



Siren Test at City of Brandon, Canada

July 2003

**Prepared for:
City of Brandon
Manitoba, Canada**

**Prepared by:
Acoustic Technology, Inc. (ATI)
East Boston, Massachusetts**

* This document is submitted in connection with a proposal of Acoustic Technology, Inc. (ATI) and is the property of and contains proprietary information of ATI that is submitted with the understanding, to which the recipient agrees, that its contents or any part of them shall not be duplicated or disclosed to third parties. Nor will the propriety information herein be used to or for any other purpose except review, without the prior written consent of ATI having been obtained in each instance. If this proposal does not result in a contract, ATI reserves the right to request that this document be returned to our offices. 'Propriety information' means information not previously known to the recipient so long as not generally and properly available to the public.

City of Brandon

SIREN TEST AT CITY OF BRANDON, CANADA

Three (3) siren sound tests have been conducted in the City of Brandon. The dates, meteorological conditions and test parameters are set for PA and tone as discussed hereafter. The siren under test is ATI's 1600 Watt Omni-Directional High Powered Speaker Station Model HPSS16. Mounted on the top of the pole siren is a strobe light (See Figure 1). Therefore, we can assume that the strobe light is located at a height of 50 feet above ground.

Test 1

Date: June 9, 2003

Time: 11:30AM

Relative humidity: 92% steady rain

Temperature: 11° Celsius

Wind Speed: 18 gusting to 27 km/hr

Wind direction: North East

Tone: 3 minute steady high pitch

P.A. Test Message: "This has been a test of the Brandon Emergency Alerting Project. The test has been successful (Repeated twice) Total activation time approximately 4 minutes.

During Test 1, at all measurement locations, volunteers indicate that the strobe light was not visible except at for location D1 which has a clear line of sight of the strobe. This indicates that there are intervening obstructions between the observer, and the strobe light. Obstructions are tall trees that have full foliage, house structures and changing topography. These factors can attenuate the sound from the siren. Also, these factors can degrade the quality of the PA. All measurements were at a distance between 2000 to 5000 feet from the siren and they indicate that the PA was not heard. This is due to the fact that all measurements locations are near high noise traffic which results in a significant masking effect on the PA intelligibility. Also, noise from steady rain

interacting with ground objects was an import factor. Noise from construction activities also affects the PA audibility. The correlation between the predicted siren contours and siren measurements is shown in Figure 2.

Tone Alert Receiver Test: The receiver was located in the Security Office at the Brandon Regional Health Centre on Van Horne Ave. East. The radio signals were heard and the voice announcement was clear. The same announcement did not interfere with the BRHC Security radios. There was some static but the announcement did not come over the Security's radios.

Test 2

Date: June 20, 2003

Time: 1:30PM

Relative humidity: 47%

Temperature: 30° Celsius

Wind Speed: 22 km/hr

Wind direction: South West

Tone: 3 minute steady high pitch activated twice.

P.A. Test Message: "This has been a test of the Brandon Emergency Alerting Project. The test has been successful (Repeated three times) Total activation time approximately 7 minutes.

The same observation made in regards to strobe lights are the same in Test 1. The strobe lights are clearly seen throughout the distance if there is clear visibility. Also, concerning the PA, the same comments made on Test 1 can be extended to Test 2. Regarding the ambient noise, other noise sources were added on the ones mentioned on Test 1. These are wind generated noise and lawn mower noise. Data has been taken from Test 2 is compared to the predicted siren contours in Figure 2.

Tone Alert Receiver Test: The receiver was located at Green Acres School on Queens Street. There is confusion about the correct position of the buttons. The radio signal was heard but they did not hear any voice. The siren in the school yard could faintly be heard but not inside the school. The secretary may not always be located in the office therefore, some sort of system to notify the school generally may be required. It is suggested that a strobe light should be placed in the hallway.

Test 3

Date: July 2, 2003

Time: 6:30PM

Relative humidity: 94%

Temperature: 28° Celsius

Wind Speed: 5 km/hr

Wind direction: West

Tone: 3 minute alternating pitch activated twice. Following the first activation this message.

P.A. Test Message: “This is a test of the Brandon Emergency Alerting Project. A second activation will take place shortly. (Repeated three times)

Tone: A second 3 minute alternating pitch followed by this announcement.

P.A. Test Message: “This has been a test of the Brandon Emergency Alerting Project. The test has been successful.” (Repeated three times) Total activation time approximately 9 minutes.

The same observations made about strobe lights for Test 1 and 2 are the same on Test 3. The strobe light is clearly seen on Test 3 throughout the distance if there is clear visibility. The measurement in location A3, at a distance of 3500 feet indicates the PA is clear at all measurement location. At location E3, at a distance of 2500 feet indicates that announcements were clear. At location H3, at a distance of 3000 feet indicates the PA was clear at through out the entire message. At location I3, at a distance of 2500 feet the PA was clear from all the locations. It appears from Test 3 the PA performed very well mainly due to low wind speed however, traffic noise was included. It is concluded that the PA can be heard at a distance of 3500 feet. However, after this distance the PA quality deteriorates and this is due to the fact that high frequency sound attenuates must faster than low frequency sound in a typical voice spectrum. The test also indicates some traffic noise mainly only from trucks still exists with no construction activities.

Tone Alert Receiver Test: The receiver was located at Rideau Park Personal Care Home on Victoria Ave. The voice announcement was clearly understood and the volume was very good. The siren could also be heard when the front doors were opened but not when the doors were closed.

Conclusion

The following conclusions can be made based on these three (3) tests:

1. The ATI HPSS16 performed very well and it comes roughly 1 mile (5200 feet) for tone and 3500 feet for voice with adequate intelligibility.
2. Factors such as wind, barrier effect and ambient noise must be taken into account in designing a complete system.
3. To overcome the above factors, ATI's Model HPSS32 maybe considered. The HPSS32 is double the power of the HPSS16.
4. The HPSS32 will slightly enhance the P.A. due to sound/distance limitations. This will offset obstruction sound attenuation.
5. It is also recommended to make P.A. messages simple and short.

**FIGURE 1 : SIREN INSTALLATION WITH
STROBE LIGHT ON TOP OF THE POLE**



FIGURE 2 : CITY OF BRANDON SIREN TESTS

