STATEMENT OF CARL T. JONES, JR., P.E.
IN SUPPORT OF A
REQUEST FOR SPECIAL TEMPORARY AUTHORITY
FOR A CONVENTIONAL EXPERIMENTAL RADIO STATION

Applicant: MegaWave Corporation

I am a Consulting Engineer and president of Carl T. Jones Corporation, with offices located in Springfield, Virginia. My education and experience are a matter of record with the Federal Communications Commission. I am a Registered Professional Engineer in the Commonwealth of Virginia, Registration No. 013391.

General

This office has been authorized by MegaWave Corporation ("MegaWave") to prepare this engineering statement in support of a Request for Special Temporary Authority ("STA") to construct and operate a conventional experimental radio station for the purpose of antenna research and development.[1] The antenna to be used for the experimental station will be a crossed dipole antenna that will be laid on the surface of the ground. The two elements of the crossed dipole antenna will be excited with an unmodulated continuous wave ("CW") signal in a manner that will produce an approximate omnidirectional radiation pattern.

[1] Two sites are proposed for the experimental station, the primary site will be in Devens, Massachusetts and a secondary site is proposed in Lancaster, Massachusetts. Only one site will be operational at any given time.

7901 Yarnwood Court
Springfield, VA 22153-2899
tel: (703) 569-7704
fax: (703) 569-6417
email: info@ctjc.com
www.ctjc.com

It is proposed to operate the experimental station on selected frequencies in the AM broadcast band to determine the field radiated by the antenna in the lower, middle, and upper portions of the band. Based on allocation studies performed by this office, three frequencies have been selected that will result in the lowest probability of interference to existing co-channel and adjacent channel stations. The three selected frequencies are: 780 kHz, 1180 kHz, and 1680 kHz. The experimental station will only be operated during daytime hours between local sunrise and local sunset; therefore, only daytime allocation and interference studies were performed to select the three proposed operating frequencies.

The duration of the experiment will be less than six months and therefore the instant STA Request is being filed instead of an application for Experimental License in accordance with 47 C.F.R.5.54(a)(2) and 47 C.F.R.5.61 of the FCC's Rules and Regulations. A more detailed discussion of the proposed experimental station and the daytime allocation study is contained in the paragraphs below.

Primary Purpose for the Experimental Station

The primary purpose for the proposed experimental station is to verify the radiated field from a crossed dipole antenna as a function of frequency across the AM Broadcast Band. This will be accomplished by performing field strength measurements along radial paths extending from the selected primary and secondary test sites.

Description of Technical Facilities

The proposed transmission system will consist of: a crossed dipole antenna and the associated balun(s); a precision signal source; a Rhode and Schwarz linear power amplifier; and a quadrature hybrid/impedance matching circuit. The crossed dipole antenna will actually consist of two separate horizontal dipole antennas laid on the surface of the ground oriented 90 degrees with respect to each other. Each dipole element will consist of a copper wire contained within an outer dielectric jacket. Nominal equal powers with a relative phase of 90 degrees will be applied to the two horizontal dipoles to result in an approximate omnidirectional horizontal plane radiation pattern. The antenna will radiate a vertically polarized signal.

The radiation efficiency of the proposed crossed dipole antenna, when compared to a conventional vertical monopole antenna or a dipole antenna, is expected to be quite low. Based on computer modeling using the Numerical Electromagnetics Code ("NEC"), the maximum field efficiency is expected to be 18.5 mV/m at one kilometer per kilowatt. The maximum proposed antenna input power for the experimental station is 250 watts (125 Watts input to each of two dipole antennas). Therefore, the inverse distance field for this antenna is expected to be 9.25 mV/m at one kilometer.

In order to generate the required 250 Watts of RF input power to the antenna, it is proposed to use a Rhode and Schwarz Model BBA100 linear power amplifier in combination with a precision signal source.

Location of Experimental Station

Two separate test locations have been identified to evaluate the performance of the crossed dipole antenna. The primary test location will be a plot of land adjacent to MegaWave's office and laboratory facilities in Devens, Massachusetts. The coordinates (NAD83) for this primary test site are N42 32 19, W71 37 20. A secondary test site has also been identified in Lancaster, Massachusetts. The coordinates for the secondary test site are N42 29 39, W71 40 52. The two test locations are approximately 6.9 kilometers apart. A single antenna and transmitter system will be employed so that only one test site will be active at any given time.

Hours of Operation

The hours of operation of the proposed Experimental Radio Station will be limited to daytime hours only between local sunrise and local sunset at the test locations.

Daytime Allocation Study and Selected Operating Frequencies

A daytime allocation study was performed for the two test sites described above in order to identify frequencies that would result in no predicted interference to other co-channel and adjacent channel AM stations. In addition, it was important to locate at least one frequency in the lower, middle, and upper portions of the AM frequency band. Based on the allocation study, three frequencies were identified that meet the above criteria. The three selected frequencies are: 780 kHz, 1180 kHz, and 1680 kHz.

In the allocation study every frequency in the AM band was evaluated for use by the proposed experimental station. Only those frequencies that resulted in no predicted overlap of the experimental station's interfering contour and an existing AM station's protected contour, as defined in the FCC's Rules and Regulations, were selected for use. Predicted received interference to the experimental station was allowed in the frequency selection process otherwise no low and middle band frequencies would be available for use. Further, based on experience in this area of Massachusetts, the actual soil conductivity values during the summer months when testing is planned are expected to be considerably lower than the FCC's soil map values on which the study was based; therefore, there is likely to be no actual received interference to the experimental station. Finally, should there be interference received from other licensed Broadcast Stations, techniques can be employed in performing the planned field strength measurements to mitigate to a large degree the impact of an undesired co-channel or adjacent channel signal.

The maps of Figures 1, 2, and 3 show the predicted protected and interfering signal contours of the primary experimental station (Devens, MA) and other pertinent co-channel and adjacent channel stations on the selected frequencies of 780 kHz, 1180 kHz, and 1680 kHz, respectively. Based on the contour locations depicted on the maps, there is predicted to be no overlap of the proposed experimental station's interfering contours with the protected contours of any co-channel or adjacent channel station on any of the three selected frequencies. The maps of Figures 4, 5 and 6 show the same contours for the selected secondary test site (Lancaster, MA). Again, for this test site,

there is predicted to be no overlap of the proposed experimental station's interfering contours with the protected contours of any co-channel or adjacent channel station. Based on the fact that there is no predicted prohibited contour overlap, it is believed that the probability that the proposed experimental station would cause harmful interference to the protected service area of an existing AM station is extremely low. Further, it is believed that because the operation of the experimental station will be during the summer and early fall months, lower soil conductivity values during this time of the year will further reduce the probability of interference.

Compliance with Radiofrequency Energy Guidelines

MegaWave personnel will be present at all times when the crossed dipole antenna is energized to ensure test personnel and the general public are restricted from any area in the immediate vicinity of the antenna where fields are predicted to be above the maximum permissible exposure level. Further, appropriate signage will be employed at the periphery of the antenna to warn of the potential for high levels of radio frequency energy. Should it be deemed necessary to employ a further means of restricting access, the area surrounding the antenna will be roped off so there can be no inadvertent access to areas where the fields exceed the maximum permissible exposure level.

Summary

It is proposed to construct and operate an experimental station to verify the field radiated by a crossed dipole antenna laid on the surface of the ground. It is proposed to perform testing at two separate test sites and on three frequencies selected in the AM Broadcast Band. Allocation and interference studies performed by this office, verified that operation of the experimental station is predicted to cause no harmful interference to any other AM Broadcast Station. It is therefore respectfully requested that MegaWave Corporation be granted Special Temporary Authority to construct and operate the proposed experimental station, as described herein, for a period not to exceed six months.

This engineering statement and the associated figures were prepared by me or under my direct supervision and the information contained herein is believed to be true and correct.

DATED: May 8, 2014

7901 Yarnwood Court
Springfield, VA 22153-2899
tel: (703) 569-7704
fax: (703) 569-6417
email: info@ctjc.com
www.ctjc.com

MegaWave Experimental Station - Devens, MA Site - 780 KHz

M780 Devens MA
MegaWave Project
Freq: 780 kHz
Class: B
Latitude: 42-32-18.70 N
Longitude: 071-37-20 W
Power: 250 watts
RMS Equiv 9.26 mV/m @1km
Crossed - Dipole

WNNW
LAWRENCE, MA
Freq: 800 kHz
Class: B
Latitude: 42-40-26 N
Longitude: 071-11-26 W
Power: 3 kW
RMS: 286.46 mV/m @1km
Towers: 1

WVNE
LEICESTER, MA
Freq: 760 kHz
Class: D
Latitude: 42-14-57 N
Longitude: 072-04-41 W
Power: 25 kW
RMS: 291.29 mV/m @1km
Towers: 1

WPRV
PROVIDENCE, MA
Freq: 790 kHz
Class: B
Latitude: 41-50-03 N
Longitude: 071-21-56 W
Power: 5 kW
RMS: 311.57 mV/m @1km
Towers: 1

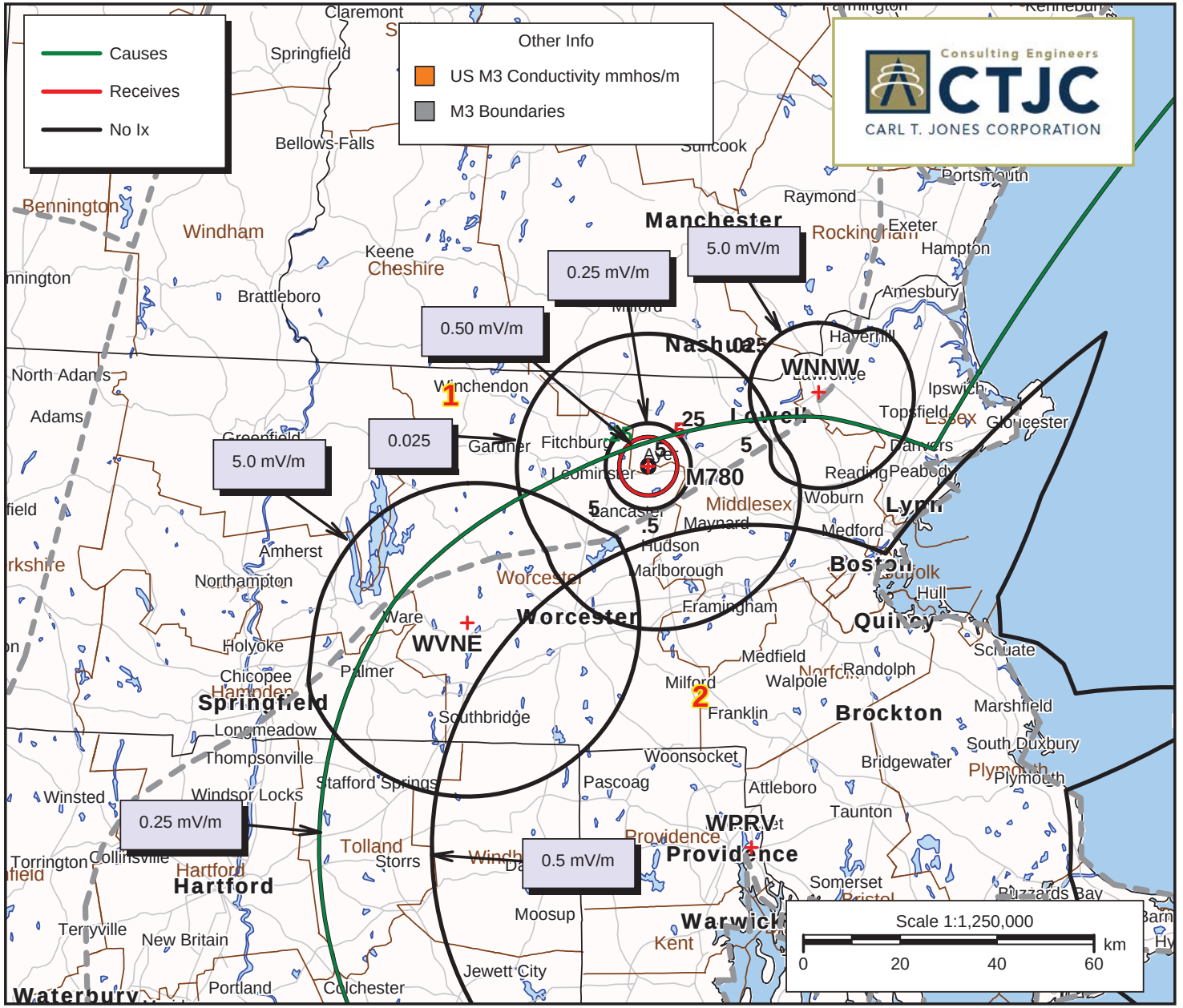

Figure 1

MegaWave Experimental Station - Devens, MA Site - 1180 KHz

M1180
MegaWave Project
Freq: 1180 kHz
Class: B
Latitude: 42-32-18.70 N
Longitude: 071-37-20 W
Power: 250 watts
RMS: Equivalent 9.26 @ 1 km
Crossed Dipole

WWRX
Hope Valley, RI
Freq: 1180 kHz
Class: D
Latitude: 41-31-36 N
Longitude: 071-44-35 W
Power: 1.8 kW
RMS: 305.8 mV/m @1km
Towers: 1

WXKS
Newton, MA
Freq: 1200 kHz
Class: B
Latitude: 42-17-20 N
Longitude: 071-11-21 W
Power: 50 kW
RMS: 2192 mV/m @1km
Towers: 4

WWDJ
Boston, MA
Freq: 1150 kHz
Class: B
Latitude: 42-24-48 N
Longitude: 071-12-40 W
Power: 5 kW
RMS: 772.49 mV/m @1km
Towers: 3
Augs: 7

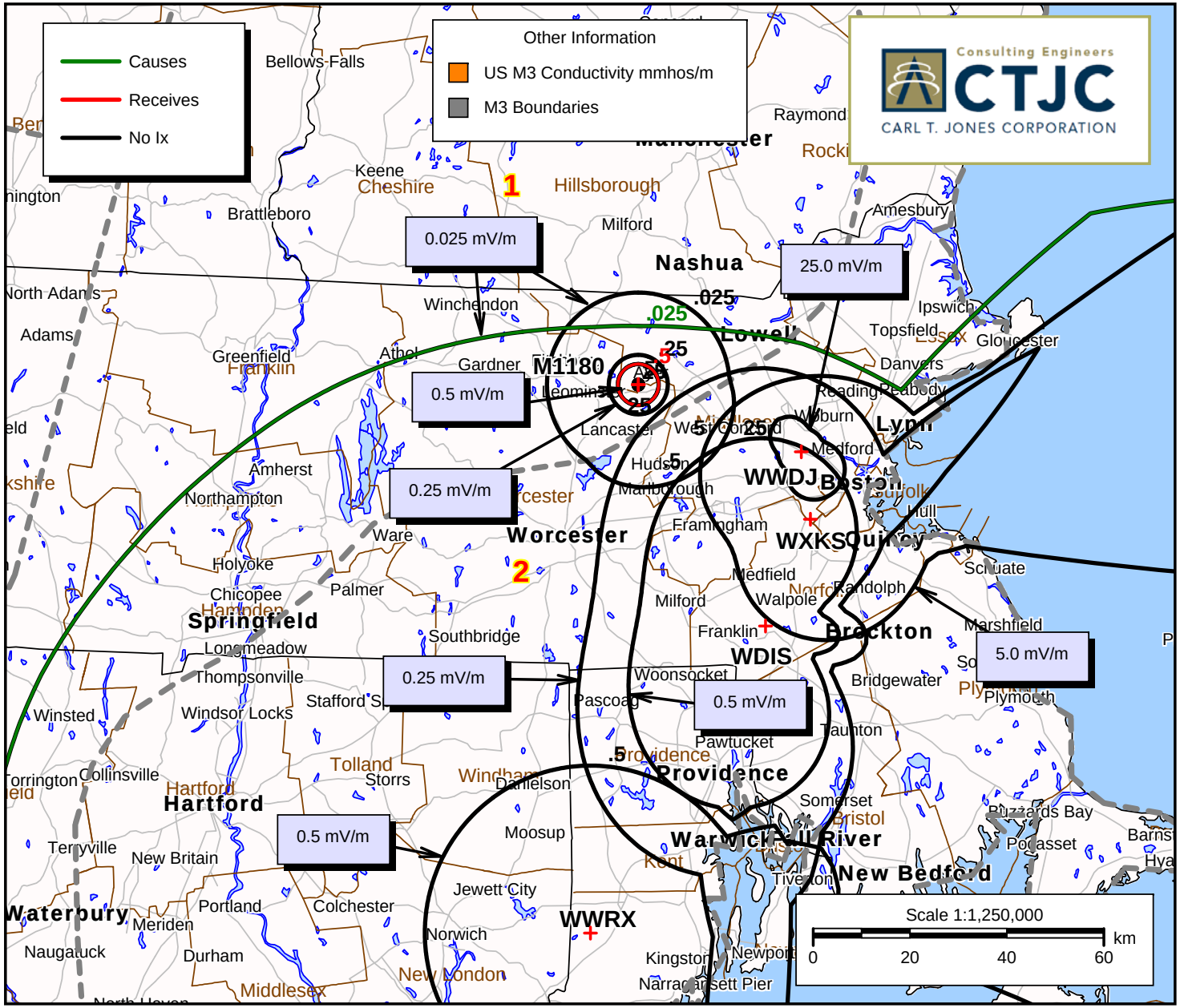

Figure 2

MegaWave Experimental Station - Devens Site - 1680 KHz

M1680
MegaWave Project
Freq: 1680 kHz
Class: B
Latitude: 42-32-18.70 N
Longitude: 071-37-20 W
Power: 250 watts Input
RMS: Equiv 9.26 mV/m @1km
Crossed Dipole

WTTM
Lindenwold, NJ
Freq: 1680 kHz
Class: B
Latitude: 39-53-15.60 N
Longitude: 075-00-05.40 W
Power: 10 kW
RMS: 282 mV/m @1km
Towers: 1

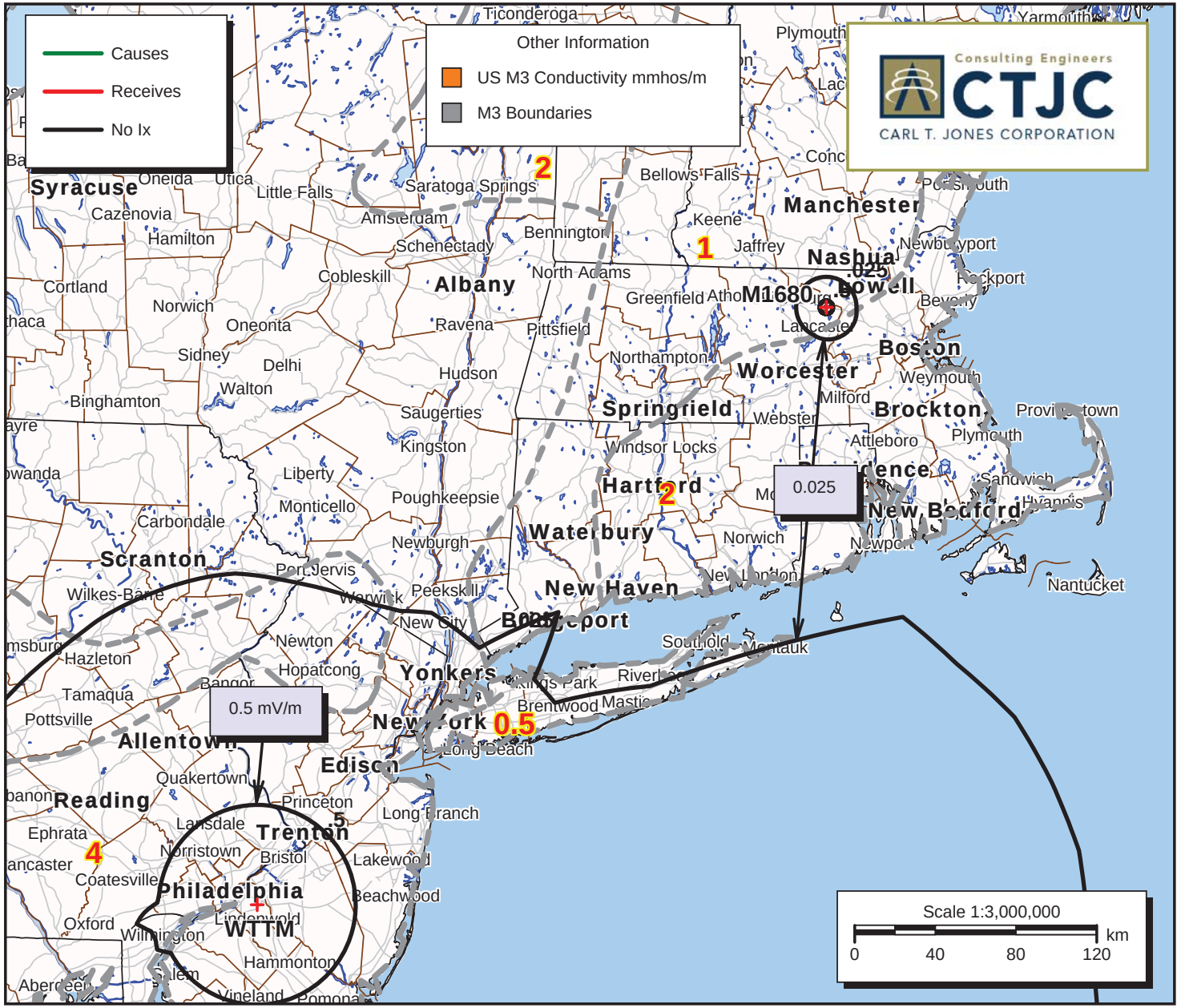

Figure 3

MegaWave Experimental Station - Lancaster, MA Site - 780 KHz

M780 Devens MA
MegaWave Project
Freq: 780 kHz
Class: B
Latitude: 42-29-38.50 N
Longitude: 071-40-51.50 W
Power: 250 watts
RMS Equiv 9.26 mV/m @1km
Crossed - Dipole

WNNW
LAWRENCE, MA
Freq: 800 kHz
Class: B
Latitude: 42-40-26 N
Longitude: 071-11-26 W
Power: 3 kW
RMS: 286.46 mV/m @1km
Towers: 1

WVNE
LEICESTER, MA
Freq: 760 kHz
Class: D
Latitude: 42-14-57 N
Longitude: 072-04-41 W
Power: 25 kW
RMS: 291.29 mV/m @1km
Towers: 1

WPRV
PROVIDENCE, MA
Freq: 790 kHz
Class: B
Latitude: 41-50-03 N
Longitude: 071-21-56 W
Power: 5 kW
RMS: 311.57 mV/m @1km
Towers: 1

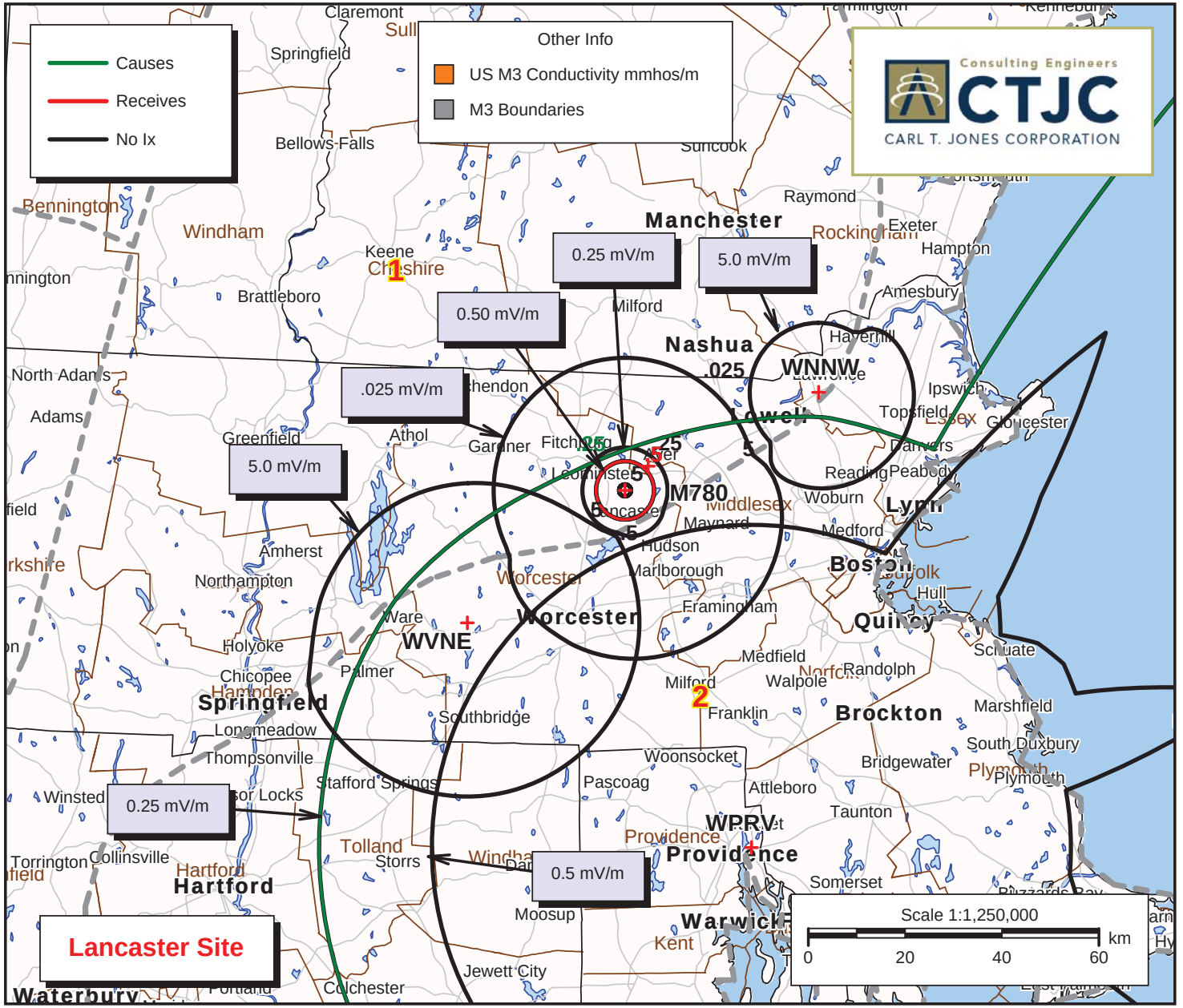

Figure 4

MegaWave Experimental Station - Lancaster, MA Site - 1180 KHz

M1180
MegaWave Project
Freq: 1180 kHz
Class: B
Latitude: 42-29-38.50 N
Longitude: 071-40-51.50 W
Power: 250 watts
RMS: Equivalent 9.26 @ 1 km
Crossed Dipole

WWRX
Hope Valley, RI
Freq: 1180 kHz
Class: D
Latitude: 41-31-36 N
Longitude: 071-44-35 W
Power: 1.8 kW
RMS: 305.8 mV/m @1km
Towers: 1

WXKS
Newton, MA
Freq: 1200 kHz
Class: B
Latitude: 42-17-20 N
Longitude: 071-11-21 W
Power: 50 kW
RMS: 2192 mV/m @1km
Towers: 4

WWDJ
Boston, MA
Freq: 1150 kHz
Class: B
Latitude: 42-24-48 N
Longitude: 071-12-40 W
Power: 5 kW
RMS: 772.49 mV/m @1km
Towers: 3
Augs: 7

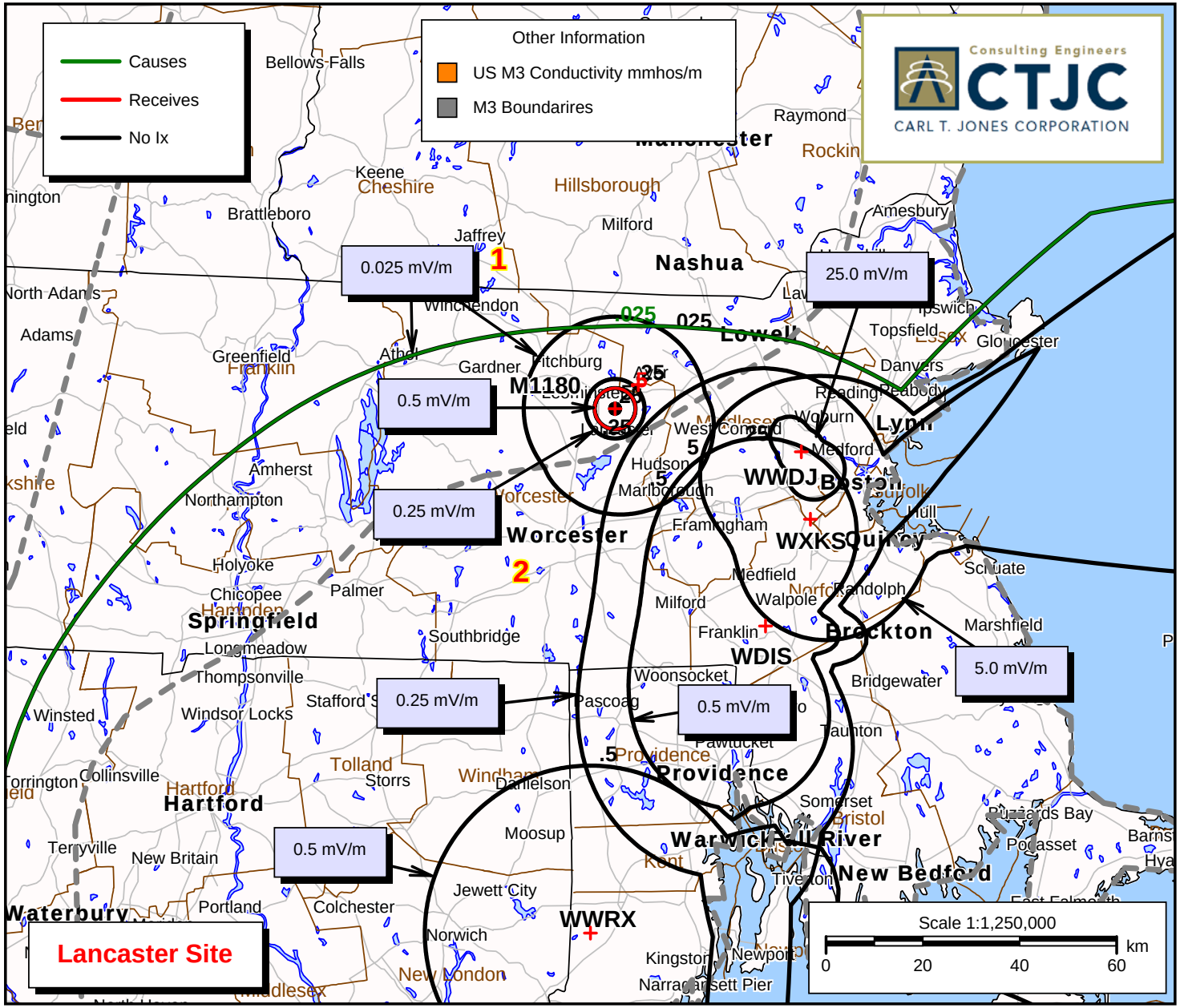

Figure 5

MegaWave Experimental Station - Lancaster, MA Site - 1680 KHz

M1680
MegaWave Project
Freq: 1680 kHz
Class: B
Latitude: 42-29-38.50 N
Longitude: 071-40-51.50 W
Power: 250 watts Input
RMS: Equiv 9.26 mV/m @1km
Crossed Dipole

WTTM
Lindenwold, NJ
Freq: 1680 kHz
Class: B
Latitude: 39-53-15.60 N
Longitude: 075-00-05.40 W
Power: 10 kW
RMS: 282 mV/m @1km
Towers: 1

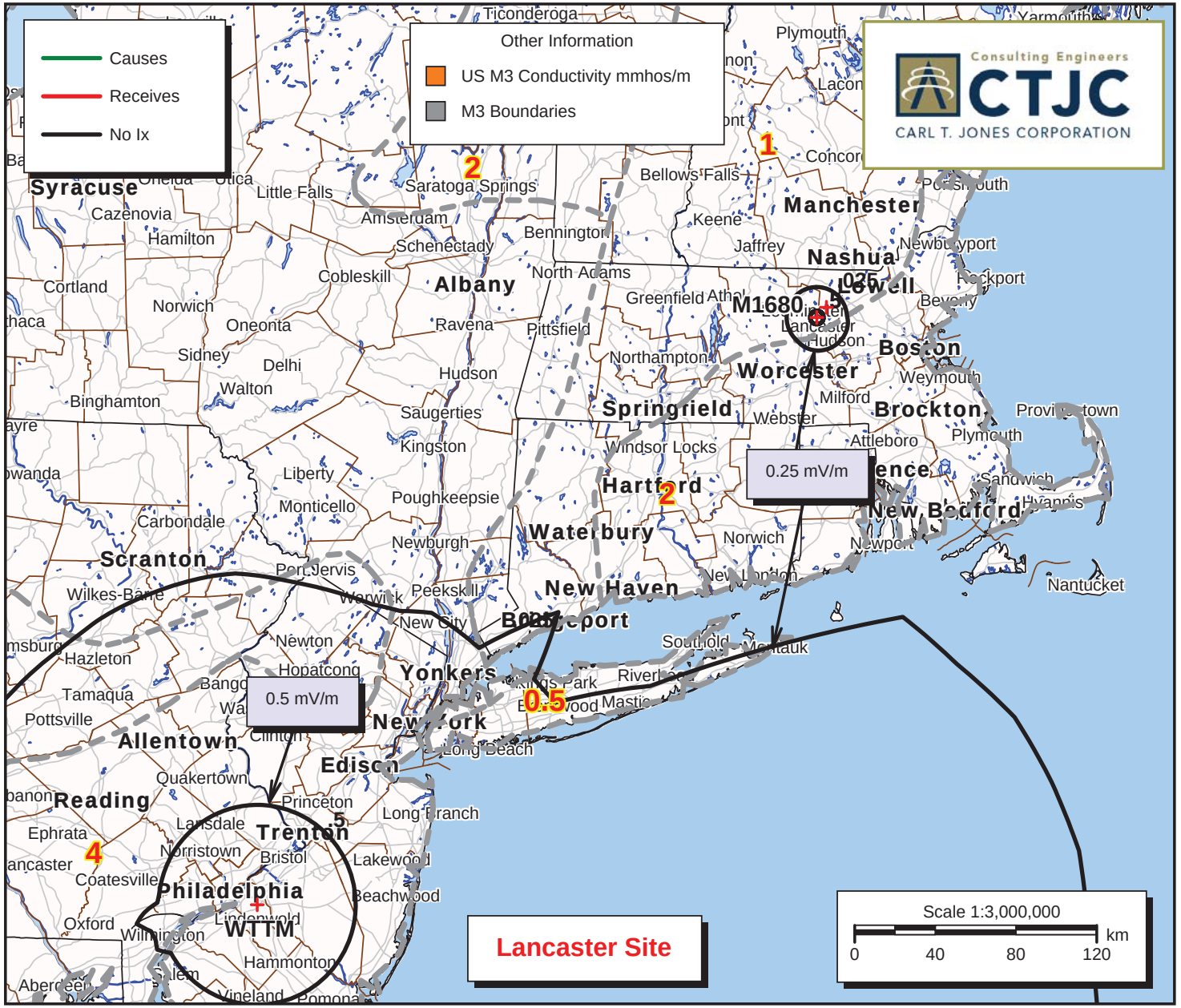

Figure 6