnson, 42 N.J. 146, 171 (1964), and may do so using "(1) expert testimony, (2) scientific and legal writings, and (3) judicial opinions," State v. Cavallo, 88 N.J. 508, 521 (1982)[.]
>
> [Ibid. (alterations in original).]

"Thus, the test in criminal cases [is] whether the scientific community generally accepts the evidence." Harvey, 151 N.J. at 170. To establish general acceptance, "the party proffering the evidence need not show infallibility of the technique nor unanimity of its acceptance in the scientific community." Cassidy, 235 N.J. at 492. "[T]he State's burden is to prove that the . . . test and the interpretation of its results are non-experimental, demonstrable techniques that the relevant scientific community widely, but perhaps not unanimously, accepts as reliable." Harvey, 151 N.J. at 171.

"Whether expert testimony is sufficiently reliable to be admissible under N.J.R.E. 702 is a legal question we review de novo." State v. J.L.G., 234 N.J. 265, 301 (2018). "When reviewing a decision on the admission of scientific evidence, an appellate court should scrutinize the record and independently

review the relevant authorities, including judicial opinions and scientific literature." Harvey, 151 N.J. at 167.

Having carefully reviewed the record in light of the applicable precedents, we affirm the trial court's conclusion that historical cell site data analysis is generally accepted in the scientific community and sufficiently reliable to be admitted into evidence to show the general location of a cell phone at a particular time. We therefore affirm the court's December 9, 2016 order to the extent that it reaches the same conclusion. However, we conclude that shortcomings in Hauger's methodology render the opinion he offered in this case unreliable. As a result, we reverse that portion of the trial court's order permitting the admission of Hauger's testimony and the exhibits he created, and remand for further proceedings. We add the following comments.

III.

There is no published opinion in this State squarely addressing the admissibility of historical cell site data analysis in a criminal matter. A number of out-of-state and federal precedents, however, are instructive.

Federal courts have been receptive to expert testimony regarding historical cell site data analysis. "District courts that have been called upon to decide whether to admit historical cell-site analysis have almost universally

done so." United States v. Hill, 818 F.3d 289, 297 (7th Cir. 2016); accord United States v. Reynolds, 626 Fed. Appx. 610, 616-17 (6th Cir. 2015) (allowing historical cell site data analysis to show where parties other than defendant were not); United States v. Schaffer, 439 F. App'x 344, 347 (5th Cir. 2011) (concluding that the field of historical cell site data analysis "is neither untested nor unestablished"); United States v. Weathers, 169 F.3d 336, 339 (6th Cir. 1999) (admitting expert testimony on historical cell site data analysis); United States v. Jones, 918 F. Supp. 2d 1, 5 (D.D.C. 2013) (finding "the use of cell phone location records to determine the general location of a cell phone" to be both widely accepted and "based on reliable methodology"); United States v. Evans, 892 F. Supp. 2d 949, 955-56 (N.D. Ill. 2012) (finding "granulization theory" to be unreliable science, but still finding other historical cell site data analysis methods have been adequately tested).

So too have the courts of other States. State v. DePaula, 166 A.3d 1085, 1097-99 (N.H. 2017) (admitting historical cell site data analysis as lay witness testimony); State v. Johnson, 797 S.E.2d 557, 563 (W.Va. 2017); Pullin v. State, 534 S.E.2d 69, 71 (Ga. 2000); Wilson v. State, 195 S.W.3d 193, 200-02 (Tex. Crim. App. 2006) (allowing a Sprint employee to testify as an expert on historical cell site data analysis); contra Phillips v. State, 163 A.3d 230, 234

(Md. Ct. App. 2017) (noting trial court found the State failed to establish the FBI agent's drive tests were generally accepted in the relevant community).

Courts, however, have barred admission of expert testimony on historical cell site data analysis where the method used by a particular expert renders the testimony unreliable. See generally Omnipoint Commc'n. Enters., L.P. v. Zoning Hearing Bd., 331 F.3d 386, 399 (3rd Cir. 2003) (finding a lack of drive test data renders an expert's opinion on signal strength unsupported); United States v. Sepulveda, 115 F.3d 882, 891 (11th Cir. 1997) (finding the expert's testimony lacked precision and thus did not support the particular premise at issue).

This court has allowed expert testimony on drive testing in civil matters for the purpose of showing lackluster cell coverage in a municipality. N.Y. SMSA Ltd. v. Twp. of Mendham Zoning Bd. of Adjustment, 366 N.J. Super. 141, 150 (App. Div. 2004); N.Y. SMSA, L.P. v. Bd. of Adjustment, 370 N.J. Super. 319, 337 (App. Div. 2004); Sprint Spectrum, L.P. v. Zoning Bd. of Adjustment, 360 N.J. Super. 373, 379 (App. Div. 2003); Sprint Spectrum, L.P. v. Borough of Upper Saddle River Zoning Bd. of Adjustment, 352 N.J. Super. 575, 587-88 (App. Div. 2002). We have recognized that a cell phone company

performing a drive test "to determine the gap in coverage was accurate and accepted in the industry[.]" Sprint Spectrum, 360 N.J. Super. at 389.

The Seventh Circuit found that "[h]istorical cell-site analysis can show with sufficient reliability that a phone was in a general area, especially in a well-populated one. It shows the cell sites with which the person's cell phone connected, and the science is well understood." Hill, 818 F.3d at 298 (noting that the analysis "requires specialized training" which was satisfied by the FBI Special Agent in the matter, who had employed the method extensively). The court, however, made clear that historical cell site data analysis must be presented with caution:

> Our concern is that the jury may overestimate the quality of the information provided by this analysis. We therefore caution the government not to present historical cell-site evidence without clearly indicating the level of precision—or imprecision—with which that particular evidence pinpoints a person's location at a given time. The admission of historical cell-site evidence that overpromises on the technique's precision—or fails to account adequately for its potential flaws—may well be an abuse of discretion.
>
> [Id. at 299.]

Hauger adequately conveyed the limitations inherent in historical cell site data analysis, acknowledging its limitation of providing only a general area in which a cell phone could be located. Had this matter proceeded to trial,

defendant's counsel would have been free to explore through cross-examination the limitations of Hauger's analysis.

Our analysis also applies to the charts Hauger created to depict the intended pie-wedge shaped coverage area of the towers. Pie-shaped wedges are not intended to portray a cell tower sector's actual coverage area. Jones, 918 F. Supp. 2d at 5.

> [T]he size of the pie-shaped wedge is unimportant. The radius of the sides of the wedge, and thus the distance of the connecting arc from the cell tower, is not meant to convey the coverage area of the signal coming from that antenna. The wedge is drawn in simply to indicate the direction of the sector to which the phone connected. The signal from that antenna could extend less far or farther away from the cell tower than the length of the pie-shaped wedges. Thus, because [the FBI Special Agent] does not purport to portray the "coverage area" of any particular cell tower or antenna, he cannot be said to have used an unreliable methodology in doing so.
>
> [Ibid.]

Both experts agreed that pie-wedge charts generate a reliable estimation of the coverage area of a given cell tower sector. Although defendant rightly points out that the drive test reflected a coverage footprint that exceeded the 120-degree pie wedge in some places and contained gaps within the pie wedge in others, Hauger used the pie-wedge shaped areas solely as a starting point

before his drive test. Further, Hauger made the limitations inherent in pie-wedge charts clear throughout his testimony, acknowledging they are merely an estimation and starting point, not an actual footprint boundary. Had this matter proceeded to trial presumably those limitations would have been made known to the jury.

IV.

It is undisputed that a tower's footprint can shift over time due to changes in the surrounding environment. "[B]ecause radio waves extend out horizontally and then descend, coverage is affected by the surrounding topography . . . ." Sprint Spectrum, L.P., 360 N.J. Super. at 379. "While the proximity of the user is a significant factor in determining the cell tower with which the cell phone connects, it is not the only one . . . . [O]ther factors include . . . geography and topography . . . and 'environmental and geographical factors.'" Hill, 818 F.3d at 295-96 (quoting Aaron Blank, The Limitations and Admissibility of Using Historical Cellular Site Data to Track the Location of a Cellular Phone, 18 Rich. J.L. & Tech. 3, 5 (2011)). "[S]ignal strength may depend upon environmental and geographical factors, including the weather, topography, and level of urban development." Blank, 18 Rich. J.L. & Tech. at 3.

Hauger acknowledged that because he did not examine construction records or any other source of information he did not know whether any buildings or other structures were built or destroyed in or around Tower 3397 and Tower 41-2 in the twenty-two months between the shooting and his drive test. If there were buildings erected in those months, the coverage map for the towers, as measured during Hauger's drive test, could represent a smaller dominant signal range than existed at the time of the shooting. If buildings were destroyed during that period, Hauger's drive test coverage map might show a larger dominant signal range than existed at the time of the shooting.

Although we affirm the court's conclusion that a drive test is a generally accepted method of historical cell site data analysis, we conclude that Hauger's failure to investigate environmental changes in the area of the two towers in the twenty-two months between the shooting and the drive test render his opinion in this matter unreliable. Hauger's observation that he did not notice any new construction during the drive test is insufficient to render his drive test reliable. We therefore reverse the December 9, 2016 order to the extent that it permitted the admission of Hauger's testimony and the exhibits he created.

To the extent we have not specifically addressed any of defendant's remaining arguments it is because we conclude they lack sufficient merit to warrant discussion in a written opinion. R. 2:11-3(e)(2).

Affirmed in part, reversed in part, and remanded for proceedings consistent with this opinion. We do not retain jurisdiction.

I hereby certify that the foregoing is a true copy of the original on file in my office.

CLERK OF THE APPELLATE DIVISION