APPENDIX C

NOISE ASSESSMENT

Please note that WSP no longer performs noise analyses and Cameron Engineering & Associates, LLP was unable to contact the original author (Andrew McKee) to have the minor changes made that were requested by VHB. Instead, the following responses are provided:

Comment: The Introduction should indicate that the study is for the Jewish Congregation of Brookville, not Brooklyn.

Response: Hand corrected by Cameron Engineering & Associates, LLP.

Comment: Although not quantitatively specified, unreasonable noise is outlined in Section 104-3 of the Village Code.

Response: Agreed. A copy of the ordinance is provided following the study.

Comment: Table 8 indicates a source of "manufacturers noise levels." The "cut sheet" of the specific mechanical equipment proposed to be used should be provided.

Response: A copy of the cut sheet is provided following the study.

Our ref: US02-0021-001-am.001j

JEWISH CONGREGATION OF BROOKVILLE

VILLAGE OF MUTTONTOWN, NY

ENVIRONMENTAL NOISE IMPACT ASSESSMENT OF NEW SYNAGOGUE

PREPARED FOR CAMERON ENGINEERING & ASSOCIATES LLP

WSP Acoustics
512 Seventh Avenue
New York
New York 10018
Tel: +1 212.951.5927
http://www.wspenvironmental.com

WSP Group plc
Offices worldwide

WSP

1.0 Introduction

The Jewish Congregation of Brookville is planning to build a new synagogue on a parcel of land adjacent to Route 106 in Muttontown, Long Island, NY. The proposed synagogue will constitute a single building located in the south east corner of the site and will include 90 parking spaces (57 paved and 33 grass pavers) along the north side of the site. Access to the site will be directly off of Route 106 and the access road will run west to east along the middle of the site.

Concerns have been raised regarding the impact of the new synagogue on the neighboring residential properties from traffic noise impact (from use of the car park and access road), from mechanical equipment serving the main building and from outside activities such as use of the children's playground.

This report details the results of a 24hr noise survey carried out on site and an impact assessment from traffic, mechanical equipment and activity noise.

2.0 Noise Criteria and Standards

The Code of the Incorporated Village of Muttontown Section § 104-2 - Unreasonable noise prohibited states that: "*No person shall make or cause to be made or continued, nor shall any owner, lessee or occupant of any land in the village permit to be made or continued on his premises, any unreasonable noise within the village, except as permitted in Chapter 70 hereof relating to the regulation of firearms*"

The code is qualitative in nature and as such does not provide particularly useful guidance in determining what is an acceptable level of noise from this type of development. A level of noise considered reasonable by one person could be considered unreasonable by another.

Therefore in the absence of quantitative local noise ordnance we have to assess the potential for disturbance using other parameters. The most appropriate for this site based on the prevailing noise climate, which is dominated by traffic noise from Route 106, and the noise sources being assessed would be to assess the change in overall noise level at the nearest residential property boundary and the average human response to that change.

The accepted standard for community response to noise increases and one which is defined by the International Standards Organisation (ISO) is shown in Table 1 below:

Change (dBA)	Category	Description
0	None	No observed reaction
5	Little	Sporadic complaints
10	Medium	Widespread complaints
15	Strong	Threat of community action
20	Very Strong	Vigorous community action

Table 1: ISO 150/TC43.1969. Noise assessment with respect to community response

In addition to this, Table 2 below shows the accepted industry standard for human perception to changes in sound levels:

Human Perception of Sound	Change (dBA)
Barely perceptible	2-3
Readily noticeable	5
A doubling of perceived loudness	10

Table 2: Source: Bolt Beranek and Newman.1973. Fundamentals and Abatement of Highway Traffic Noise

Noise can be measured using one of many different parameters. Noise levels for the assessment were measured in terms of L_{eq}. The concept of L_{eq} (equivalent continuous sound level) was primarily used in assessing noise in industry but over the last decade has become the standard by which other types of noise, such as aircraft noise, environmental noise and construction noise are assessed. The L_{eq} more accurately reflects the way in which humans respond to changes in noise levels as opposed to comparing absolute maximum and minimum noise levels. L_{eq} has been adopted by the EPA as the appropriate parameter for use in assessing environmental noise impact.

The L_{eq} is defined as a notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (i.e. 1/2 hour, 1 hour, etc). It is always defined in terms of a time period, in this case $L_{eq\ 1hour}$. By using the $L_{eq\ 1hour}$ we can directly compare an abstract short term noise source, such as a human voice or a single car pass, with the steady state environmental noise level, even if the source itself does not last for the whole hour.

Where noise levels are continuous such as from fixed mechanical equipment, impact is measured against the L_{90} ambient noise level measured on site. The L_{90} represents the average noise level during 90% of the measured period and is accepted as the industry standard representation of minimum background noise level. The L_{90} ignores influence from transient sources such as road traffic and aircraft. Mechanical equipment impact will therefore be assessed against the minimum L_{90} measured on site.

Technical terms used in this report are explained in attached Appendix A.

3.0 Noise Surveys & Data Collection

A noise survey was conducted to collect the necessary data to assess the impact of the proposed synagogue on neighboring properties. The survey is detailed below along with the survey methodology and the measured data.

3.1 Survey Methodology

3.1.1 Measurement Equipment

The equipment used in noise level measurements is listed in Table 3 below.
Sound and the various descriptors used within this report are discussed in Appendix A

OCTAVE BAND AND STATISTICAL SOUND LEVEL MEASUREMENT EQUIPMENT			
MAKER, MODEL	EQUIPMENT DESCRIPTION	SERIAL NO.	Frequency Range
SVAN 948	Integrating Precision Sound Level Meter	6534	20 to 20,000 Hz
Bruel & Kjaer Type 4230	Acoustical Calibrator	1558662	1000 Hz

Table 3: List of measuring equipment

3.1.2 Measurement Methodology

The microphone, which is connected to the sound level meter, was mounted on a post approximately 6ft high at a location in the approximate center of the site. A wind screen was placed over the microphone to minimize the effects of the wind. The system was calibrated before and after measurements were made, no calibration drift was found to have occurred.

The SVAN 948 samples the sound pressure levels every 16 seconds and digitally processes them into the cumulative distribution of sound levels for the period(s). This distribution is calculated as a table giving the percent of time a given sound level is exceeded during the measurement period. The L_{eq}, Equivalent Sound Level (the constant sound level equal in sound energy to the actual sound occurring during the period) is also calculated. The statistics recorded are the L_{90}, the residual background ambient sound level (the level exceeded 90% of the period); the L_{10}, the level exceeded 10% of the period, and generally accepted as being representative of traffic noise; and the maximum sound level in dB(A) was measured. These descriptors and other important sound concepts are discussed in detail in Appendix A.

3.2 Long Term Background Noise Survey

A site survey was undertaken between 7th and 8th August 2007. The site is currently an undeveloped green field site and the purpose of this survey was to establish the current ambient noise levels that exist on site in absence of any noise from the new proposed synagogue.

Measurements were taken over a continuous 22 hour period at a location in the approximate center of the site. This is shown in attached Figure 1. Measured noise levels are shown in attached Figure 2.

The ambient noise levels on site (and the neighboring sites to the north, south and east) are dominated by road traffic using Route 106 between East Norwich and Jericho. The average daytime noise level measured between 07:00am and 22:00 is 57dBA. Noise levels begin to drop significantly around 00:30 and begin to increase again around 06:15 as the morning rush begins.

It can be see from Figure 2 that noise levels measured at Position 1 are fairly consistent throughout the monitoring period. The L_{eq} noise levels are summarized in Table 4 below:

Time Period	Average L_{eq} Noise Level	Minimum L_{eq} Noise Level	Maximum L_{eq} Noise Level	Minimum L_{90} Noise Level
08:00 – 22:00	57.1	54.0	59.2	49.1
22:00 – 08:00	54.6	50.9	57.4	46.2

Table 4: Summary of background noise measurements

4.0 Assessment of Traffic Noise Impact

4.1 Assessment Assumptions

In order to carry out an assessment of traffic noise impact the following assumptions have been made based on the schedule of uses provided by the project engineer and described in the draft Environmental Impact Assessment.

- A maximum of 90 cars arriving at and leaving the synagogue parking lot before and after Saturday service (9.30am arrival and 11:30am departure).
- A maximum of 90 cars arriving at and leaving the synagogue parking lot for weekend weddings – take place on Saturday evening or Sunday.
- During Rosh Hashanah and Yom Kippur (3 days per year) it is proposed that alternative off-site parking arrangements will be made and the majority of the congregation will arrive at the synagogue by shuttle bus. As such only a maximum of 90 cars will arrive at and leave the site during these times. However in order to study the impact from having all members park on site during these times a scenario whereby a maximum of 340 cars arrive at and leave the synagogue parking lot during Rosh Hashanah and Yom Kippur has been used. It is assumed that all 340 cars arrive (and leave) over a minimum period of 2 hours.
- The maximum speed of car using access road is 15mph
- Each car journey from Route 106 to parking space or from parking space to Route 106 takes an average of 30 seconds and it is assumed that all cars arrive at or leave site within a single 1 hour period.
- A standard distance from source (vehicle) to residential property line of 200ft used for the assessment
- The average noise level of a car moving at 15mph is 55dB(A) at 15ft. Based on previous standard noise measurements for similar assessments.

4.2 Assessment

The assessment of noise impact was carried out to the neighboring property line to the north. This is the nearest property lot to the exit road and approximately 200ft north of the noise survey measurement location.

The following minimum background noise levels were measured:

	Minimum $L_{eq,\ 1hour}$ sound pressure level	
	08:00 to 22:00	22:00 to 08:00
	54	51

Table 5: Measured noise levels on site

Based upon the above assumptions and measured noise levels on site the following assessment of the impact of vehicle movement was carried out and is presented in Table 6 below. Where a standard calculation formula has been used this has been included in parentheses in the table:

	Noise Level
Single motor vehicle @ 15ft	55 dB(A)
Correction to calculate hourly L_{eq} noise level from single vehicle movement lasting 30 seconds [10log (30/3600)]	-20.8 dB(A)
Distance loss from car to nearest property at 200ft [10log(15/200)]	-11.2 dB(A)
Average Hourly L_{eq} noise level from single vehicle movement at nearest residential property line at 200ft	23.0 dB(A)
Increase in average hourly L_{eq} noise level from 90 cars arriving at or leaving car park after weekend service in 1 hour [10log(90)]	+19.5 dB(A)
Increase in average hourly L_{eq} noise level from 340 cars arriving at or leaving car park during Rosh Hashanah or other special service in 1 hour [10log(340)] – scenario for additional parking alternative only	+25.0 dB(A)

Table 6: Traffic noise impact assessment

From the information given in Table 7 above we can determine the resultant impact of vehicle movements on the nearest residential property for each time period.

	Noise level [dBA L_{eq}] during daytime and night time periods	
	07:00 to 22:00	22:00 to 07:00
Noise level from 90 vehicle movements (23.0dB + 19.5dB)	42.5	42.5
Minimum L_{eq} background noise level measured on site	54	51
Resultant noise level (noise from vehicles + background noise level)	54	51
Resultant increase in noise level	0	0
Noise level from 340 vehicle movements (additional alternative parking scenario)	48	48
Minimum L_{eq} background noise level measured on site	54	51
Resultant noise level (noise from vehicles + background noise level)	55	53
Resultant increase in noise level	1	2

Table 7: Resultant noise increase from vehicle movements

WSP

4.3 Discussion of Traffic Noise Impact

Table 7 above shows the resultant noise increase at the property line that can be expected from use of the car park of the proposed new synagogue.

It can be seen that during normal weekend and weekday use of the synagogue there will be no increase in noise associated with the maximum 90 cars arriving at or leaving the synagogue car park in a single hour.

During Rosh Hashanah and other special holidays, where car numbers could theoretically reach as many as 340 in a single hour, there will be an increase in hourly noise levels at the property line. During the daytime period the increase is expected to be a maximum of 1dB and during the late evening period it is expected to be a maximum of 2dB.

It can be seen from Table 2 in section 2.0 that a 2-3dB increase in noise levels is barely perceptible to the average person. As such a maximum 2dB increase in noise is unlikely to cause a disturbance at the property line and therefore will have no negative impact on the neighboring residences themselves. During normal weekly operation, when a maximum of 90 cars will use the car park during a typical service, it can be expected that there will be no increase in current site background noise levels through the use of the car park and so no negative impact at the property line.

It should be emphasised that due to the arrangement for off-site parking the scenario whereby 340 cars arrive at or leave the site at the beginning and end of high holiday services will almost certainly never happen and has been studied here for information purposes only.

5.0 Assessment of Mechanical Equipment Noise Impact

Four (4) AAON air handling units are to be located on the 1 storey roof at the rear of the synagogue to provide air conditioning to the various spaces. These units will operate during synagogue operating hours only, which we understand is 08:00 to 22:00.

The manufacturers quoted sound power levels are presented in Table 8 below:

	Sound Power Level (dB) at Octave Band Center Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
AAON RTU	93	91	92	96	93	88	84	81

Table 8: Manufacturers noise levels

The mechanical units are located approximately 150' from the synagogues eastern property line and the assessment has been carried out to this location.

	Noise Level
Single AAON unit @ 10ft	75 dB(A)
Distance loss to 150ft	-22 dB(A)

Cumulative noise of 4 units operating [10 log(4)]	+6 dB(A)
Noise level at property line	59 dB(A)

Table 9: Mechanical unit noise impact assessment

From the information given in Table 9 above, we can determine the resultant impact of mechanical units operating.

	Noise level [dBA L_{eq}] during daytime period
	08:00 to 22:00
Noise level from 4 units operating	59
Minimum L_{90} background noise level measured on site	49
Resultant noise level	59
Resultant increase in noise level	10

Table 10: Mechanical unit noise impact at property line

5.1 Discussion of Mechanical Noise Impact

It can be seen from Table 10 above that with all 4 rooftop units operating noise levels will be 10dB above minimum L_{90} background noise levels at the property line to the east.

The nearest house (on plot 2432) is located at 180' to the south of the mechanical units. At this position noise levels will be 7dB above the minimum L_{90} noise level measured on site. At this level, noise from the mechanical units will be clearly audible at the neighboring property and as such remedial measures will be required to reduce noise from this source.

The nearest houses to the north and east are located at 500' and 300' respectively. At the house to the north, noise from mechanical equipment will be at or below minimum background noise levels and so of no disturbance to the occupants. At the house to the east noise levels will be 1dB above minimum background noise levels, meaning there will be no impact on the occupants.

5.2 Recommendations for Mechanical Units

The mechanical units are to be surrounded by a 10' parapet wall which will screen them from the neighboring properties. With this in place, noise levels at the property line to the north and east will be reduced by at least 10dB. This will mean that during hours of operation (08:00 to 22:00) noise from mechanical equipment will be at or below the background noise levels on site at any location on the property line. As such there will be no negative impact from their operation on neighboring properties.

WSP

6.0 Assessment of Synagogue Activity Noise Impact

6.1 Assessment Assumptions

In order to carry out an assessment of synagogue activity noise impact, by which we mean noise from worshippers attending services and from the playground and nursery school the following assumptions have been made based on the schedule of uses provided by the Congregation.

- There will be a maximum of 12 children and 1 teacher using the playground and attending outside nursery school classes at any one time.
- Normal activities in the sunken patio area and on the terrace will be limited to small services during the summer with a maximum of 30 persons in attendance.
- For the new building, provisions have been made to accommodate 866 people in total. 247 will be seated in the Sanctuary, 400 will be in temporary seating in the Oneg and 219 seated in a combination of the balcony and/or temporary seating under a tent on the outdoor terrace.
- High holiday services (Rosh Hashannah and Yom Kippur) will feature a maximum attendance of 866 during daytime services (08:00 to 13:00), with 219 persons being accommodated in a tent on the outside terrace.
- During evening services a maximum of 600 persons is expected, all of whom will be accommodated inside the temple.
- Noise from a typical outdoor nursery class of 12 children and 1 teacher is taken to be 65dB(A) at 15ft. This is based on survey measurements (of a larger class) taken for a previous project.
- Noise from a single outside worshipper during high holiday services is taken to be 53dB(A). This is based on a typical quiet male voice measured at 5ft.
- Noise from a single outside worshipper attending a normal outside service on either the patio or the terrace is taken to be 58dB(A). This is based on a typical male voice measured at 5ft.
- The sunken patio is 14ft deep at its lowest point. There will be a minimum of 10dB of screening from activity within this area to the nearest property line.
- The Rabbi will be "miked" and broadcast via loudspeakers to the outside tent. Amplified voice levels from the Rabbi for outside services is taken to be 70dB(A) from each speaker, based on a raised male voice measured at 5ft. It is assumed that there are 4 speakers arranged around the tent.
- It is assumed that there is no environmental impact from noise associated with the portion of the service taking place inside the temple.

6.2 Assessment Results

Based on the above assumptions the following assessments have been carried for 4 scenarios. The first assessment is for maximum daytime attendance during a high-holiday service. The second is for 30 persons attending an outside service in the sunken patio. The third is for 30 persons attending an outside service on the terrace. The fourth and final assessment is for a class of 12 children using the playground area. The assessments are presented in Tables 11, 12, 13 and 14 below. Where a

standard calculation formula has been used this has been included in parentheses in the tables.

	Noise Level
1 outside worshipper measured at @ 5ft	53 dB(A)
Increase in noise level from 219 worshippers at outside service [10log(219)]	+23 dB
Distance loss from terrace outside temple where tent will be located to nearest residential property line to south at 75ft [20log(5/75)]	-23.5 dB
Maximum noise level from 219 outside worshippers at residential property line	52.5 dB(A)
1 loudspeaker broadcasting outside service @ 5ft	70 dB(A)
Increase in noise level from 4 loudspeakers broadcasting outside service [10log(4)]	+6
Distance loss from terrace outside temple to nearest residential property line to south at 75ft [20log(5/75)]	-23.5 dB
Maximum noise level from Rabbi at outside service at residential property line	52.5dB(A)
Total noise from outside service [52.5dBA + 52.5dBA]	**55.5 dB(A)**
Minimum L_{eq} background noise level measured during hours of daytime outside service (08:00 to 13:00)	**56.6 dB(A)**

Table 11: Noise impact assessment of maximum daytime service attendance

	Noise Level
1 outside worshipper on sunken patio measured at @ 5ft	58 dB(A)
Increase in noise level from 30 worshippers at outside service [10log(30)]	+14.5 dB
Distance loss from sunken patio to nearest residential property line to east at 50ft [20log(5/50)]	-20 dB
Screening loss from sunken patio being 14ft below grade	-10 dB
Maximum noise level from 30 outside worshippers at residential property line	42.5 dB(A)
1 Rabbi at outside service in sunken patio @ 5ft	70 dB(A)
Distance loss from sunken patio to nearest residential property line to east at 50ft [20log(5/50)]	-20 dB
Maximum noise level from Rabbi at outside service at residential property line	50 dB(A)
Total noise from outside service [36dBA + 43.5dBA]	**51 dB(A)**
Minimum L_{eq} background noise level measured between 08:00 and 22:00	**54 dB(A)**

Table 12: Noise impact assessment from service on sunken patio

	Noise Level
1 outside worshipper on terrace measured at @ 5ft	58 dB(A)
Increase in noise level from 30 worshippers at outside service [10log(30)]	+14.5 dB
Distance loss from terrace to nearest residential property line to the east at 75ft [20log(5/75)]	-23.5 dB
Maximum noise level from 30 outside worshippers at residential property line	48.5 dB(A)
1 Rabbi at outside service on terrace @ 5ft	72 dB(A)
Distance loss from terrace to nearest residential property line to the east at 75ft [20log(5/75)]	-23.5 dB
Maximum noise level from Rabbi at outside service at residential property line	48.5 dB(A)
Total noise from outside service [48.5dBA + 48.5dBA]	**51.5 dB(A)**
Minimum L_{eq} background noise level measured between 08:00 and 22:00	**54 dB(A)**

Table 13: Noise impact assessment from service on terrace

	Noise Level
12 children using playground area/attending class measured at @ 15ft	65 dB(A)
Distance loss from children's playground to nearest residential property line to south at 50ft [20log(15/50)]	-10.5 dB
Maximum noise level from children playing/outside class at residential property line to the south	**54.5 dB(A)**
Minimum L_{eq} background noise level measured between 08:00 and 22:00	**54 dB(A)**

Table 14: Noise impact assessment from children's playground/outside class

6.3 Discussion of Synagogue Activity Noise Impact

It can be seen from Tables 11, 12, 13 and 14 above that noise from the various outside activities are expected to be at or below the minimum L_{eq} background noise level measured on site.

If we consider high-holiday service activity first, where 219 people are expected to be located on the outside terrace, noise is expected to be 1dB below the minimum L_{eq} background noise level at the property line. At this level we would expect noise to be occasionally audible but unlikely to be or disturbance.

During small outside services on either the terrace or the sunken patio, when a maximum of 30 people will be in attendance, noise levels will be between 2.5 and 3dB below the minimum L_{eq} background noise level at the nearest property lines to the east and south. At these levels below the minimum background noise level, we would expect noise to be occasionally audible but unlikely to be or disturbance.

During nursery classes and playground activity when a maximum of 12 children will be present, noise levels will be 0.5dB above the minimum L_{eq} background noise level at

the nearest property line to the south. We would expect this increase in noise to be barely perceptible over current ambient noise levels and so unlikely to be of disturbance.

We would therefore conclude that outside activity noise associated with the operation of the new synagogue will comply with the Code of the Incorporated Village of Muttontown in that it will not generate unreasonable noise and will have no detrimental impact on the neighboring residential properties.

7.0 Assessment of Noise Impact from Construction Activity

The new synagogue will of course require construction activities. A detailed construction plan is not yet available however we have formulated a plan based on our understanding of the site conditions and the buildings to be constructed.

Indicative noise levels during the construction of the proposed development can be predicted for the operations that are likely to take place on site. These are as follows:

- Site preparation – site preparation will involve the back-filling, levelling and grading and the removal of earth where foundations are to be installed. It is assumed that these activities will require the use of dozers, excavators and trucks.
- Building – it is assumed that any building works will require regular truck movements, concrete truck mixers, a compressor and hand tools.
- Drainage and road paving – there is no current road and drainage infrastructure for this project and construction will require the laying of new road paving/asphalt.

7.1 Assessment Assumptions

We would expect the site preparation to be the noisiest phase of this project followed by general truck movements (both concrete mixers and general delivery trucks) to and from the site. General construction activities are unlikely to generate significant levels of sustained noise, however *good practice* will be followed during all phases of the project through the implementation of a comprehensive *Noise Mitigation Plan*.

Source noise levels used for this assessment are taken from *Regulation of Construction Activity Noise. Patterson, W.N., R. A. Ely, and S.M. Swanson, Bolt Beranek and Newman, Inc., Report 2887, for the Environmental Protection Agency, Washington, D.C., November 1974.* Typical source noise levels are shown in Table 15 below.

The following assumptions have been made in the predictions:

- Noise propagation is assumed to be hemispherical;
- No attenuation from atmospheric or ground absorption is assumed;
- The intervening ground between the development and the receptor points is acoustically hard ground;
- No barrier attenuation has been assumed;
- Predicted noise levels are those under neutral weather conditions.

Source	Noise Level at 50ft	Area of development used on	Distance to nearest residential property line
Dump Truck	88	Site clearance/preparation	50
Front end loader	84	Site clearance/preparation	50
Shovel	84	Site clearance/preparation	50
Backhoe	85	Site clearance/preparation	50
Truck	88	All	50
Front end loader	84	Road	50
Dump Truck	88	Road	50
Asphalt Spreader	89	Road	50
Roller	80	Road	50
Motor crane	93	Construction	100
Backhoe	85	Construction	100
Air compressor	81	Construction	100
Concrete mixer	85	Construction	100
Concrete vibrator	76	Construction	100
Hoist	76	Construction	100

Table 15: Noise levels from construction activities

Source noise levels are presented in terms of $L_{Aeq,\ 1hour}$ at 50ft. In reality each of the noise sources will only be in operation for a percentage of each 1 hour period, which will result in lower $L_{Aeq,\ 1hour}$ noise levels. This will be referred to as the on-time and the predicted on-times for each of the above are presented in Table 16 below. An example of this is the roller. The measured noise is 80dB(A) at 50ft and has an on-time of 50% (or 30 minutes in any 60 minute period). The corrected $L_{Aeq,\ 1hour}$ is therefore 77dB(A) at 50ft.

Source	$L_{Aeq,1hour}$ Noise Level at 50ft	% on-time	Corrected $L_{Aeq,1hour}$ Noise Level at 50ft
Dump Truck	88	25	82
Front end loader	84	25	78
Shovel	84	25	78
Backhoe	85	50	82
Truck	88	25	82
Front end loader	84	50	81
Asphalt Spreader	89	25	83
Roller	80	50	77
Motor crane	93	10	83
Backhoe	85	50	82
Air compressor	81	20	74
Concrete mixer	85	50	82
Concrete vibrator	76	25	70
Hoist	76	10	66

Table 16: On-time noise levels from construction activities

7.2 Assessment Results

What we would consider worst case construction scenarios using the following equipment have been determined for the 3 phases (site clearance; road construction; building construction):

Site clearance:

- 1 x dump truck
- 1 x front end loader
- 1 x truck
-

Road construction:

- 1 x dump truck
- 1 x truck
- 1 x roller
- 1 x asphalt spreader

Building construction:

- 1 x motor crane
- 1 x backhoe
- 1 x truck
- 1 x air compressor
- 1 x concrete mixer
- 1 x concrete vibrator
- 1 x hoist

Based on the above anticipated activities in any 1 hour, the following noise levels are predicted at the nearest property line.

	Noise Level
1 dump truck at @ 50ft	82dB
1 front end loader at @ 50ft	78dB
1 truck at @ 50ft	82dB
Cumulative noise level from all 3 sources [82+78+82]	86dB

Table 17: Noise impact from site clearance noise at property line

	Noise Level
1 dump truck at @ 50ft	82dB
1 truck at @ 50ft	82dB
1 roller at @ 50ft	77dB
1 asphalt spreader at @ 50ft	83dB
Cumulative noise level from all 4 sources [82+82+77+83]	88dB

Table 18: Noise impact from road construction activity at property line

	Noise Level
1 motor crane at @ 50ft	83dB
Distance loss to 100ft (20 log 50/100)	-6dB
Resultant noise level at 100ft	77dB
1 backhoe at @ 50ft	82dB
Distance loss to 100ft (20 log 50/100)	-6dB
Resultant noise level at 100ft	76dB
1 truck at @ 50ft	82dB
2 trucks	+3dB
Distance loss to 100ft (20 log 50/100)	-6dB
Resultant noise level at 100ft	79dB
1 air compressor at @ 50ft	74dB
Distance loss to 100ft (20 log 50/100)	-6dB
Resultant noise level at 100ft	68dB
1 concrete mixer at @ 50ft	81dB
Distance loss to 100ft (20 log 50/100)	-6dB
Resultant noise level at 100ft	75dB
1 concrete vibrator at @ 50ft	70dB
Distance loss to 100ft (20 log 50/100)	-6dB
Resultant noise level at 100ft	64dB
1 hoist at @ 50ft	66dB
Distance loss to 100ft (20 log 50/100)	-6dB
Resultant noise level at 100ft	60dB
Cumulative noise level from all 7 sources [77+76+79+68+75+64+60]	84dB

Table 19: Noise impact from construction activity at property line

7.3 Discussion of Synagogue Construction Noise Impact

It can be seen from Tables 17, 18 and 19 above that predicted noise levels from the 3 phases of site development are between 84 and 88dB(A) at the nearest property line to the activity taking place. The nearest property line to the road and parking lot construction and to the main clearance areas is approximately 50ft to the north and the closest property line to building construction activities is approximately 100ft to the east.

It should be noted that these noise levels are based on worst case activities during each of the phases. The noise levels are also prior to any noise mitigation measures being implemented such as screens around noisy stationary equipment and implementing other *good practice* procedures from the *Construction Noise Mitigation Plan*. We would expect that with good practice and noise mitigation measures noise from construction activities can be reduced by between 10 and 15dB at the property line. While these levels will remain audible, they would not be significantly higher than the current daytime maximum traffic noise levels of 70dB(A) measured on site.

As mentioned above a *Construction Noise Mitigation Plan* will be utilized to ensure compliance with the Code of the Incorporated Village of Muttontown.

The mitigation plan will include the following:

- Construction work is allowed between 08:00am and 6:00pm and as such construction will NOT take place outside of these hours.
- All construction equipment being operated on this site will be equipped with the appropriate manufacturer's noise reduction device(s), including, but not limited to, a manufacturer's muffler that is free of rust, holes and exhaust leaks.
- The site operator/responsible party will mitigate noise from construction devices with internal combustion engines by ensuring that the engine's housing doors are kept closed, and by using noise-insulating material mounted on the engine housing that does not interfere with the manufacturer's guidelines for engine or exhaust operation and operating at lower engine speeds whenever possible.
- All equipment will be switched off when not in use.
- Motor vehicles will not be left idling.
- Quieter back-up alarms shall be used in pre-2008 model year vehicles when practicable for this site.
- Where practicable, portable compressors, generators and pumps will be located in a position on site away from noise sensitive neighboring buildings.
- Noisier devices shall be covered with noise insulating fabric to the maximum extent that does not interfere with the manufacturer's guidelines for engine or exhaust operation. Further reduction of noise shall be achieved by operating the devices at lower engine speeds during the work whenever possible.
- The operator of this site will implement a noise mitigation training program to ensure that all field-workers are made aware of the need to minimize construction noise.

While noise from any construction site, big or small, is inevitable, through the implementation of a noise mitigation plan there is no reason why neighbors should be unduly disturbed.

8.0 Cumulative Assessment of Noise

There are instances where more than one of the above sources will operate at once.

The following assumptions have been made:

- It is assumed that all traffic arrives before a service
- There will be no children's outside school activities occurring during a service
- There could be children's outside school activities occurring as people arrive for services
- Children's outside school activities will only occur during the daytime period of 08:00 to18:00
- Rosh Hashanah and regular services can take place anytime up to 22:00, however only daytime high-holiday services require the use of the tent on the terrace.

The cumulative impact of more than one source is presented in Table 20 below. Two assessment positions have been chosen which represent the closest points on the property line to neighboring residential properties. These are position 1, at the property line directly to the south of the playground and position 2, at the property line directly to the east of the HVAC installation. Assessment locations are shown in attached Figure 3. In each case the minimum ambient noise level measured on site during the period in which activity is expected to take place has been used.

	Noise Level
Position 1 – property line directly south of children's playground	
Traffic noise (90 vehicles arriving for normal services) – distance from source to receive is 200ft	42.5dB(A)
HVAC units operating (assuming minimum 10dB attenuation from screening) - distance from source to receive is 175ft	48.0dB(A)
Playground noise - distance from source to receive is 50ft	54.5 dB(A)
Existing minimum ambient noise level during the day (08:00 – 18:00)	56.6dB(A)
Cumulative noise from vehicles, HVAC units, playground and existing ambient	59.1dB(A)
Resultant increase in minimum ambient noise levels	**+2.5dB**
Position 2 – property line directly to east of HVAC installation	
Traffic noise (90 vehicles arriving at normal services) – distance from source to receive is 225ft	41.0dB(A)
HVAC units operating (assuming minimum 10dB attenuation from screening) - distance from source to receive is 150ft	49.0dB(A)
Playground noise - distance from source to receive is 250ft	40.5 dB(A)
Existing minimum ambient noise level during the day (08:00 to 18:00)	56.6dB(A)
Cumulative noise from vehicles, HVAC units, playground and existing ambient	57.4dB(A)
Resultant increase in minimum ambient noise levels	**+0.8dB**
Position 1 – property line directly south of children's playground	

Service noise (during Rosh Hashannah) - distance from source to receive is 75ft	55.5dB(A)
HVAC units operating (assuming minimum 10dB attenuation from screening) - distance from source to receive is 175ft	48.0dB(A)
Existing minimum ambient noise level during morning/daytime service (08:00 to 13:00)	56.6dB(A)
Cumulative noise from service, HVAC units and existing ambient	59.4dB(A)
Resultant increase in minimum ambient noise levels	**+2.8dB**
Position 2 – property line directly to east of HVAC installation	
Service noise (during Rosh Hashanah) - distance from source to receive is 150ft	49.5dB(A)
HVAC units operating (assuming minimum 10dB attenuation from screening) - distance from source to receive is 150ft	49.0dB(A)
Existing minimum ambient noise level during morning/daytime service (08:00 to 13:00)	56.6dB(A)
Cumulative noise from service, HVAC units and existing ambient	57.9dB(A)
Resultant increase in minimum ambient noise levels	**+1.3dB**
Position 1 – property line directly south of children's playground	
Service noise (normal outdoor service on terrace – 30 people + 1 Rabbi) - distance from source to receive is 75ft	51.5dB(A)
HVAC units operating (assuming minimum 10dB attenuation from screening) - distance from source to receive is 175ft	48.0dB(A)
Existing minimum ambient noise level during service (08:00 – 22:00)	54.0dB(A)
Cumulative noise from normal outdoor service; HVAC units and existing ambient	56.5dB(A)
Resultant increase in minimum ambient noise levels	**+2.5dB**
Position 2 – property line directly to east of HVAC installation	
Service noise (normal outdoor service on terrace – 30 people + 1 Rabbi) - distance from source to receive is 150ft	45.5dB(A)
HVAC units operating (assuming minimum 10dB attenuation from screening) - distance from source to receive is 150ft	49.0dB(A)
Existing minimum ambient noise level during service (08:00 – 22:00)	54.0dB(A)
Cumulative noise from normal service; HVAC units and existing ambient	55.6dB(A)
Resultant increase in minimum ambient noise levels	**+1.6dB**

Table 20: Cumulative noise impact from site activity

8.1 Discussion of Cumulative Noise Impact

We know from Table 2 in section 2.0 that a 2-3dB increase in noise levels is barely perceptible to the average person. It can be seen that without exception all cumulative noise levels will result in an increase in existing minimum ambient noise levels of less than 3dB. As such cumulative noise from Synagogue activities is unlikely to cause a disturbance at the property line and therefore will have no negative impact on the neighbouring residences themselves.

WSP

9.0 Conclusions

An environmental noise impact assessment has been completed for a proposed new synagogue for the Jewish Congregation of Brookville. The site is located on Route 106 between Jericho and East Norwich in the Village of Muttontown.

An assessment of traffic noise impact has been completed based on the proposed levels of site traffic expected during typical weekend usage of the facility and during special holidays such as Rosh Hashanah. Noise from these levels of traffic were compared against current ambient noise levels measured on the proposed synagogue site. It was found that worst case traffic noise would result in an overall increase in noise at the property line of 2dB and that this increase would be barely perceptible to the average person. As a result there will be no negative impact on the neighboring residences due to site traffic serving the proposed new synagogue.

An assessment of the impact from rooftop mechanical equipment was also completed. Manufacturer's noise levels were compared with minimum daytime and night-time background noise levels and found to be significantly in excess of the background noise levels at the property line, although absolute noise levels themselves were not excessively high.

The mechanical units will however be surrounded by a 10' high parapet which will screen them from the neighboring residences. The parapet will reduce mechanical unit noise to levels at or below the minimum ambient noise levels at the property line. With the parapet in place there will be no negative impact from mechanical equipment on the neighboring properties.

An assessment of activity noise associated with outdoor events has also been completed. It has been found that with the activity from events such as outdoor services during high holidays, small services on the sunken patio or terrace and children using the playground or attending outside classes will generate noise levels at or below the minimum background levels measured on site. At these levels activity noise may be occasionally audible at the property line but there should be no negative impact from said activities on the neighboring residential properties.

Finally, an assessment of construction activity noise has been completed. It has been found that construction activity from site clearance, road construction and building constriction activities will be around 84 to 88dBA at the property line. With noise mitigation measures, good construction practice, and a *Construction Noise Mitigation Plan*, noise should be reduced by between 10 and 15dB. While these levels will remain audible at the property line, they would not be significantly higher than the maximum traffic related noise levels measured on site.

In addition to the impact from the individual noise sources and at the request of the Committee, the impact from the cumulative effect of all sources that could operate simultaneously has also been considered. The cumulative noise from all sources will result in an overall increase in noise of less than 3dB. A 2-3dB increase in noise levels is barely perceptible to the average person and as such cumulative noise from

various noise sources is unlikely to cause a disturbance at the property line and therefore will have no negative impact on the neighbouring residences themselves.

Based on our findings we can therefore conclude that in our opinion noise need not be a deciding factor in granting planning permission for the new synagogue.

Andrew McKee
Principal Acoustic Consultant

Encl.

Appendix A – Acoustic Terminology
Appendix B - Schedule of Uses

Figure 1 – Site Plan
Figure 2 – Measured Noise Levels
Figure 3 – Cumulative Assessment Site Plan

APPENDIX A - SOUND

Sound consists of minute changes in air pressure. The speed at which the pressure changes (its frequency), is responsible for the perception of pitch or tone.

The range of sound pressures that can be heard by humans is very large. The sound pressure varies from two ten-thousands-millionths ($2x10^{-10}$) of an atmosphere for sounds barely audible to humans, to two-thousandths ($2x10^{-3}$) of an atmosphere for sounds which are so loud as to be painful.

The decibel notation system is used to present sound levels over this wide physical range. Essentially the decibel system compresses this range to a workable scale. Zero decibels is assigned to the level for a minimal sensation of hearing, and 140 decibels to sound which, on average, is painful. Thus a range of ten million is expressed on a scale of zero to 140.

Sound pressure level in decibels is defined:

Sound pressure level - (dB) = $20 \log_{10} (P/P_0)$

Where P = instantaneous sound pressure, and
P_o = reference sound pressure, = 20 μPa

Sound varies with pitch. Pitch is objectively represented by frequency. Sound affects people differently and transmits through structures differently depending on its frequency context (spectrum shape). It has become standard practice to measure the sound pressure level spectrum of a noise by using a series of octave bands with center frequencies at 31.5, 63, 125, 250, 500, 1000, 2000, 4000 and 8000 Hz (Hertz, or cycles per second). In this report, these octave bands are used in assessing the impact of ambient noise on the project.

The human ear does not perceive sound at low frequencies in the same manner as those at higher frequencies, i.e., sounds at low frequency do not seem as loud as those of equal intensity at higher frequencies. Thus the A-weighting network is provided in sound analysis systems to simulate the response of the human ear. A-weighted sound levels are expressed in units of decibels (dB) with the symbol (A) added to denote A-weighting.

A-weighted sound levels are used by the engineer to evaluate hearing damage risk and community annoyance impact, and are also used in federal, state and local noise ordinances. The symbol dB(A) or dBA is often used to denote A-weighted sound levels. Figure A.1 presents the shape of the A-weighted network and Figure A.2 presents typical A-weighted sound levels for typical noise sources.

Sounds transmit through structures differently depending on the frequency content of the sound and the composition of the structure. Low frequency sounds transmit more readily than high frequency sounds. People, however, are less sensitive to low frequency sounds.

A single number description has been developed to reflect the human perception of transmitted sound. This description is the Sound Transmission Class rating (STC). The STC of a structure is calculated by taking the noise reduction across the structure at 16-one-third octave bands, centered at frequencies from 125 to 400 Hz, fitting the STC curve to them allowing some levels to be below the curve. The point on the curve at 500 Hz is the STC rating.

Sound is not constant in time. Statistical analysis is used to describe the time varying distribution of sound and to compute single number descriptors for the time-varying sound. This report contains the following statistical sound levels:

L_X - This is the sound level exceeded X% of the time during the measurement period. For example, L_{10} is the sound level exceeded 10% of the time during the measurement period.

L_{eq} - This is the equivalent steady sound level which provides an equal amount of acoustic energy as the time-varying sound.

Figure A.1: A-Weighting Network

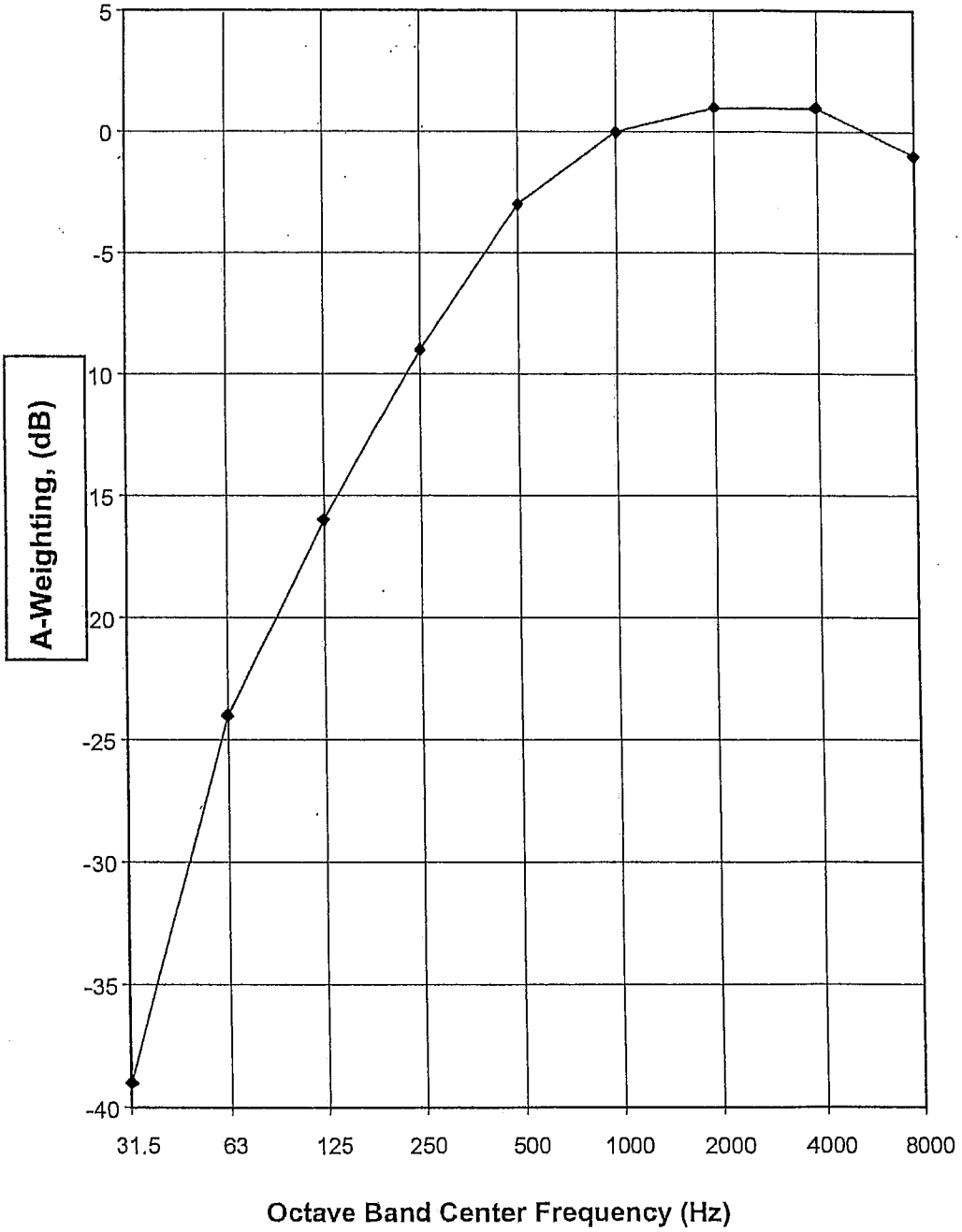
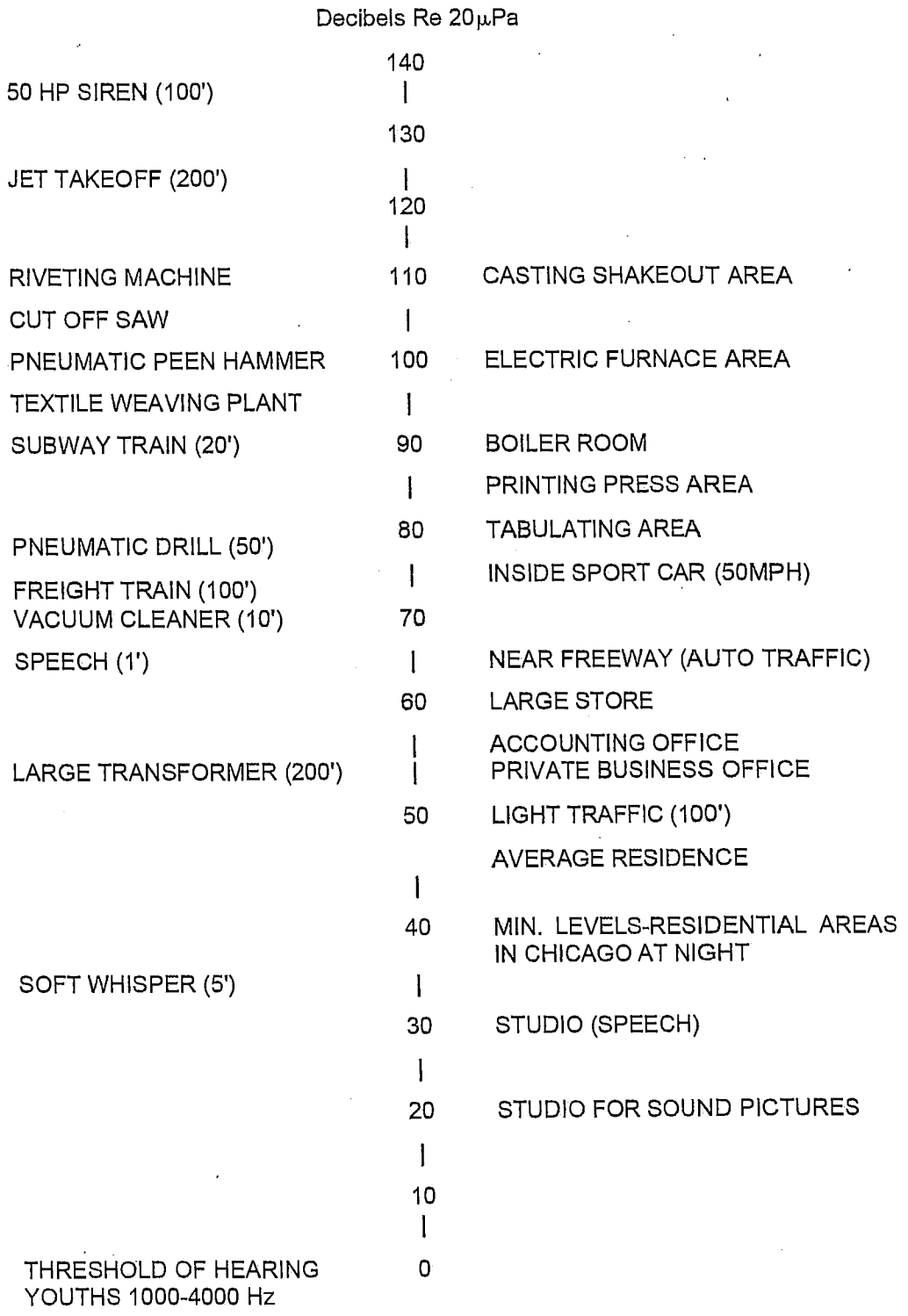


Figure A.2: Typical A-Weighted Sound Levels



APPENDIX B

Jewish Congregation of Brookville
PROPOSED PROGRAM

Type of Activity	Frequency	Typical Attendance	Projected Maximum Attendance	Additional Details	Approx. Parking Need
Religious Services	Friday 7:30-8:30pm plus Kiddish afterwards	20-30	50		20
	Saturday 10:00-11:30 am plus Kiddish afterwards	150-250	250		100
	Saturday evening (late afternoon - near sunset)	100-150	200		80
Community meetings	Congregation meeting: 1 weeknight a month approx. 7:30 pm	20	25		13
	Adult education: Various weekday evenings 7:30 pm	10-20	25		13
Weddings	Most would occur on Saturday evening or Sunday. They will not occur on a Friday evening or Saturday. Weddings are mainly held off-site or in the city, & there are only a handful each year. This summer, for example, there are 2 weddings in off-site halls. Any wedding would be for congregants only.	150-250	250		100
Nursery School	There is none now. The future building is expected to have 6 classrooms, so maybe up to 90 children (15 per class) * Parking is for 6 teachers, some assistants, & a principal only. Congregants' children only.	40 kids	40		10
Hebrew School	Monday 4-6 pm (grade 3)	25 children	50 children	For 2 teachers, principal, & staff.	8
	Monday 6:15-8:15 pm (grade 6)	25 children	50 children	Pickup and drop off tend to queue	8
	Tuesday 4-6 pm (grade 5)	25 children	50 children	behind the door.	8
	Thursday 4-6 pm (grade 4)	25 children	50 children	Future may have 1 more teacher	8
	Thursday 6:15-8:15 pm (grade 7)	25 children	50 children	& different staggering of hours.	8
	One Wednesday a month (grades K-2)	10	30		5
	One weekday a month (confirmation)	10	30		5
High Holidays	Rosh Hashannah & Yom Kippur (3 days a year - each day begins the evening before) They use CW Post now, but would use their own building.	300-350	800-850	Includes expansion into and behind the social hall.	340
Funeral Services	Random	100	100		40

FIGURE 1 – SITE PLAN

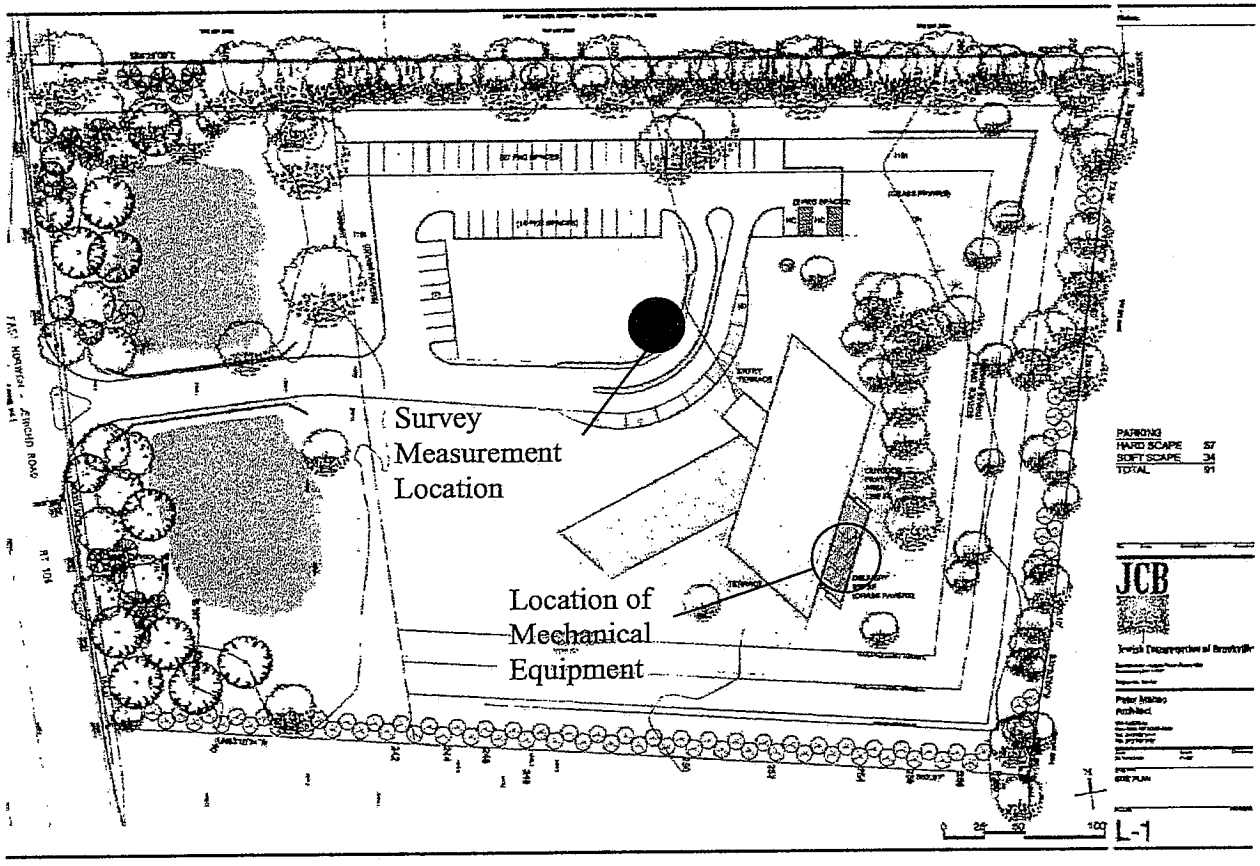
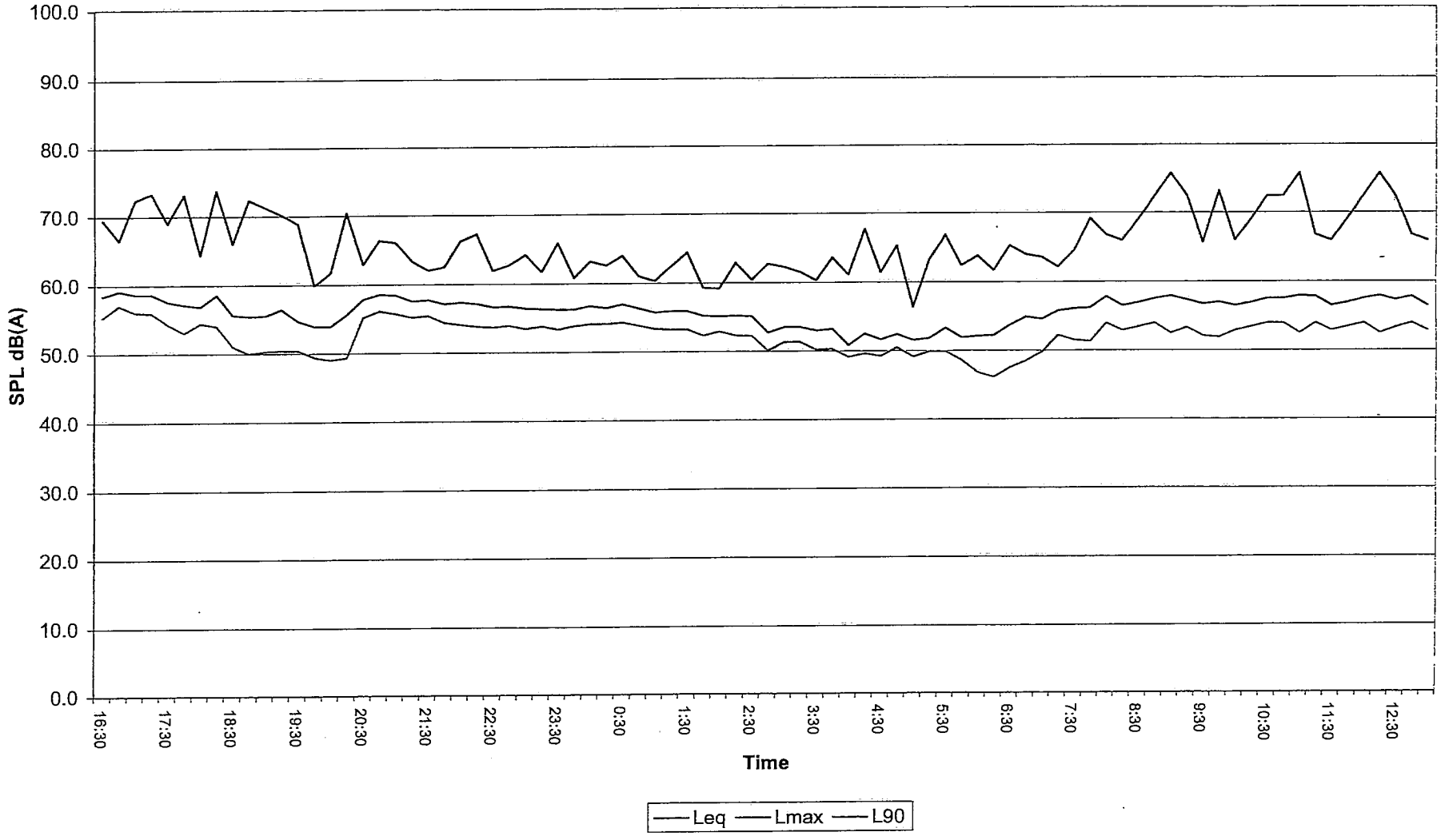


FIGURE 2
Background Noise Levels Measured On Site
August 7th to August 8th 2007



NB, Each data point represents a 15 minute sample period

Figure 2

Chapter 104, NOISE

[HISTORY: Adopted by the Board of Trustees of the Village of Muttontown 3-13-2000 by L.L. No. 2-2000. Amendments noted where applicable.]

GENERAL REFERENCES

Alarm systems -- See Ch. 11.
Animals -- See Ch. 15.
Auctions and sales -- See Ch. 24.
Firearms and weapons -- See Ch. 70.
Parades and exhibitions -- See Ch. 116.
Peace and good order -- See Ch. 120.
Peddling and soliciting -- See Ch. 123.

§ 104-1. Definitions.

As used in this chapter, the following terms shall have the meanings indicated:

ANIMAL -- Any dog, cat, bird, chicken, rooster, cow, sheep, horse or any other livestock or animal.

COMMERCIAL LANDSCAPER -- Any commercial gardener, landscaper, tree surgeon or other individual involved in a lawn or ground maintenance business.

CONSTRUCTION MACHINERY -- Any tractor, bulldozer, backhoe, earthmoving machine, cement mixer, crane or other similar construction machinery.

LANDSCAPING EQUIPMENT -- Any powered leaf blower, mower, chain saw, grinder, trimmer or other internal combustion engine apparatus or landscaping equipment used for lawn or ground maintenance.

LOUDSPEAKER -- Any radio or television set, musical instrument, phonograph, loudspeaker, sound amplifier or other machine or device for the producing or reproducing of sound.

MOTOR VEHICLE -- Any vehicle capable of being operated or driven upon a public highway which is propelled by any power other than muscular power, except electrically driven mobility assistance devices operated or driven by a person with a disability, fire and police vehicles and ambulance and other emergency vehicles. "Motor vehicle" shall exclude farm-type tractors and vehicles used exclusively for agricultural purposes, or ground maintenance, other than for hire.

NOISEMAKING DEVICE -- Any device of any design or manufacture that is designed to create unreasonable noise or designed for the purpose of scaring, frightening or disturbing a domestic animal or wildlife.

RECREATIONAL VEHICLE -- Any self-propelled vehicle which is primarily for off-highway operation or competitions and only incidentally operated on a public highway, such as, but not limited to, a go-cart, all-terrain vehicle, unlicensed motorcycle, motorbike or snowmobile.

UNREASONABLE NOISE -- Any loud, unnecessary, unusual or annoying, intermittent or prolonged noise which annoys, destroys, injures or endangers the comfort, repose, health, peace or safety of a reasonable person of normal sensitivity. Factors to be considered in determining whether a sound is an unreasonable noise may include, but are not limited to, the following:

A. The volume, intensity and nature of the noise.

B. The volume and intensity of the background noise, if any.

C. The time of day and duration of the noise.

VILLAGE -- The Incorporated Village of Muttontown and all territory within its boundaries.

§ 104-2. Unreasonable noise prohibited.

No person shall make or cause to be made or continued, nor shall any owner, lessee or occupant of any land in the village permit to be made or continued on his premises, any unreasonable noise within the village, except as permitted in Chapter 70 hereof relating to the regulation of firearms.

§ 104-3. Acts constituting unreasonable noise.

Without limiting the provision of § 104-2, the following acts are expressly declared to be unreasonable noise in violation of this chapter:

A. Horn and signaling device. The sounding of any horn or signaling device on any boat, motor vehicle or recreational vehicle, except as a danger or warning signal.

B. Loudspeaker for advertising or broadcasting. The playing, using, operating or permitting to be played, used or operated of any loudspeaker on a public street, public waterway or other public place for the purpose of advertising or broadcasting which is heard on private property, unless a permit therefor shall have been issued by the Board of Trustees.

C. Unnecessary amplification. The playing, using, operating or permitting to be played, used or operated of any loudspeaker at a volume level sufficient to cause the sound produced or reproduced to be audible at a point 10 feet beyond the property boundary line of the property from which the sound is produced or reproduced.

D. Animal.

(1) The keeping or allowing to be kept of any animal outdoors which causes unreasonable noise between the hours of 9:00 p.m. and 8:00 a.m. of the following morning.

(2) The keeping or allowing to be kept of any animal which creates or causes unreasonable noise that is continuous for a period exceeding 30 minutes in duration.

E. Exhaust. The discharge of the exhaust of any internal combustion engine without a muffler or other device which will effectively prevent unreasonable noises emanating therefrom.

F. Noisemaking device. The using, operating, discharging, installing or causing to be used, operated, discharged or installed of any noisemaking device.

G. Construction and operation of construction machinery. The construction, demolition, alteration or repair of any building and the operation of construction machinery at any time on Saturday, Sunday and New York State legal holidays and for all other days between the hours of 6:00 p.m. and 8:00 a.m. of the following morning, except pursuant to a permit issued by the Building Inspector or the Mayor in an emergency situation. Nothing herein shall be construed to prohibit minor alteration to a building which is entirely enclosed or the use of small power tools and machinery for the maintenance of a person's property. The operation of a generator for emergency purposes shall not be prohibited under any provision of this chapter.

H. Commercial landscaper. The use of any landscaping equipment by commercial landscapers at any time on Sunday and New York State legal holidays and for all other days between the hours of 6:00 p.m. and 8:00 a.m. of the following morning. In the A-3 (1/2 acre) Zoning District or any lot within 500 feet of the A-3 Zoning District, the use of landscaping equipment at any time on Saturday is also prohibited. The Mayor or designated representative is authorized to issue temporary permits to commercial landscapers to use landscaping equipment in emergency situations during prohibited hours.

I. Alarm. A burglar alarm or other alarm system of any building, motor vehicle, recreational vehicle or boat which is continuous and exceeds 15 minutes in duration.

J. Tires. The intentional use and operation of a motor vehicle or recreational vehicle in such a manner as to cause excessive squealing or other excessive noise of the tires.

K. Recreational vehicle.

(1) The continuous use or operation of any recreational vehicle on private or public property for a period exceeding 30 minutes.

(2) The use or operation of any recreational vehicle on private or public property at any time on Sunday and New York State legal holidays and for all other days between the hours of 6:00 p.m. and 8:00 a.m. the following morning, unless pursuant to a permit issued by the Board of Trustees.

§ 104-4. Enforcement.

Upon receipt of a complaint, the Police Department, Building Inspector or village representative shall conduct an investigation to determine if there is a probable violation of the provisions of this chapter. For the first occurrence, in lieu of issuing an appearance ticket, an appropriate warning may be issued to the violator to cease and desist from continuing such noise.

Unit Rating

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.104 (SN: 0873918)

1A	1B	1C	1D	2	3	4	5A	5B	5C	6A	6B	6C	7	8	9	10	11	12	13	14A	14B	15	16	17	18	19	20	21	22	23
R	M	-	0	2	5	-	8	-	0	-	B	B	0	2	-	2	4	4	:	0	0	0	0	-	0	0	0	-	B	D	E	-	0	0	0	-	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	B

Tag: RTU# 1

Job Information

Job Name:	Generic
Job Number:	Job #59
Site Altitude:	0 ft.
Refrigerant	R-410A

Unit Information

Approx. Op./Ship Weights:	2470 / 2470 lbs.
Supply CFM/ESP:	9000 / 0.45 in. wg.
Final Filter FV / Qty:	432.00 fpm / 6
Outside CFM:	2700
Ambient Temperature:	95 °F DB / 75 °F WB
Return Temperature:	75 °F DB / 62 °F WB

Static Pressure

External:	0.45 in. wg.
Evaporator:	0.65 in. wg.
Filters Clean:	0.20 in. wg.
Dirt Allowance	0.35 in. wg.
Economizer:	0.00 in. wg.
Heating:	0.21 in. wg.
Total:	1.86 in. wg.

Cooling Section

	Gross	Net
Total Capacity:	314.60	298.06 MBH
Sensible Capacity:	234.66	218.13 MBH
Latent Capacity:	79.94 MBH	
Mixed Air Temp:	80.00 °F DB	67.00 °F WB
Entering Air Temp:	80.00 °F DB	67.00 °F WB
Lv Air Temp (Coil):	55.37 °F DB	55.30 °F WB
Lv Air Temp (Unit)	57.05 °F DB	55.97 °F WB
Supply Air Fan:	1 x 245 @ 5.65 BHP	
SA Fan RPM / Watts:	1592 / 5.480*	
Evaporator Coil:	19.5 ft² / 6 Rows / 12 FPI	
Evaporator Face Velocity:	462.0 fpm	

Heating Section

PreHeat Type:	Std (No Preheat)
Heating Type:	Nat. Gas Heat
Heating CFM:	9000
Total Capacity:	218.7 MBH
OA Temp:	10.0 DB / 9.0°F WB
RA Temp:	75.0 °F DB / 62.0 °F WB
Entering Air Temp:	60.0 °F DB / 45.0 °F WB
Leaving Air Temp:	82.5 °F DB / 54.9 °F WB
Input:	270.0 MBH
Heater Qty:	1
Consumption:	270.0 MBH
Operation:	N/A

EER - ARI Listing Information

EER @ ARI Conditions: 11.1

Application EER @ Op. Conditions: 10.2

No ARI Rating Program Exists for Units Over 20 Tons

All AAON Units Are Tested In Accordance With ARI Standards

Electrical Data

Rating:	208/3/60
Unit FLA:	143
Minimum Circuit Amp:	155
Maximum Overcurrent:	200

	Qty	HP	VAC	Phase	RPM	FLA	RLA
Compressor 1:	2		208	3			48.1
Condenser Fans:	3	0.75	208	1	1075	5.4	
Supply Fan:	1	10.00	208	3	1760	30.8	
Combustion:	1	0.25	208	1	3200	1.7	

Cabinet Sound Power Levels*

Octave Bands:	63	125	250	500	1000	2000	4000	8000
Discharge LW(dB):	93	91	92	96	93	88	84	80
Return LW(dB):	79	78	76	71	72	69	63	56

*Sound power levels are given for informational purposes only. The sound levels are not guaranteed.