SAMPLE SLIP AND FALL ON SNOW AND ICE

FORENSIC WEATHER CONSULTANTS, LLC

1971 Western Avenue, #200
Albany, New York 12203
518-862-1800 (P)
Www.WeatherConsultants.Com

FORENSIC WEATHER INVESTIGATION OF THE WEATHER AND GROUND CONDITIONS FOR THE PERIOD DECEMBER 16-18, 2013 AT 110 MAIN STREET IN QUEENS, NEW YORK

May 8, 2015

CASE NAME:	"XXXXXXXXXXXX"
DATE AND TIME OF INCIDENT:	December 18, 2013 at 3:30 a.m. EST
PREPARED FOR:	Mr. XXXXXX, Esquire
COMPANY:	XXXXX, LLP.

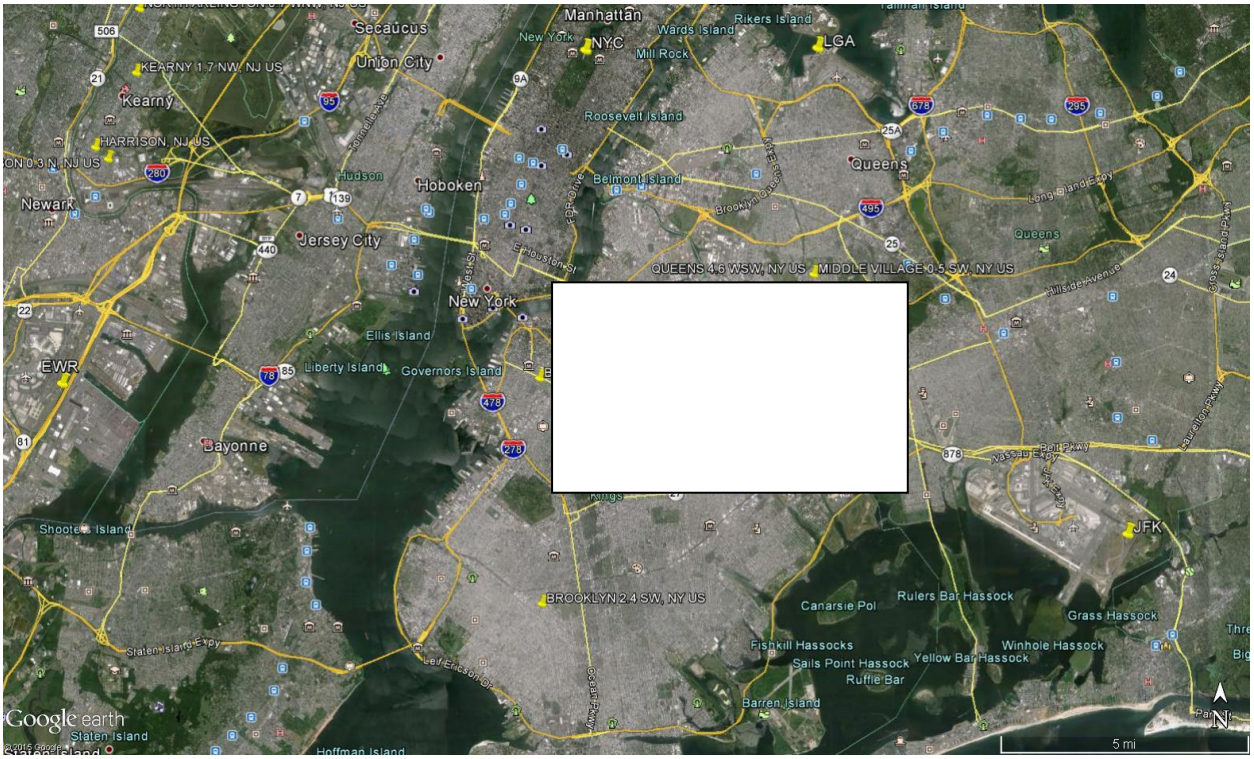
ASSIGNMENT:

This case was assigned to me by XXXXXXX, LLP. I was asked to perform an in-depth weather analysis and forensic weather investigation at 110 Main Street in Queens, New York in order to determine what the weather conditions were leading up to and including the time of this incident.

This written report and all of the tables, graphs, findings and opinions contained in it has been prepared for use with this specific case only. Use of this information for any other matter other than what is indicated above is prohibited.

METHODOLOGY:

Forensic Weather Consultants, LLC uses only the most trusted and reliable sources of weather information that can be certified by the federal government. In order to accurately determine the weather conditions that existed leading up to and including the time of the incident, a detailed search was performed to find the closest, official weather stations to the incident location. Using the computer program "Google Earth", weather station locations provided by the National Climatic Data Center were plotted and are indicated by a yellow pushpin. The incident location was plotted by our office and is indicated by a red pushpin. These maps will help give you an approximate location of the weather stations we used in this study and their proximity to the incident location.



In order to perform my analysis of the weather conditions that existed, I obtained and reviewed official copies of the following weather records (the distance from the incident location and each weather station is also provided):

a. National Weather Service Hourly Surface Weather Observations/Quality Controlled Local Climatological Data (QCLCD) from the Central Park Observatory in New York, New York (approximately 5.3 miles north-northwest of the incident location).

b. National Weather Service Hourly Surface Weather Observations/Quality Controlled Local Climatological Data (QCLCD) from the Newark Liberty International Airport in Newark, New Jersey (approximately 11.0 miles west-southwest of the incident location).

c. National Weather Service Hourly Surface Weather Observations/Quality Controlled Local Climatological Data (QCLCD) from the John F. Kennedy International Airport in Queens, New York (approximately 11.3 miles east-southeast of the incident location).

d. 5-Minute Surface Observations from the Central Park Observatory in New York, New York.

e. 5-Minute Surface Observations from the Newark Liberty International Airport in Newark, New Jersey

f. 5-Minute Surface Observations from the John F. Kennedy International Airport in Queens, New York.

g. Cooperative observer weather station reports from Brooklyn 3.1 NW, New York (approximately 1.8 miles southwest of the incident location).

h. Cooperative observer weather station reports from Queens 4.6 WSW, New York/Middle Village 0.5 SW, New York (approximately 4.3 miles east-northeast of the incident location).

i. The publication entitled "Local Climatological Data" for the Central Park Observatory in New York, New York (approximately 5.3 miles north-northwest of the incident location).

j. The publication entitled "Local Climatological Data" for the Newark Liberty International Airport in Newark, New Jersey (approximately 11.0 miles west-southwest of the incident location).

k. The publication entitled "Local Climatological Data" for the John F. Kennedy International Airport in Queens, New York (approximately 11.3 miles east-southeast of the incident location).

l. The publication entitled "Storm Data" for New York in December 2013.

m. Super-resolution Reflectivity Doppler Radar images from the Upton, New York radar site that were zoomed in over the incident location.

n. Various weather bulletins, advisories and statements that were issued by the National Weather Service in Upton, New York.

o. Astronomical Data from Queens, New York on December 17, 2013 and December 18, 2013.

The weather data and Climatological records used for this analysis are the official records that Meteorologists rely upon every day during the normal course of business and are either kept in our office or at the National Climatic Data Center. The findings in this report utilize the weather records that were available at the time of data retrieval for this case. Any additional weather records and data that become available at a later date may be incorporated into this report in the future.

<u>In addition to the weather records and climatological data listed above, I also reviewed the following information that was provided to me</u>:

- Examination Before Trial (EBT) of xxxx

Super-resolution Doppler radar images and several other types of weather records were used in this study. Doppler radar images are useful for locating precipitation. As the radar unit sends a pulse of energy into the atmosphere and if any precipitation is intercepted by the energy, part of the energy is scattered back to the radar. These return signals, called "radar echoes", are assembled to produce radar images. The location of the colored radar echoes indicates where precipitation is falling and the various colors indicate the intensity of the precipitation through the color code key on the right side of the radar image itself. Doppler radar images are received

approximately every 6 minutes and can determine if precipitation was falling at the incident location and if so, when it started and stopped.

It should be noted that the radar image date and time stamps that are given on the Doppler radar images are given in "GMT", which is Greenwich Mean Time. In order to convert "GMT" to Eastern Standard Time (EST), a subtraction of 5 hours is necessary.

ANALYSIS:

The following table is a summary of the daily weather and ground conditions day by day at the location of the incident. This summary includes the date, the Maximum temperature for the 24 hour period (in Fahrenheit), the Minimum temperature for the 24 hour period (in Fahrenheit), the Liquid-Equivalent precipitation total for the 24 hour period (in inches), the amount of snow and sleet that fell during the 24 hour period (in inches) and the snow and ice depth that was present on the ground at 7:00 a.m. EST (in inches). It should be noted that any snow and/or ice measurements, including the snow and/or ice depth on the ground, are taken in exposed, untreated and undisturbed areas away from any objects that may act to distort the true measurement.

Please note that the Liquid Equivalent Precipitation/Rain column indicates the total liquid amount of melted snow and ice and/or the amount of rain that accumulated.

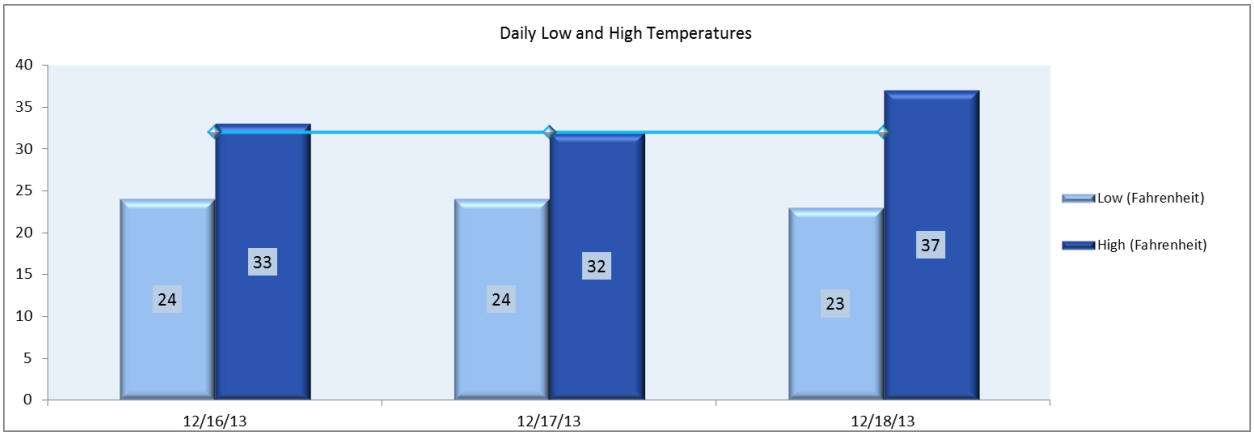
DECEMBER 2013

Date	Maximum Air Temperature	Minimum Air Temperature	Liquid Equivalent Precipitation/Rain	Snow/Sleet	Snow/Ice On Ground
12/16	33	24	0.00"	0.0"	1.0"
12/17	32	24	0.19"	1.9" + Ice	1.0"
12/18	37	23	0.00"	0.0"	2.0"

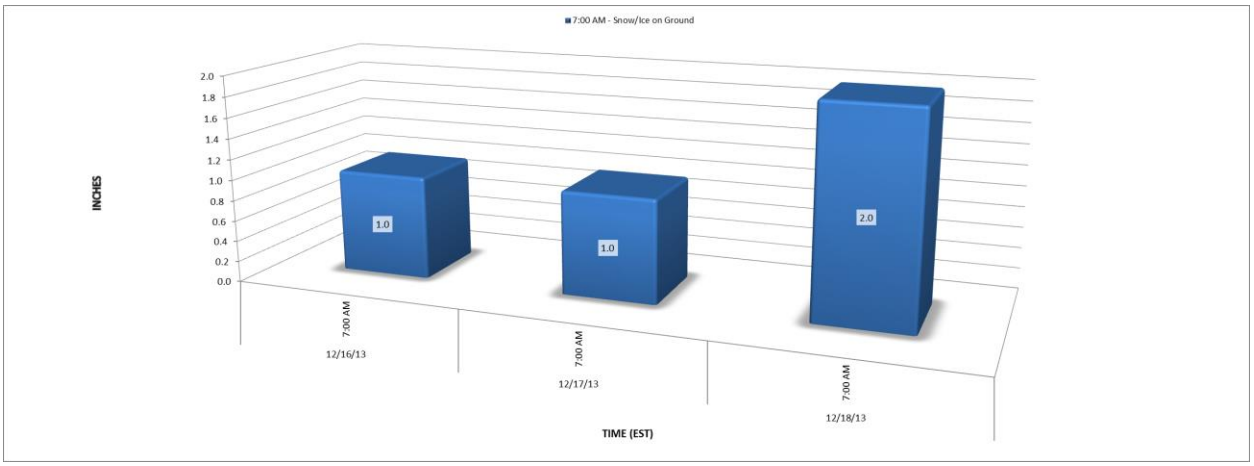
It should be noted that the table above reflects the snowfall amounts as well as the snow and ice depth on exposed, untreated and undisturbed surfaces.

A winter storm caused approximately 4.9" of snow to fall on December 14th, 2013, with additional precipitation also falling on December 15th, 2013.

DAILY TEMPERATURE



SNOW AND ICE ON GROUND



Melting and refreezing processes occurred on December 16th and 18th, 2013and these processes caused new areas of ice to form in addition to the snow and ice that was already on the ground from the original storm(s). With air temperatures already above freezing at the start of the day, some of the snow and ice that was present melted and caused areas of standing water, puddles, runoff and wet surfaces to accumulate. This was especially the case on any depressions, low lying areas or surfaces adjacent to any snow or ice that was pushed, plowed or shoveled into piles following earlier storms. Direct sunshine and the resultant incoming solar radiation sometimes causes melting to occur even when the air temperature is below freezing. As the air temperature dropped below freezing, or as the sun began to get lower in the horizon about one hour before sunset (with air temperatures already below freezing), these areas of standing water and runoff refroze to ice on exposed, untreated and undisturbed surfaces. The result is a presence of snow and/or ice from the original storm(s) with additional areas of ice present from the melting and re-freezing processes.

DECEMBER 17, 2013 (DAY BEFORE THE INCIDENT)

On December 17, 2013 (day before the incident), Doppler radar images that were zoomed in over the incident location and nearby surface observations indicated that occasional light to at times moderate snow fell from approximately 5:00 a.m. through 1:00-1:30 p.m. During this time, the snow was mixing with sleet from approximately 10:54 a.m. through 11:18 a.m. Occasional light freezing rain or freezing drizzle (which was mixing with light snow and/or sleet at times) fell from approximately 1:00-1:30 p.m. through 3:45 p.m. Light snow fell from approximately 3:45 p.m. through 4:43 p.m. After a lull in the precipitation, light snow fell from approximately 5:23 p.m. through 5:41 p.m. Approximately 1.9" of snow and less than 1/10th of an inch of ice/glaze accumulated on December 17th, 2013.

According to the National Weather Service in Upton, New York, the following snowfall report was received on December 17th, 2013:

- Greenpoint, New York – 1.9" at 4:30 p.m.

According to the National Weather Service, "Freezing Rain" is defined as "Rain that falls as a liquid but freezes into glaze upon contact with the ground." This creates very slippery and treacherous ground surfaces.

The National Weather Service in Upton, New York issued a "Winter Weather Advisory" that was in effect from 3:29 a.m. through 7:00 p.m. on December 17th, 2013.

New ice formed as a result of freezing rain or freezing drizzle, which fell from approximately 1:00-1:30 p.m. through 3:45 p.m. on December 17th, 2013.

TEMPERATURE ANALYSIS FOR DECEMBER 17, 2013

On December 17th, 2013, the maximum air temperature was 32 degrees Fahrenheit and the minimum air temperature was 24 degrees Fahrenheit. The air temperature was below freezing for the entire day.

DECEMBER 18, 2013 (DAY OF THE INCIDENT)

On December 18th, 2013 (day of the incident), Doppler radar images that were zoomed in over the incident location and nearby surface observations indicated that no precipitation fell.

At 8:30 a.m. on December 18th, 2013 (time and date of the incident), the sky was mostly sunny, the air temperature was 26 degrees Fahrenheit and approximately 2.0" of pre-existing snow and ice was present on exposed, untreated and undisturbed surfaces.

A melting and refreezing process occurred on December 18th, 2013 (day of the incident). As air temperatures rose above freezing from approximately 11:15 a.m. through 7:00-8:00 p.m. on December 18th, 2013, some of the snow and ice that was present melted, and areas of standing water, puddles, runoff and wet surfaces developed in some locations. This was especially the

case on any depressions, low lying areas or surfaces adjacent to any snow or ice that was pushed, plowed or shoveled into piles following earlier storms. As the air temperature dropped below freezing from approximately 7:00-8:00 p.m. through Midnight on December 18th, 2013, these areas of standing water and runoff refroze to ice on exposed, untreated and undisturbed surfaces. New ice formed from approximately 7:00-8:00 p.m. through 9:00-10:00 p.m. on December 18th, 2013 (day of the incident).

TEMPERATURE ANALYSIS FOR DECEMBER 18, 2013

On December 18th, 2013, the maximum air temperature was 37 degrees Fahrenheit and the minimum air temperature was 23 degrees Fahrenheit.

The air temperature was below freezing from Midnight through approximately 11:15 a.m. The air temperature rose above freezing from approximately 11:15 a.m. through 7:00-8:00 p.m. The air temperature dropped back below freezing from approximately 7:00-8:00 p.m. through Midnight.

REVIEW OF ICE TREATMENT CHEMICALS AND ABRASIVES

According to the publication "Snow and Ice Control Operations for Local Highway Officials" that was published by the "Cornell Local Roads Program", there are a wide variety of materials used for snow and ice control[1]. They are generally separated into two categories: Chemicals and Abrasives. Abrasives include natural sand, finely crushed rock or gravel, bottom ash, slag, ore tailings and cinders. In order to maximize their effect, abrasives must stick to the ice surface. The article further states, "All ice control chemicals work the same way. They depress the freezing point of water and melt ice. Up to limits unique for each chemical, as solution concentration increases, the freezing point decreases." Below is a list of ice control chemicals and the pavement surface temperature they are effective to:

NaCl (Road Salt) - Solid:	15° F
NaCl (Road Salt) - Liquid:	23° F
MgCl2 (Magnesium Chloride) - Solid:	0° F
MgCl2 (Magnesium Chloride) - Liquid:	10° F
CaCl2 (Calcium Chloride) - Solid:	-20° F
CaCl2 (Calcium Chloride) - Liquid:	0° F

CONCLUSIONS

In conclusion, it is my opinion that:

- At 7:00 a.m. on December 16th and 17th, 2013, approximately 1.0" of snow and ice was present on exposed, untreated and undisturbed surfaces.

[1] http://www.clrp.cornell.edu/library/manuals/snow_and_ice_control.pdf

- A winter storm caused a wintry mix of snow, sleet, freezing rain and freezing drizzle to fall, with some occasional lulls, from approximately 5:00 a.m. through 5:41 p.m. on December 17th, 2013 (day before the incident).
- Approximately 1.9" of snow and a light glaze of ice less than 1/10th of an inch thick accumulated on December 17th, 2013 (day before the incident).
- The last time new ice formed before the time of the incident was from approximately 1:00-1:30 p.m. through 3:45 p.m. on December 17th, 2013 as a result of freezing rain or freezing drizzle.
- No precipitation fell from approximately 5:41 p.m. on December 17th, 2013 through and beyond the time of the incident on December 18th, 2013 (for approximately 15 hours before the time of the incident).
- At 8:30 a.m. on December 18th, 2013 (time and date of the incident), the sky was mostly sunny, the air temperature was 26 degrees Fahrenheit and approximately 2.0" of pre-existing snow and ice was present on exposed, untreated and undisturbed surfaces.

CERTIFICATION

I certify that the above information contained in this report is true and accurate to the best of my ability and that all of my opinions, findings, estimations and interpolations expressed in this report were made with accuracy as a professional meteorologist within a reasonable degree of meteorological certainty.